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Cultural adaptation and psychometric properties of the Selfitis Behavior Scale: cross-sectional study in Brazilian adolescents

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Abstract:

Objective: to translate, adapt, and identify the psychometric properties of the Selfitis Behavior Scale (SBS). Methods: online study conducted with 261 Brazilian adolescents. The translation and cross-cultural adaptation process followed international guidelines, resulting in an adequate scale with face, content and construct validity. Results: The five factors explained 78.2% of the total variance. Confirmatory factor analysis (structural equation model for latent variables) showed an adequate fit of the five-factor model with $\chi 2$= 2.42 p=0.001, GFI=0.92, AGFI= 0.89, NNFI= 0.92, TLI= 0.96, CFI= 0.93, RMSEA= 0.041. All factor loadings were statistically different from zero (0; t >1.96, p<0.05). The total internal consistency value by Cronbach's alpha and McDonald's omega was above 0.80 and the internal consistencies of each factor were above 0.79. Conclusion: This is the first Brazilian study to evaluate the psychometric properties of a selfie scale. The SBS proved to be a reliable and valid instrument to assess selfie behavior.

Key Words: Social Media use, Selfie-taking, Selfitis, Selfitis Behavior Scale, Psychometric Properties

Introduction

The various online activities, accessing websites, messenger apps, using social media, and Internet gaming, have become part of most people's daily lives, especially among adolescents and young adults (Lin et al., 2017; McLean et al., 2019). Given the emergence of social media platforms such as Facebook, Twitter, Instagram, Tik Tok, Snapchat, and others, there has been an increase in the number of studies investigating problematic social media use, dependence on this behavior, and its impact on people's lives (Alimoradi et al., 2019; Montag et al. 2015, 2017). However, assessing aspects of well-being and self-esteem in the face of social media use is rarely discussed in the literature, such as the behavior of taking selfies and sharing them on social media, especially among adolescents.

The American Psychiatric Association (APA) has officially confirmed that taking "selfies" is a mental disorder. The APA made this publication during its annual board meeting in Chicago (Vincent, 2014). The disorder has been termed selfitis, being defined as the desire to take pictures of oneself (body and/or face) via a smartphone and post them on social media (McLean et al., 2019). It is a worldwide phenomenon, especially among adolescents and young adults (Griffiths and Balakrishnan, 2018; Lin et al., 2019; McLean

et al., 2019). Selfitis behavior involves several actions among them preparing the image (staging), editing the image such as color and background changes, selecting the best image, posting the image, viewing and evaluating the amount of "likes" and comments made by others towards the posted image (Balakrishnan and Griffiths, 2017; McLean et al., 2019). About half of the 7.6 billion people in the world are on some form of social media, with an average of over 170 selfies per day (Kemp, 2018). This equates to 650 billion selfies per day worldwide. The practice is more widespread on some platforms than others. On Snapchat, for example, 74% of all images shared are selfies (Reilly et al., 2019).

As for population, studies indicate that adolescents are more active in posting selfies than young or older adults (Dhir et al., 2016; Baiocco et al., 2016), highlighting the need to evaluate the effects of selfie practices in this population.

Understanding and studies on selfie behavior are still limited, with a few studies, conducted mainly by Asian researchers, on the negative impacts of selfie behavior on psychological and physical health (Dokur et al., 2018; Pantic et al. 2017). The results of such studies showed that selfie behavior is possibly associated with narcissism, self-centered behavior, low self-esteem, loneliness, and depression. However, these studies did not use any psychometric instrument to assess the presence of such behaviors, and such results are seen only as possible inferences.

Adolescents and young adults post selfies on social media in search of popularity, recognition, and appreciation (McLean et al., 2019). In a study conducted by Chua & Chang (2016), adolescents described that peer recognition was the greatest motivation for sharing selfies, indicating that the amount and valence of feedback play a predominant role in self-esteem and feelings of acceptance. On the other hand, when a post does not receive the desired amount of "likes" or comments, it can result in impoverished feelings of well-being (Jong & Drummond, 2016). Young people's recognition of social media photo sharing and feelings of well-being highlights selfie practices as an important area of research. Increasing understanding about these effects on adolescents is particularly important, as adolescence is a significant period of identity development, self-image, and social interactions, all of which are likely to be impacted by selfie practices.

Considering that more and more adolescents and young adults engage in the behavior of taking selfies, Balakrishnan and Griffiths (2017) developed the Selfitis Behavior Scale (SBS), whose psychometric tests to assess the reliability and validity of the scale (exploratory factor analysis and internal consistency) were satisfactory when

assessed in a sample of Indian university students, as well as in a sample of university students from Iran and Afghanistan (Lin et al., 2019), a sample of Turkish university students (Ciplak & Atici, 2021), and in a sample of Italian university students (Monacis et al., 2020).

Although research indicates that selfie behavior can become an addiction (Kaur and Vig, 2016; Kela et al., 2017; Shah, 2015; Singh and Lippmann 2017; Griffiths and Balakrishnan, 2018) little is known about the impact, positive or negative, of this behavior. Furthermore, there are several instruments and studies developed in Brazil on problematic internet use and its impact on people's lives. However, to the best of our knowledge, there is no Brazilian study that addresses the behavior of taking selfies. We can infer that this lack of Brazilian studies on selfie behavior is due to the absence of an existing instrument validated for use in Brazil.

Therefore, the aim of this study was to perform the translation, cross-cultural adaptation and construct validation of the SBS to be used with Brazilian adolescents.

Method

Data were collected in 2 stages. First, the study started with a pilot sample consisting of 45 adolescents (mean age = 16, SD = 2) who were invited to participate in the online study via social media, WhatsApp contacts. After receiving approval from the research ethics committee of the Federal University of São Paulo (No. 4.526.802), the authors designed an online study using Google forms. The online study began with details of the study's purpose and requirements, followed by an informed consent form. If participants did not give their informed consent to participate, they could not complete the online study. The eligibility criterion was to be between 12 and 18 years of age and have account on any social network. This study (pilot version[n=45] and final version [n=261]) was developed in accordance with the Declaration of Helsinki as a statement of ethical principles for medical research involving human subjects.

For the second stage, in which a factor analysis was performed, 261 Brazilian adolescents participated (mean age = 16, SD = 2) who also expressed agreement with the study to then answer the SBS.

Procedure of Translation and Cross-Cultural Adaptation of the Selfitis Behavior Scale

After formally obtaining the authors who developed the SBS (Balakrishnan & Griffiths, 2017), we used the cross-cultural adaptation method proposed by Brislin (1970; 1973; 1980; 1986) in which four stages were part of the process: translation (and adaptation), semantic equivalence assessment, pilot study, and back-translation. We also used the universalist approach to cross-cultural adaptation of instruments, proposed by Herdman et al., 1997; Herdman et al., 1998) considered one of the most adequate for proposing a process that includes conceptual and item equivalence (which includes a broad literature review on the concepts that support the original scale and its applicability in the Brazilian context), semantic (capacity of the scale to maintain the original concept) and operational (which refers to the operational aspects involved in the application of the questionnaire, such as question format [if online or paper], mode of applicability [if self-completion or by interview]).

