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SEÇÃO: ARTIGO

Exploring the relationship between body image measures and social connectedness

Explorando a relação entre medidas de imagem corporal e conexão social

Explorando la relación entre las medidas de la imagen corporal y la conexión social

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Abstract: The present study examined the effects of body image flexibility (one's acceptance of negative body image experiences) and body image dissatisfaction on social connectedness (SC). The sample consisted of 235 university students. A robust path analysis model revealed that body image flexibility predicted SC only when mediated by self-compassion and depression while sex (i.e., being female) had a direct effect on social connectedness. Body image dissatisfaction was not a significant predictor of SC but predicted BMI. This study contains relevant information regarding the associations between body image and SC given that the results were obtained while controlling for relevant covariates. The data presented here suggest that body image flexibility relates to SC in women with lower depression symptoms or high self-compassion.

Keywords: body image flexibility, body image dissatisfaction, self-compassion, depression symptoms, social connectedness

Resumo: O presente estudo examinou os efeitos da flexibilidade da imagem corporal (aceitação de experiências de imagem corporal negativa) e da insatisfação com a imagem corporal na conexão social (CS). A amostra foi composta por 235 estudantes universitários. Um modelo de *path analysis* robusto revelou que a flexibilidade da imagem corporal predisse CS apenas quando mediada por autocompaixão e depressão, enquanto o sexo (e.g. feminino) teve um efeito direto na conexão social. A insatisfação com a imagem corporal não foi um preditor significativo de CS, mas previu o IMC. Este estudo contém informações relevantes sobre as associações entre imagem corporal e CS, uma vez que os resultados foram obtidos controlando as covariáveis relevantes. Os dados apresentados aqui sugerem que a flexibilidade da imagem corporal está relacionada à CS em mulheres com menos sintomas de depressão ou alta autocompaixão.

Palavras-chave: flexibilidade da imagem corporal, insatisfação com a imagem corporal, autocompaixão, sintomas de depressão, conexão social

Resumen: El presente estudio examinó los efectos de la flexibilidad de la imagen corporal (la aceptación de las experiencias negativas de la imagen corporal) y la insatisfacción con la imagen corporal en la conexión social (CS). La muestra estuvo formada por 235 estudiantes universitarios. Un modelo de análisis de trayectoria robusto reveló que la flexibilidad de la imagen corporal predijo la CS solo cuando estaba mediada por la autocompasión y la depresión, mientras que el sexo (es decir, ser mujer) tenía un efecto directo en la conexión social. La insatisfacción con la imagen corporal no fue un predictor significativo de CS, pero predijo el IMC. Este estudio contiene información relevante sobre las asociaciones entre la imagen corporal y la CS, dado que los resultados se obtuvieron controlando las covariables relevantes. Los datos presentados aquí sugieren que la flexibilidad de la imagen corporal se relaciona con la CS en mujeres con síntomas de depresión más bajos o alta autocompasión.

Palabras clave: flexibilidad de la imagen corporal, insatisfacción con la imagen corporal, autocompasión, síntomas de depresión, conexión social



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Social connectedness (SC) reflects an "internal sense of belonging and is defined as the subjective awareness of being in close relationship with the social world...(which) includes proximal and distal relationships with family, friends, peers, acquaintances, strangers, community, and society" (Lee & Robbins, 1998, p. 338). SC has been found to play a fundamental role in interpersonal functioning and psychological well-being and is considered a protective factor for depression, perceived stress, and social discomfort (Hare-Duke et al., 2019; Lee et al., 2001; Rude & Burham, 1995; Townsend & McWhirter, 2005). SC has been associated with lower mortality rates in young adults and studies involving this population might reveal important factors that account for the ability to connect with others (Holt-Lunstad et al., 2017). Adulthood is considered an important period for the development of social connections and women are usually more prone to SC than men (Lee et al., 2001; Lee & Robbins, 2000).