In the first stage, the original version of the questionnaire was translated into Brazilian Portuguese by the authors of this study who are fluent in English. The translation process included the general analysis of each item of the questionnaire, comparing it to the original English version. This correspondence transcends the literalness of the words, including more subtle aspects, such as the impact that a term may have on the cultural context of the target population. This comparative analysis between the versions (translated and original) is necessary because the literal correspondence of a term does not imply similar interpretations in different cultures (Giusti & Befi-Lopes, 2008). In this approach, there is the understanding that culture has a significant impact on the understanding of the variables, necessitating cross-cultural adaptation to ensure that the original objective of the scale is equally achieved when applied in the language in which it is being adapted (Herdman et al., 1998).

For the pilot study, it is recommended to test the translated and adapted questionnaire in a small portion of the target population, among 30 and 40 people at least, to assess possible difficulties in understanding the questionnaire. At this moment, the operational equivalence was also evaluated, referring to the operational aspects involved in the application of the questionnaire, such as the format of the questions [if online or paper] and the mode of applicability [if self-completion or by interview]. After the cross-cultural adaptation of the SBS, it was inserted into a virtual Google Forms platform and a link was created to be disseminated for data collection from the pilot sample consisting of 45 adolescents aged 12 to 18 years who, in addition to answering the questionnaire,

were asked to indicate how easy/difficult it was to understand each item and an open field for suggestions.

After this careful and detailed translation, adaptation, search for semantic equivalence, and application in a pilot sample, the version of the SBS for the Portuguese spoken in Brazil was back-translated into English by a professional fluent in Brazilian Portuguese, but whose mother tongue was English. The back-translation of the SBS was done blindly, that is, the professional who did the back-translation did not have access to the original questionnaire, nor did he have technical knowledge on the subject, as recommended in the literature (Beaton et al., 2000; Beaton et al., 2002; Beaton et al., 2007; Guillemin et al., 1993; Eremenco et al., 2005). The next step was to compare the original version with the back-translated version and assess whether the translated version maintained semantic and conceptual equivalence, i.e., whether the items retained the same conceptual meaning after translation. The review of the back-translation confers quality to the cross-cultural adaptation, especially the conceptual equivalence (Herdman et al., 1998). This comparison between the versions in search of possible discrepancies was performed by the committee of experts, who in the present study were the principal investigators. It was observed that there were no discrepancies between the original version and the translated and adapted version. After the comparison and evaluation between the versions, we sent the back-translated version to the original authors of the questionnaire to verify the equivalence of the items, which were considered excellent by the original authors, who reiterated the authorization to use the scale in Brazil.

Selfitis Behavior Scale (SBS)

The SBS is an instrument developed by Indian researchers (Balakrishnan and Griffiths, 2017) to assess behaviors related to taking selfies, called selfitis. In the original study developed by Balakrishnan and Griffiths (2017) conducted with 225 Indian university students (average age 20 years), an exploratory factor analysis was applied and six factors were identified: environmental enhancement, social competition, attention seeking, mood modification, self-confidence, subjective conformity. The SBS comprises 20 items that are rated using a five-point Likert scale (1 = strongly disagree and 5 = strongly agree), where higher scores indicate higher levels of selfie-taking behavior. Scores ranging from 20-40 indicates low selfitis behavior, 41 to 60 indicates mild selfitis behavior, 61 to 80 indicates moderate selfitis behavior and 81 to 100 indicates severe level on selfitis behavior.

As mentioned earlier, the exploratory factor analysis performed in the original study detected 6 factors, and of the 20 items, four items were related to the "environmental enhancement" and the "social competition" factors and three items in each of the remaining four factors, attention-seeking, mood modification, subjective conformity and self-confidence. The original instrument showed satisfactory internal consistencies in each of the six factors, with overall internal consistency 0.876 (Balakrishnan and Griffiths, 2017).

Brazilian validation of the Selfitis Behavior Scale (SBS)

Procedure and data analysis

Face validity assessment of the SBS was performed using the sample of the pilot application of the scale with the participation of 45 adolescents. This application of the scale was essential to assess face validity, which includes the understanding, clarity, and simplicity of the language used in the questionnaire (Campos et al., 2019).

Content validity was also assessed and represents the association of abstract concepts with observable and measurable indicators of the construct being assessed (Wynd et al., 2003). It also assesses the degree to which each scale item is relevant and representative of a specific construct for a particular purpose of assessing that construct (Haynes et al., 1995). It is a measure evaluated through factor analysis and also by the expert committee which, in this study, was composed of the authors of the study, in similarity to the study of Toledo Junior et al., 2018).

We also carried out construct validity, obtained through factor analysis with structural equation modeling, based on the application of the scale previously adapted and with face validity, in a sample of 261 Brazilian adolescents (age=16, SD=2).

In this study, we applied the exploratory factor analysis to assess the dimensionality of the scale in the Brazilian version, followed by the confirmatory factor analysis (structural equation model). We initially chose to use the exploratory factor analysis because the population in the present study (adolescents) had an age range different from the population in which the original instrument was validated (young adults). Therefore, it was necessary to investigate whether the dimensionality of the scale was maintained. The Kaiser-Meyer-Olkin (KMO) test and Barlett's test of sphericity were performed to confirm the adequacy and possible factoring of the data (Schumacker & Lomax, 1998). The principal components extraction method with Oblique rotation was

applied. The communalities were also evaluated to verify how much the variance (correlation) of each item was explained by each extracted factor.

MANOVA was applied to analyze the relationship between several response variables in relation to the construct and then ANOVA was performed to evaluate the mean results regarding the mean difference of the individual factors in the level of selfie intensity (low, mild, moderate and severe). We applied the calculation of the average variance extracted (AVE) which is one of the indicators that can be used to assess the quality of the structural model of a psychometric instrument (Hair et al., 2009; Fornell & Larcker, 1981). To this end, the AVE calculations were performed based on the parameters estimated through Structural Equation Modeling (SEM). The AVE represents the squared factor loading. In the SEM equation, the measurement error and the square of the factorial loadings are indicated in the same unit of measurement, therefore, the SEM represents the average proportion of the items' variance explained by the latent variable (or common factor between the items). Fornell and Larcker (1981) presented the AVE value equal to or greater than 0.50 as an indicator of adequate model fit. According to several researchers, it is possible to assess convergent validity through AVE and Cronbach's alpha (Fornell & Larcker, 1981; Pestana and Gageno, 2005; Hair et al., 2009). The use of AVE for convergent validity is growing in the scientific literature and can be easily verified in recent empirical research (Fock et al., 2013; Niclasen et al.,2013; Obasi et al., 2014). For the analysis of variance of the factors identified in the SBS, the four levels of selfitis were considered: 20-40 indicates low selfitis behavior, 41 to 60 indicates mild selfitis behavior, 61 to 80 indicates moderate selfitis behavior and 81 to 100 indicates severe level on selfitis behavior.

To evaluate the correlation between the SBS factors, Pearson's correlation analysis was performed.

To analyze internal consistency, Cronbach's alpha and McDonald's omega were used, with values greater than or equal to 0.70 considered acceptable, as well as corrected item-total correlation (Fornell & Larcker, 1981).

The exploratory and confirmatory factorial analyses and the average variance extracted were performed using the statistical software R – SEM (Structural Equation Models) package version 0.9-21 and for the other analyses the statistical package SPSS (Statistical Program for Social Sciences), version 20.0 was used.

Results

The sample was composed of 261 Brazilian adolescents (mean age=16 +/- SD=2) from Brazil, students from public schools (74%), 89% did not work, 66.5% lived with both parents, 73% were female gender and 81% had a B/C socioeconomic level.

The process of translation and cross-cultural adaptation was carried out in an adequate manner, prioritizing the semantic and conceptual equivalence of the items, confirmed by the back-translation of the scale, and the operational equivalence in which the scale was applied online (as in the studies by Balakrishnan and Griffiths 2017; Lin et al., 2019) with the same number of questions and the same response options. In the online study with the pilot sample, participants were asked to indicate how clear and understandable each item was, in addition to an open field for suggestions. After analyzing the answers regarding the scale's intelligibility, it was found that no suggestions were made to the scale's items, and that all participants mentioned that the questions were clear and easy to understand. Thus, the face validity of the scale was verified, in which no difficulties in understanding the items or suggestions for improving the scale were presented by the adolescent participants, confirming the adequacy of the cross-cultural adaptation. Based on this result, the scale was considered suitable for use in larger samples (Balakrishnan and Griffiths, 2017).

We performed the Kaiser-Meyer-Olkim (KMO) test= 0.803 and Bartlett's test of sphericity=0.89921; p=0.001 which concluded respectively the adequacy of the sample and readiness to factor the data (Hair et al., 2009; Kaiser & Rice, 1974, Tabachinich and Fidell, 2001). Table 1 presents the results of Exploratory Factor Analysis (EFA) on SBS conducted with the sample of 261 adolescents. Unlike the original version, the EFA found 5 factors and not 6, having been loaded in the same factor the items of "mood modification" and "self-confidence" factors which we entitled "mood and confidence". We observed eigenvalues ranging from 1.05 to 5.10 in each of the factors, being considered satisfactory (Hair et al., 2009). The five factors explained 78.3% of the total variance. According to the original study (Balakrishnan and Griffiths, 2017), at least three items converged on each factor, and this explains the homogeneity of the measure evaluated (Byrne, 2001).

Confirmatory factor analysis (structural equation model) showed an excellent fit $\chi 2$= 2.42, Goodness of Fit Index **(GFI)**= 0.92 (acceptable greater than or equal to 0.85), Adjusted for Degrees of Freedom **(AGFI)**= 0.89 (acceptable greater than or equal to 0.80), Bentler & Bonett's Non-Normed Fit Index **(NNFI)**=0. 92 (acceptable values close to 1), Tucker-Lewis Index **(TLI)**=0.96 (acceptable values close to 1), Bentler's

Comparative Fit Index **(CFI)**=0.93 (acceptable values greater than or equal to 0.90), Root Mean Square Error of Approximation **(RMSEA)**=0.041 (90% CI 0.034; 0.062) (acceptable values less than or equal to 0.08). All factor loadings were statistically different from zero (0; $t>1.96$, $p<0.05$). The acceptance values of the above rates were considered by Hair et al, (2009), Hatcher (1994), Hu & Bentler (1999) and Bowling (2005). The items of the five factors were loaded significantly by adopting as significant those equal or greater than 0.60, which also satisfies the necessary condition for the content validity of the scale (Nunnally, 1978), in which the items are evaluated on a single construct. The results of the assessed indices and content validity, confirmed by the correlation between the items in factor analysis; Pearson correlation and corrected item-total correlation confirm the content validity of the scale. These data demonstrated a good adequacy of the factor analysis data matrix. The observed communalities ranged from 0.61 to 0.89, the latter being observed in item 8 *"Taking selfie in different poses increases my social status"*, which accounted for 89% of the variance explained by the factors. High factor communalities (equal to or above 0.5) indicate that the principal components method extracted a large amount of variance from a particular item (Hair et al., 2009). The "environmental enhancement" factor had the least amount of variance explained (20.33%). The "subjective conformity", "mood and confidence", "attention seeking" and "social competition" factors accounted respectively for 78.22%, 67.88%, 52.34% and 38.94% of the variance explained for each factor (table 1).

Convergent validity tests whether the items in a scale, or the dimension of a multidimensional scale, converge to a single construct or dimension (Graver and Mentzer, 1999). In modelling by partial least squares (PLS), the convergent validity is shown by the average variance extracted (AVE), which computes the variance captured for each variable. The present study showed AVE values above 0.79 (environmental enhancement=0.81; social competition=0.79; attention seeking=0.83; mood and confidence= 0.85 and subjective conformity=0.79) which confirmed the convergent validity of the scale (Fornell e Larcker 1981; Sanches-Franco & Roldan, 2005; Balakrishnan e Griffiths, 2017) (table 1).

Pearson's correlation matrix was used to evaluate the degree of association between the factors. In general, values above 0.50 were observed among all factors. In some cases, a high correlation was verified, for example, "social competition" factor presented high correlations with the "attention seeking" (r=0.79), "mood and confidence" (r=0.80) and "subjective conformity"(r=0.81) factors. There was also a strong correlation

between the "attention seeking" and "subjective conformity" factor (0.80), the same for the "mood and confidence" and "subjective conformity" factor (r=0.82) (table 2).

Table 3 presents the corrected item-total correlation data and the internal consistency of the SBS assessed from Cronbach's Alpha (α) and McDonald's Omega (ω) coefficients, including their values if items were deleted. Overall, satisfactory levels of alpha and omega (between 0.60 and 0.89; Toledo Junior et al., 2018; Bowling, 2005; Tavakol & Dennick, 2011) were verified not only among the factors, but also among the SBS items. It is worth mentioning that the omega values were slightly higher than the alpha values, in some factors and items. The overall reliability of the scale was α=.80 and ω =.81. The individual reliability scores for each of the 5 factors in the α and ω rates were above 0.78. For some items, it was observed that the α and ω coefficients decreased if the items were deleted, indicating they were robust items and necessary for the reliability of the scale. The column "Corrected Item-Total Correlation" presents the correlations between each item and the total score of the scale. In general, these correlations should not be lower than 0.3 in order to have reliability. Items that do not correlate with the total decrease the reliability of the questionnaire. In the present study, values above 0.52 were observed, confirming the reliability of the scale (Hair et al., 2009).