Some researchers argue that body image concerns enhance the fear of rejection or exclusion, and this decreases the chances of social bonding (Ferreira et al., 2013; Pinto-Gouveia et al., 2014). Body image dissatisfaction, for instance, was associated to worst expectations about relationships with future partners (Santuzzi et al., 2006), fear of intimacy and concerns about approval in social interactions (Cash et al., 2004), increased sensitivity to rejection (Calogero et al., 2010) and feelings of loneliness (Teng et al., 2019). Differently, feelings of social safeness and connectedness are positively linked to body appreciation and negatively associated to disordered eating attitudes and unfavorable comparisons based on physical appearance (Ferreira et al., 2018; Pinto et al., 2017; Mendes et al., 2019).

Individual perceptions and attitudes about one's own body might vary between concerns, dissatisfaction, and acceptance. Body image dissatisfaction (BID) is associated with anxiety and depression symptoms, reduced quality of life, and risky behaviors such as dietary restraint, compulsive eating, frequent dieting, and disordered eating (Griffiths et al., 2018). Higher

levels of BID have been frequently observed in samples of undergraduate students across countries (Pinto et al., 2019; Radwan et al., 2019) and the beginning of adult life is a phase followed by great dissatisfaction with the body due to social pressures faced in different settings (Bucchianeri et al., 2013; Grogan, 2012). The effects of BID seem gender-specific. For instance, drive for thinness and excessive dieting behaviors are often observed in women in an attempt to resolve the social insecurity arising from BID (Marta-Simões & Ferreira, 2018).

Contrary to BID, the ability to fully experience the body in the present moment, embracing the emotions, thoughts, memories, or body sensations with a non-judgmental stance is also frequently studied (Rogers et al., 2018). This ability is known as body image flexibility (BIF). BIF covers the capacity to pursue a life that is consistent with personal values and the ability to flexibly respond to body image in the presence of unwanted experiences regarding the body and/or weight (Sandoz et al., 2013). BIF has a protective function against psychological distress related to physical appearance, preventing people from engaging in maladaptive behavior to alleviate discomfort with the body (Sandoz et al., 2013). Importantly, BID scores are strongly and inversely related to BIF (Rogers et al., 2018; Tan et al., 2019) and while the first is related to distress and symptoms of eating disorders the second is associated with high quality of life scores, lower symptoms of eating disorders and body appreciation (Ferreira et al., 2011; Pellizzer et al., 2018; Sandoz et al., 2013). Therefore, one of the main assumptions in this study is that BIF associates positively with SC while BID might decrease the ability to connect with others.

To accept physical appearance in the present moment the individual needs to adopt a non-judgmental and compassionate stance with her own body. Self-compassion is defined as the tendency to respond to one's suffering in a kind and compassionate way, instead of being judgmental and critical about one's behaviors and emotions (Neff, 2003; Neff & Dahm, 2015). Higher

levels of self-compassion were associated with higher reports of BIF (Braun et al., 2016; Ferreira et al., 2011; Kelly et al., 2014; Liss & Erchull, 2015) and lower BID, body concerns, and disordered eating (Rodgers et al., 2017; Wasylikiw et al., 2012). Specifically, women with overweight/obesity and higher levels of self-compassion seem to accept their physical appearance and report fewer weight concerns and unhealthy weight-control practices (Kelly et al., 2014). Furthermore, self-compassion was associated to SC in previous studies (Neff, 2003; Neff & McGehee, 2010). Thus, self-compassion might mediate the effects of both BID and BIF and SC. This hypothesis was considered before and researchers argued that self-compassion skills may function as an antidote to social threats while at the same time playing a crucial role in the development of attitudes of acceptance and respect regarding body image (Rahimi-Ardabili et al., 2018).