The MANOVA indicated that the factors differ across the four selfitis's intensity levels (low, mild, moderate, severe) with the following rates: Wilks' λ= 0.421; f=39.32 (15.981); $p<0.001$). The average results concerning the mean difference of the individual factors at the intensity level (ANOVA) are shown in Table 4. The effect size was calculated with the partial eta-squared test ($\eta 2$) which showed moderate to large level of significance (Cohen, 1988). Among the factors, "attention seeking" was identified to differ widely across the four levels of selfie intensity, followed by "social competition," "mood and confidence," "subjective conformity" and "environmental enhancement" factors.

Table 5 presents the mean and standard deviation of the factors in relation to the selfitis's intensity levels. The means showed that participants with low selfitis's intensity level had the highest mean (3.39) in "environmental enhancement"; "mood and confidence" factor had the highest mean (3.21) for those with mild selfitis's intensity level; "subjective conformity" factor reached the highest mean (3.19) among those with moderate selfitis's intensity level; and "attention seeking" and "social competition" factors had the highest mean (4.02 and 3.45, respectively) among those with severe selfitis's

intensity level.

The appendix presents the items of the Brazilian version of the Selfitis Behavior Scale.

Discussion

The cross-cultural adaptation of a scale requires care so that equivalence is achieved between the original version and the translated and adapted version, paying attention to the adequacy of each country's context and being understandable to the target population. In the present study, we applied all international guidelines for a good quality of translation and cross-cultural adaptation of the SBS Brislin (1970; 1973; 1980; 1986), Beaton et al., 2007; Guillemin et al., (1993), Eremenco et al., (2005), Herdman et al., (1997) verifying face validity (verified by the pilot sample), content validity (verified by the experts committee, by factor analysis and corrected item-total correlation and Pearson correlation) and construct validity (by exploratory and confirmatory factor analysis).

As for construct validity, the exploratory factor analysis observed that the 20 items of the scale loaded on 5 factors, unlike the original study by Balakrishnan and Griffiths (2017) in which 6 factors were found. It is believed that possibly this difference is due to the number of factors between the original study and the present study refers to the sample difference, which in the original study was conducted with college students and in the present study was conducted with adolescents. Several authors have reported that adolescents are more active in their selfie posting than young adults or older, highlighting the need to evaluate the effects of selfie practices in this population (Dhir et al., 2016; Baiocco et al., 2016). In addition, one must consider the cultural aspects related to both countries (Brazil and India) that may have influenced the reduction of factors in the Brazilian version. In a study on the psychometric properties of the SBS conducted in countries such as Iran and Afghanistan (Lin et al., 2019), the SBS remained with 6 factors and good rates in the confirmatory factor analysis (CFA) model. The Italian version of the SBS, on the other hand, like the Brazilian version, also presented a model with 5 factors (Monacis et al., 2020). The "mood modification" and "self-confidence" factors, when grouped together and were called in this study as "mood and confidence" and showed satisfactory communalities (above 0.62).

It is worth mentioning that the original study found 6 factors by applying only the exploratory factor analysis (EFA), while in the present study, in addition to the EFA, we

also performed the CFA, with a good fit for structural equation models and good reliability evaluated by Cronbach's α and McDonald's ω coefficients.

In addition, the sample size meets the parameters required for more advanced statistical analyses (minimum of 200 participants) as suggested for confirmatory factor analysis (Watkins, 1989). The Structural Equation Model applied in the factor analysis, showed excellent fit, CFI (0.93), TLI (0.96), RMSEA (0.041), GIF (0.92), AGIF (0.89), NNFI (0.92). The Cronbach's α and McDonald's ω reliability of the factors and overall reliability of the scale proved quite satisfactory with coefficients above 0.80 (α) and 0.81 (ω), respectively (Bentlet, 1995)

Considering selfie behaviors levels (low, mild, moderate and severe) it was found that people who had low levels of selfie scored higher on the "environmental enhancement" factor. This factor demonstrates that people who engage in selfie behaviors feel privileged to connect to the environment through the selfie to create emotional memories, and associate the selfie with some environment (e.g. they always take selfies when they are with friends in some environment, or when they are in a bar, restaurant, or any other place, in order to record the moment) (Boursier & Manna, 2018; Kiprin, 2013).

It was observed that people who had mild selfitis level, scored higher on "mood and confidence" factor, which brings items that present the change in mood and self-confidence, from the selfie behavior. It is known that mood change, especially that which is for the better, along with a sense of self-confidence can reinforce the behavior, increasing the chances of addiction, as it activates the brain reward circuitry. In the present study, feeling good about taking selfies and viewing them privately before posting, increased the individual's self-confidence. In this regard, Tajuddin et al. (2013) highlights the positive relationship between self-confidence and positive mood (self-efficacy feeling). Meier & Gray (2013) assessed a sample of American adolescents, in relation to general Facebook use and found that higher amounts of Facebook photo postings, were related to feelings of self-confidence, while activities such as viewing friends' photos and visiting others' profiles, including commenting on friends' photos and unfollowing their photos, was related to a range of lower self-confidence indicators. Self-admiration can also lead to increased self-confidence, improved mood, and increased desire to take and post selfies (Boursier & Manna, 2018). However, it may be that the increase in self-confidence is mainly experienced online, during the posting of the selfie, which would also be something important to investigate. In the same vein, social media interaction via mobile digital devices seems to help many individuals overcome negative

mood states (McLean et al., 2019). This is corroborated by Khan & Imran (2019), who claim that selfie behavior is related to mood regulation.

Self-esteem is another behavior through which individuals can improve their mood state by improving their self-confidence, increasing the chances of taking and posting selfies. Furthermore, it is possible that selfie sharing is associated with higher self-confidence in circumstances where careful selfie selection has taken place, or where there is a high chance of positive feedback (Chang et al., 2019). While selfie posting may be associated with an improved sense of self-esteem and confidence, it appears that in the short-to-medium term, selfie posting may have more variable effects depending on the feedback received (Rosenthal-von der Puetten et al., 2019). More research is needed on the role of mood modification in selfitis, both on the positive and negative consequences of selfie and mood behavior. The present study showed that those who are still in the early stages of selfitis (mild levels), scored higher on the "mood and confidence" factor, meaning they are more vulnerable to feeling good and confident when posting selfies. In the same sense, those participants with moderate levels of selfitis scored higher on the "subjective conformity" factor. This factor explains the need to belong to the group. A need that, often at excessive levels, makes the individual subject themselves to anything to be accepted in an online group or to gain a "like" (McLean et al., 2019; Rosenthal-von der Puetten et al., 2019). Chua & Chang (2016) conducted a study with girls in Singapore and found that the need for acceptance by the online group was associated with self-esteem ratings and seeking positive feedback. In the present study, those in selfitis's moderate levels, exhibited higher need for acceptance than in the other groups. Furthermore, it was observed that the "subjective conformity" factor showed strong correlations with "social competition", "attention seeking", and "mood and confidence" factors. Such data allows us to infer that the greater the need for acceptance, the more competition is observed (e.g., taking selfies in different poses; posting selfies to receive more "likes"), the more attention-seeking is observed through attempts to increase popularity by posting selfies, and the more confident the subject feels when taking and posting selfies.

Among those with selfitis's severe levels, the scores were on "social competition" and "attention seeking" factors. The social competition can be related to numerous behaviors, from compulsive gambling to substance use (Balakrishnan and Griffiths (2017). In the present study, the "social competition" factor had the second highest mean (3.45) among the 5 factors, indicating it is one of the factors most related to selfitis's

severe behavior. That is, it seems that in selfitis's severe levels, sharing selfies, in different poses, waiting for "likes" and comments, and using image editing resources, are the most relevant aspects. The same for the "attention seeking" factor which achieved the highest average (4.02). People who score in this factor are those who are attention seekers on social networks, seek "likes" and positive feedbacks, seek to feel more popular, compete for attention, popularity and feedback, and invest time in editing images to be shared. Indeed, positive feedback to a post can reinforce self-confidence, fulfilling the individual's expectations (Boursier & Manna, 2018). It is worth noting that attention seeking can also be a narcissistic component (Khan & Imran, 2019; McCain et al., 2016). According to Gnambs (2017) there is a solid positive relationship between self-promoting selfies shared on social media and levels of narcissism. In other words, "attention seeking" is a factor that has been shown to be quite associated with selfitis's severe levels, corroborating the studies conducted by Balakrishnan and Griffiths (2017) and Seidman (2013). According to Haggard (2014) people are more concerned with showing the moment being lived than actually living it, as in a constant search for attention.

The results of the present study showed that the SCS is a useful scale in the assessment of selfie-taking behavior, which represents a new area within studies on the use of digital technologies. Since this is the first Brazilian study on selfie-taking behavior, it brings an addition to the literature on disorders related to the use of digital technologies and/or media. In addition to the psychological consequences of selfie-taking behavior (which can be positive or negative), this study provides insights for further studies to evaluate the concept further and in different contexts and with different populations. Further research is needed on the role in the acquisition, development, and maintenance of selfiitis behavior, including personality traits, motivations, cognition, and attitudes.

It is worth mentioning that so far there are few studies on selfie behavior and especially on selfie addiction, and most of what has been published academically (both theoretical studies and empirical research) are from researchers in India. This is because India and other Asian countries are countries that have more social media users (Lamba et al., 2016).

The main limitations of the study refer to the fact that the sample is not representative of Brazilian adolescents and was conducted only with adolescents. In this sense, studies with larger samples and with different age groups and genders is recommended. Although the present study used several criteria to examine the content validity of the SBS, no gold standard is available to thoroughly verify the concept.

This study has contributed to the scientific debate about the psychological functions and attitudes implicit in selfie behavior, as well as the possible motivations behind this practice. Furthermore, the results of the present study demonstrate that the SBS is a reliable and valid scale for assessing selfitis.

References

Alimoradi, Z., Lin, C.Y., Imani, V., Griffiths, M. D., & Pakpour, A. H. (2019). Social media addiction and sexual dysfunction among Iranian women: The mediating role of intimacy and social support. Journal of Behavioral Addictions. Advance online publication. https://doi.org/10.1556/2006.8.2019.24.

Baiocco, R., Chirumbolo, A., Bianchi, D., Ioverno, S., Morelli, M., Nappa, M.R. (2016). How HEXACO personality traits predict different selfie-posting behaviors among adolescents and young adults. Front Psychol, 7:2080.

Balakrishnan, J., Griffiths, M.D. (2017). An exploratory study of "selfitis" and development of the Selfitis Behavior Scale. Int J Ment Health Addiction, 29. https://doi.org/10.1007/s11469-017-9844-x.

Beaton, D.E., Bombardier, C., Guillemin, F., Ferraz, M.B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. Spine (Phila Pa 1976); 25:3186. http://dx.doi.org/10.1097/00007632-200012150- 00014.

Beaton, D., Bombardier, C., Guillemin, F., Ferraz, B.M. (2002). Recommendations for the cross-cultural adaptation of health status measures. Illinois: American Academy of Orthopedic Surgeons, Institute for Work & Health.

Beaton, D., Bombardier, C., Guillemin, F., Ferraz, M.B. (2007). Recommendations for the cross-cultural adaptation of the DASH & QuickDASH outcome measures. Toronto: Institute for Work & Health;

Bentlet, P.M. (1995). Structural Equations program. Manual. Encino, California: Multivariate Software Inc.

Boursier, V., Manna, V. (2018). Selfie expectancies among adolescents: construction e validation of an instrument to assess expectancies toward selfies among boys and girls. Front Psychol. 2018;9(839). https://doi:10.3389/fpsyg.2018.00839

Bowling, A. (2005). Measuring health: a review of quality of life measurement scales. 3rd ed. Berkshire: Open University Press.

Brislin, R.W. (1970). Back-translation for cross-cultural research. J Cross-Cult Psychol.1(3):185-216.

Brislin, R.W, Lonner, W.J, Thorndike, R.M. (1973). Cross-cultural research method. New York: Wiley.

Brislin, R.W. (1980.) Handbook of cross-cultural psychology: methodology. Boston: Allyn e Bacon.

Brislin, R.W. (1986). The wording and translation of research instruments. In: Berry J.W. Field methods in cross-cultural research. Beverly Hills: Sage Publications, p. 137-64.

Byrne, B. M. (2001). Structural equation modeling with AMOS: Basic concepts, applications, and programming. Mahwah: Lawrence Erlbaum Associates.

Campos, L.C.B., Ossada, V.A.Y., Costa, V.Z., Cruz, D.M.C. (2019). Adaptação transcultural e validade face do Wheelchair Skills Test Questionnaire (versão 4.3) para cuidadores. Cad. Bras. Ter. Ocup., São Carlos, 27 (1): 17-26. https://doi.org/10.4322/2526-8910.ctoAO1594

Chang, L., Li, P., Loh, R.S.M., Chua, T.H.H. (2019). A study of Singapore adolescent girls' selfie practices, peer appearance comparisons, and body esteem on Instagram. Body Image. 29:90–99. https://doi:10.1016/j. bodyim.2019.03.005

Chua, T.H.H., Chang, L. (2016). Follow me and like my beautiful selfies: Singapore teenage girls' engagement in self-presentation and peer comparison on social media. Comput Human Behav. 55(Part A):190–197. https://doi:10.1016/j.chb.2015.09.011

Ciplak, E., Atici, M. (2021). The selfitis Behavior Scale: an adaption study. European Journal of Education Sciences 8(2). http://dx.doi.org/10.19044/ejes.v8no2a29

Cohen, J. A. (1988). Statistical Power Analysis for the Behavioral Sciences. Hillsdale, NJ: Lawrence Erlbaum Associates.

Dhir, A., Pallesen, S., Torsheim, T., Ereassen, C.S. (2016). Do age and gender differences exist in selfie-related behaviours? Comput Human Behav. 63(Supplement C):549–555. https://doi:10.1016/j.chb.2016.05.053

Dokur, M., Petekkaya, E., & Karadag, M. (2018). Media-based clinical research on selfie-related injuries and deaths. Ulusal travma ve acil cerrahi dergisi [Turkish Journal of Trauma and Emergency Surgery], 24(2), 129–135. https://doi.org/10.5505/tjtes.2017.83103.

Eremenco, S.L., Cella, D., Arnold, B.J. (2005). A comprehensive method for the translation and cross-cultural validation of health status questionnaires. Eval Health Prof. 28(2):212-32. http://dx.doi.org/10.1177/0163278705275342

Fock, H., Hui, M. K., Au, K., & Bond, M. H. (2013). Moderation effects of power distance on the relationship between types of empowerment and employee satisfaction. Journal of Cross-Cultural Psychology, 44(2), 281–298. http://doi:10.1177/0022022112443415

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39–50.

Giusti, E., Befi-Lopes, D.M. (2008) Tradução e adaptação transcultural de instrumentos estrangeiros para o Português Brasileiro (PB). Pró-Fono Revista de Atualização Científica; 20(3):207-10.

Gnambs, T. & Appel, M. (2017). Narcissism and Social Networking Behavior: A Meta-Analysis. Journal of Personality, 4 (4).

Graver, M. & Mentzer, J. T. (1999) Logistic research methods: employing structural equation modeling test for construct validity. Journal of Business Logistics, 20(1), 33- 57.

Griffiths, M. D., & Balakrishnan, J. (2018). The psychosocial impact of excessive selfie-taking in youth: A brief overview. Education and Health, 36(1), 3–5.https://www.researchgate.net/publication/322696268

Guillemin, F., Bombardier, C., Beaton, D. (1993). Cross-cultural adaptation of health- related quality of life measures: literature review and proposed guidelines. J Clin Epidemiol. 46(12):1417-32. http://dx.doi.org/10.1016/0895- 4356(93)90142-N.

Haggard, K.M. (2014). Selfie culture and social networks. Selfie Culture. http://people.ucsc.edu/selfieculture~k mhaggar/Assignment4.pdf

Hair, Jr., Black, W.C., Babin, B.J, Eerson, R.E., Tatham, R.L. (2009). Análise multivariada de dados. 6ed. Porto Alegre; 688 p

Hatcher L. (1994). A step-by-step approach to using the SAS system for factor analysis and structural equation modeling. Cary, NC: SAS Institute Inc; ,588 p.

Haynes, S.N., Richard, D.C.S., Kubany, E.S. (1995). Content validity in psychological assessment: a functional approach to concepts and methods. Psychol Assess, 7(3):238-247.

Herdman, M., Fox-Rushby, J., Badia, X. (1997). 'Equivalence' and the translation and adaptation of health-related quality of life questionnaires. Qual Life Res. 6(3):237-47.

Herdman, M., Fox-Rushby, J., Badia, X. (1998). A model of equivalence in the cultural adaptation of HRQoL instruments: the universalist approach. Qual Life Res. 7(4):323-35. http://dx.doi.org/10.1023/A:1008846618880.

Hu, L., Bentler, P.M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equ Model Multidiscip J. 6:1-55.

Jong, S.T., Drummond, M.J.N. (2016). Hurry up and 'like' me: immediate feedback on social networking sites and the impact on adolescent girls. Asia-Pacific J Health Sport Phys Educ. 7(3):251–267. https://doi:10.1080/18377122.2016.1222647

Kaiser, H. F.; Rice, J. (1974). Little Jiffy, mark IV. Educational e Psychological Measurement, n. 34, p. 111-117.

Kaur, S., & Vig, D. (2016). Selfie and mental health issues: An overview. Indian Journal Health Wellbeing, 7(12), 1149–1152.

Kela, R., Khan, N., Saraswat, R., & Amin, B. (2017). Selfie: Enjoyment or addiction? Journal of Medical Science and Clinical Research, 5,15836–15840. https://doi.org/10.18535/jmscr/v5i1.96.

Khan, M.A., Imran, I. (2019). Dark triad personality, body concern, emotional intelligence and selfitis behavior among students. Journal of Research e Reviews in Social Sciences Pakistan 2(2): 424-439.

Kemp, S. (2018). Digitalin 2018: world's internet users pass the 4 billion mark. We Are Social: Special Reports. https://wearesocial.com/uk/blog/2018/01/ global-digital-report-2018.

Kiprin, B. (2013). Go Selfie Yourself. Available at: https://borislavkiprin.com/2013/ 12/13/go- selfie- yourself/

Lamba, H., Bharadwaj, V., Vachher, M., Agarwal, D., Arora, M., Kumaraguru, P. (2016). Me, myself and my killfie: characterizing and preventing selfie deaths. http://doi/10.475/123_4

Lin, C.Y., Lin, C.K., Imai, V., Griffiths, M.D., Pakpour, A.H. (2019). Evaluation of Selfitis Behavior Scale across two Persian-speaking countries, Iran and Afghanistan:

advanced psychometric testing in a large-scale sample. International Journal of Mental Health and Addiction, 19. https://doi.org/10.1007/s11469-019-00124-y

Lin, C. Y., Broström, A., Nilsen, P., Griffiths, M. D., & Pakpour, A. H. (2017). Psychometric validation of the Persian Bergen Social Media Addiction Scale using classic test theory and Rasch models. Journal of Behavioral Addictions, 6, 620–629. https://doi.org/10.1556/2006.6.2017.071.

McCain, J.L, Borg, Z.G, Rothemberg, A.H, Churillo, K.M, Weiler, P., Campbell, W.K. (2016). Personality and selfies: narcissism and the dark triad. Computers in Human Behavior, 64: 126-133. http://dx.doi.org/10.1016/j.chb.2016.06.050

McLean, S.A., Jarman, H.K., Rodgers, R.F. (2019). How do "sefies" impact adolescents'well-being e body confidence? A narrative review. Psychology Research and Behavior Management, 12:513-521. http://doi.org/10.2147/PRBM.S177834

Meier, E.P, Gray J. (2013) Facebook photo activity associated with body image disturbance in adolescent girls. Cyberpsychol Behav Soc Netw.16:16. http://doi:10.1089/cyber.2012.0411

Monacis, l., Griffitihs, M.D, Limone, P., Sinatra, M., Servidio, R. (2020). Selfitis Behavior: assessing the italian version of the Selfitis Beahavior Scale and Its mediating role in the relationship of dark traits with social media addiction. International Journal of Environmental Research and Public Health, 17, 5738. http://doi:10.3390/ijerph17165738

Montag, C., Błaszkiewicz, K., Sariyska, R., Lachmann, B., Eone, I., Trendafilov, B., et al. (2015). Smartphone usage in the 21st century: Who is active on WhatsApp? BMC Research Notes, 8, 331. https://doi. org/10.1186/s13104-015-1280-z

Montag, C., Markowetz, A., Blaszkiewicz, K., Eone, I., Lachmann, B., Sariyska, R., Trendafilov, B., Eibes, M., Kolb, J., Reuter, M., Weber, B., & Markett, S. (2017). Facebook usage on smartphones and gray matter volume of the nucleus accumbens. Behavioural Brain Research, 329, 221–228. https://doi.org/10.1016/j. bbr.2017.04.035.

Niclasen, J., Skovgaard, A. M., Andersen, A.M. N., Somhovd, M. J., & Obel, C. (2013). A confirmatory approach to examining the factor structure of the Strengths and Difficulties Questionnaire (SDQ): A large scale cohort study. Journal of Abnormal Child Psychology, 41(3), 355–365. http://doi. org/10.1007/s10802-012-9683-y

Nunnally, J. C. (1978). Psychometric theory. New York: McGraw-Hill.

Obasi, C. N., Brown, R. L., & Barrett, B. P. (2014). Item reduction of the Wisconsin Upper Respiratory Symptom Survey (WURSS-21) leads to the WURSS-11. Quality of Life Research*, 23*(4), 1293–1298. http://doi.org/10.1007/s11136- 013-0561-z

Pantic, I., Milanovic, A., Loboda, B., Błachnio, A., Przepiorka, A., Nesic, D., Mazic, S., Dugalic, S., & Ristic, S. (2017). Association between physiological oscillations in self-esteem, narcissism and internet addiction: A cross-sectional study. Psychiatry Research, 258, 239–243. https://doi.org/10.1016/j.psychres.2017.08.044.

Pestana, M. H.; Gageiro, J. N. (2005). *Análise de dados para ciências sociais*: a complementariedade do SPSS. 4o ed. Edições Sílabo: Lisboa.

Reilly, M,J., Parsa, K.M., Biel, M. (2019). Is there a selfie epidemic? JAMA Facial Plastic Surgery. http:// doi:10.1001/jamafacial.2019.0419

Rosenthal-von der Puetten A.M, Hastall M.R, Koecher S, et al. (2019) “Likes” as social rewards: their role in online social comparison and decisions to like other people’s selfies. Comput Human Behav. 92:76–86. http://doi:10.1016/j.chb.2018.10.017

Sánchez-Franco, M. J., & Roldán, J. L. (2005). Web acceptance and usage model: a comparison between goal-directed and experiential web users. Internet Research, 15(1), 21–48.

Schumacker, R. E., & Lomax, R. G. (1998). A beginner's guide to structural equation modeling. Mahwah, NJ: Erlbaum.

Seidman, G. (2013). Self-presentation e belonging on Facebook: how personality influences social media use and motivations. Personality e Individual Differences, 54(3), 402–407.

Shah, P. M. (2015). Selfie: a new generation addiction disorder—Literature review and updates. International Journal of Emergency Mental Health and Human Resilience, 17, 602.

Singh, D., & Lippmann, S. (2017). Selfie addiction. Internet and Psychiatry. https://www. internetepsychiatry.com/wp/editorials/selfie-addiction/

Tabachnick, B. G. & Fidell, L. S. (2001). Using Multivariate Statistics, Fourth Edition. Needham Heights, MA: Allyn & Bacon Editors.

Tajuddin, J. M., Hassan, N. A., & Ahmad, R. (2013). Social media usage among university students: a study on selfie and its impacts. Global Journal of Business and Social Science Review, 1(1), 124–132.

Tavakol, M., Dennick, R. (2011). Making sense of Cronbach’s alpha. Int J Med Educ 2:53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Toledo Júnior, A., Duca, J.G.M., Coury, M.I.F. (2018). Tradução e Adaptação Transcultural da Versão Brasileira do Schutte Self-Report Emotional Intelligence Test. Revista Brasileira de Educação Médica 42(4):109-114. http://dx.doi.org/10.1590/1981-52712015v42n4RB20180102

Vincent, J. (2014). American Psychiatric Association makes it official: ‘Selfie’ a mental disorder. Adobo Chronicles, March 31. https://adobochronicles.com/2014/03/31/american-psychiatric-association-makes-it-official-selfie-a-mental-disorder/.

Watkins, D. (1989). The role of confirmatory factor analysis in cross-cultural research. International Journal of Psychology, 24, 685-701.

Wynd, C.A, Schmidt, B, Schaefer, M.A. (2003). Two quantitative approaches for estimating content validity. West J Nurs Res 25(5):508-518.

DECLARATIONS

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Conflict of interest statements

The authors Pedro Henrique Ribeiro, Richard Alecsander Reichert, André Luiz Monezi Andrade, Adriana Scatena and Denise De Micheli declare that they have no conflict of interest.

Informed Consent

Informed consent: Informed consent was obtained from all individual participants included in the study. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975. This study had the approval of the research ethics committee of Universidade Federal de São Paulo (No. 4.526.802).

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Table 1. Results of the Exploratory Factor Analysis of SBS and communalities (h2) (n=261).

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	
	Environmental Enhancement	Social Competition	Attention Seeking	Mood and confidence	Subjective conformity	h^2
	loading	loading	loading	loading	loading	
Item 1	**.70**	.12	.05	.12	.06	**0.61**
Item 7	**.71**	.12	.23	.11	.34	**0.63**
Item 13	**.67**	.14	.11	-.09	.26	**0.63**
Item 19	**.73**	.22	.09	-.07	.42	**0.61**
Item 2	.20	**.70**	.11	.05	-.09	**0.65**
Item 8	.11	**.70**	.20	.12	.32	**0.89**
Item 14	.10	**.69**	.05	.20	.22	**0.79**
Item 20	.22	**.79**	.11	.22	.34	**0.76**
Item 3	.18	.01	**.71**	.13	.34	**0.70**
Item 9	.13	.09	**.79**	.14	.20	**0.77**
Item 15	.17	.01	**.80**	.16	.10	**0.77**
Item 4	.12	.11	.19	**.79**	.05	**0.62**
Item 10	.10	.13	.15	**.71**	.20	**0.69**
Item 16	.15	.12	.10	**.75**	.15	**0.64**
Item 5	.16	.09	.18	**.63**	.11	**0.70**
Item 11	-.01	-.11	.10	**.86**	.36	**0.65**
Item 17	.12	.01	.28	**.69**	.22	**0.70**
Item 6	.12	.11	-.06	0.9	**.82**	**0.74**
Item 12	.10	.16	.20	.11	**.79**	**0.70**
Item 18	-.11	.22	.30	.27	**.80**	**0.77**
Variance (%)	20.33	18.61	13.39	15.54	10.34	
Cumulative Variance (%)	20.33	38.94	52.34	67.88	78.22	
Eigenvalues	5.10	3.21	1.05	3.33	1.33	
AVE	0.81	0.79	0.83	0.85	0.79	

KMO= 0.803; **Bartlett's of sphericity** = 0.89921; Significance p<.001

AVE= average variance extracted

Extration method: principal component analysis; **rotation method:** Oblimin with Kaiser normalization.

Note: the value in bold represent the highest loadings for respective factors and significative communalities (<.50)

Table 2. Pearson's correlation matrix among SBS factors (n=261)

Factors	1	2	3	4	5

Environmental enhancement (1)	**1**				
Social Competition (2)	0.67	**1**			
Attention seeking (3)	0.59	0.79	**1**		
Mood and confidence (4)	0.60	0.80	0.57	**1**	
Subjective conformity (5)	0.57	0.81	0.80	0.82	**1**

Table 3. Corrected Item-total correlation and Internal Consistency (Alpha and omega) of the SBS and its factors (n=261)

Items	Corrected Item-total correlation	Cronbach's α	McDonald's ω	α if item deleted	ω if item deleted
Factor 1: Environmental enhancement		**0.80**	**0.81**	**0.79**	**0.79**
Item 1. Taking selfies gives me a good feeling to better enjoy my environment	**0.61**	0.81	0.79	0.80	0.79
Item 7. I am able to express myself more in my environment through selfies	**0.61**	0.82	0.83	0.81	0.80
Item 13. Taking selfies provides better memories about the occasion and the experience	**0.63**	0.70	0.75	0.70	0.74
Item 19. I take selfies as trophies for future memories	**0.69**	0.80	0.79	0.79	0.78
Factor 2: Social Competition		**0.81**	**0.82**	**0.80**	**0.80**
Item 2. Sharing my selfies creates healthy competition with my friends and colleagues	**0.60**	0.79	0.81	0.79	0.83
Item 8. Taking different selfie poses helps increase my social status	**0.80**	0.80	0.86	0.70*	0.74*
Item 14. I post frequent selfies to get more "likes" and comments on social media	**0.81**	0.81	0.85	0.70*	0.71*
Item 20. I use photo editing tools to enhance my selfie to look better than others	**0.80**	0.81	0.84	0.75*	0.76*
Factor 3: Attention seeking		**0.78**	**0.81**	**0.71***	**0.75***
Item 3. I gain enormous attention by sharing my selfies on social media	**0.75**	0.81	0.89	0.75*	0.76*
Item 9. I feel more popular when I post my selfies on social media	**0.79**	0.77	0.83	0.73*	0.76*
Item 15. By posting selfies, I expect my friends to appraise me	**0.80**	0.80	0.85	0.72*	0.75*
Factor 4: Mood and confidence		**0.79**	**0.85**	**0.78**	**0.84**
Item 4. I am able to reduce my stress level by taking selfies	**0.60**	0.65	0.68	0.66	0.68
Item 10. Taking more selfies improves my mood and makes me feel happy	**0.61**	0.70	0.75	0.72	0.76
Item 16. Taking selfies instantly modifies my mood	**0.60**	0.65	0.70	0.70*	0.76*
Item 5. I feel confident when I take a selfie	**0.55**	0.78	0.78	0.78	0.79
Item 11. I become more positive about myself when I take selfies	**0.55**	0.77	0.77	0.76	0.75
Item 17. I take more selfies and look at them privately to increase my confidence	**0.61**	0.79	0.85	0.74*	0.70*
Factor 5: Subjective conformity		**0.79**	**0.80**	**0.78**	**0.80**
Item 6. I gain more acceptance among my peer group when I take selfie and share it on social media	**0.68**	0.79	0.79	0.71*	0.75*
Item 12. I become a strong member of my peer group through posting selfies	**0.55**	0.61	0.69	0.62	0.69
Item 18. When I don't take selfies, I feel detached from my peer group	**0.52**	0.60	0.65	0.63	0.67

Overall	**0.80**	**0.81**	**0.78**	**0.79**

* *Significant change in reliability if deleted item*

Table 4. Analysis of Variance of the identified factors in SBS (n=261)

Dependent variable	mean	*F*	sig.	Partial eta square (η^2)
Environmental enhancement	3.04	9.442	.005	0.078*
Social competition	3.79	65.934	.001	0.120*
Attention seeking	3.07	70.347	.001	0.221*
Mood and confidence	3.61	45.856	.001	0.110*
Subjective conformity	3.11	15.327	.001	0.099*

significant effect size

[η^2=0.01 mean small effect]
[η^2 equal to 0.06 mean medium effect]
[η^2equal to 0.14 mean large effect]

Table 5. Analysis of variance of the factors identified in the SBS, considering the four levels of selfitis (n=261)

Dependent variable	Low level		Mild level		Moderate level		Severe level	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Environmental enhancement	**3.39***	**0.42**	2.30	0.50	2.79	0.52	2.41	0.89
Social competition	2.01	0.69	2.58	0.61	2.90	0.74	**3.45***	**0.77**
Attention seeking	3.01	0.76	2.70	0.23	2.49	0.53	**4.02***	**0.63**
Mood and confidence	3.05	0.83	**3.21***	**0.55**	2.10	0.89	2.95	0.89
Subjective conformity	2.37	0.80	2.37	0.76	**3.19***	**0.77**	2.22	0.77

significative means

Appendix. Brazilian Version of the Selfitis Behavior Scale

Itens
1. Tirar selfies me dá uma boa sensação de estar aproveitando o ambiente a minha volta
2. Compartilhar minhas selfies cria uma competição saudável com meus amigos e colegas
3. Eu ganho muita atenção ao compartilhar minhas selfies nas redes sociais.
4. Meu nível de estresse diminui quando eu tiro em selfies.
5. Eu me sinto confiante quando tiro e posto selfie
6. Eu ganho mais aceitação do meu grupo de amigos quando tiro e compartilho selfie em redes sociais.
7. Me expresso melhor em um ambiente por meio de selfies.
8. Tirar selfie em diferentes poses ajuda a aumentar meu status social.
9. Eu me sinto mais popular quando posto minhas selfies nas redes sociais.
10. Tirar selfies melhora meu humor e me deixa feliz.
11. Eu me torno mais positivo sobre mim mesmo quando tiro/compartilho selfies.
12. Ao postar selfies eu me sinto membro importante do meu grupo de amigos.
13. Quando tiro selfies tenho melhor lembrança sobre a experiência e a ocasião vivida.
14. Eu posto selfies para receber mais 'curtidas' e comentários nas redes sociais.
15. Ao postar selfies, espero que meus amigos apreciem e comentem.
16. Tirar e compartilhar selfies, instantaneamente, modifica meu humor.
17. Eu tiro selfies e as vejo em particular antes de postar, para aumentar minha confiança.
18. Quando não tiro selfies, me sinto distante do meu grupo de amigos.
19. Eu tiro selfies para me lembrar do momento por mais tempo.
20. Eu uso recursos de edição de fotos para melhorar minha selfie e parecer melhor que outras.

Scoring: Responses are rated on a 5 point Likert scale: (5 = strongly agree; 4 = Agree; 3 = Neither Agree or Disagree; 2 = Disagree; 1 = Strongly Disagree). Scores are summed. The higher the score, the greater the likelihood of selfitis.

Items 1, 7, 13 and 19 relate to environmental enhancement factor; Items 2, 8, 14 and 20 relate to social competition factor; Items 3, 9 and 15 relate to attention seeking factor; Items 4, 10, 16, 5, 11, 17 relate to mood and confidence; Items 6, 12 and 18 relate to subjective conformity factor.

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