The present study

Despite the literature suggesting a relationship between SC and body image, how these variables influence each other, and which type of body image measure is relevant is not clear. The present study intends to contribute to a better understanding of this relationship assessing how two distinct and inversely associated body image measures (i.e., BIF and BID) associates with SC in a single model that controls for relevant mediators associated with both the body image predictor and the main outcome. A robust path analysis model was tested, with BIF, BID, and sex as the main predictors, and self-compassion, distress factors (i.e., depression, anxiety and stress symptoms), and BMI as mediators. To the best of our knowledge, we have not found studies that jointly examined the links between BIF, BID, and SC. Furthermore, this study addresses a gap in body image literature by revealing a path by which BIF might impact the quality of life and psychological well-being (Rogers et al., 2018). Our main hypotheses were: (a) BID scores would negatively and significantly predict SC; (b) BIF scores would positively and significantly

predict SC, and would have a greater impact on SC than BID; (c) self-compassion scores would be positively associated with BIF and SC and mediate this relationship; d) distress scores would be negatively related with BIF and SC.

Method

Design

The present cross-sectional study was approved by the Research Ethics Committee under registration number 15212819.1.0000.5345. On-line informed consent was obtained from all volunteers.

Participants

Brazilian undergraduate students aged 18 to 35 years were recruited for the study through online advertisements in social media and emails addressed to Brazilian universities. The only exclusion criterion adopted was age. The final sample included 235 participants, mostly women ($n = 192$, 81.7%) with a mean age of 22.97 years ($SD = 4.03$). Regarding socio-demographic characteristics, most participants were from public universities ($n = 177$, 75.3%), single ($n = 183$, 77.9%), were not working at the time of the study ($n = 135$, 57.4%), and were not under any mental health treatment ($n = 140$, 59.6%). To note, participants eligible for this study were invited to participate in an intervention study conducted weeks later and unrelated to the hypothesis presented in the present manuscript.

Instruments

Demographic characteristics

A demographic questionnaire was developed for this research to collect data regarding age, schooling, professional occupation, marital status, average income, and height and weight for BMI calculus.

Distress measures

Distress variables were assessed using the Depression, Anxiety and Stress Scale – DASS-21 (Lovibond & Lovibond, 1995; Vignola & Tucci, 2014). This 21-item self-report instrument includes three subscales to assess depression, anxiety, and stress scored on a four-point Likert scale ranging from 0 (“Strongly Disagree”) to 3 (“Totally Agree”). Cronbach’s alpha obtained in the Brazilian validation study (Vignola & Tucci, 2014) is similar to that originally obtained by Lovibond and Lovibond (1995): 0.92 for the depression subscale, 0.86 for the anxiety subscale, and 0.90 for the stress subscale. In the present study, Cronbach’s alpha was 0.88 for stress, 0.87 for anxiety, and 0.91 for depression.

Body image perception

BID was assessed using the Stunkard’s Figure Rating Scale – FRS (Stunkard et al., 1983), a measure of body image perception adapted and tested in Brazilian samples by Scagliui et al. (2006) and Conti et al. (2013). The FRS is composed of nine schematic figures, starting with thinner silhouettes and progressing to increasingly larger silhouettes, in proportion to the number (1-9). Participants were asked to select the image that best indicated their current body image and size, and their ideal body image and size. The discrepancy between the actual/current and the ideal body image gives a measure of body image dissatisfaction (i.e., BID). When the difference was equal to zero, the individual was classified as “satisfied.” When the results were smaller than zero, participants were classified as “dissatisfied due to slimness,” and when the results were higher than zero, participants were classified as “dissatisfied due to overweight” (Kops et al., 2018). As an example, if the participant chose the figure 9 as its current body image and 5 as its ideal body, the subtraction is 4, which stands for “dissatisfied due to overweight”. Thus, three categories were analyzed: 0 = dissatisfied due to slimness, 1 = satisfied with the body, and 2 = dissatisfied due to overweight.

Body image flexibility

The BI AAQ – Body Image Acceptance and Action Questionnaire (Lucena-Santos et al., 2017; Sandoz et al., 2013) is an 11-item scale of psychological flexibility, specifically developed to assess the ability to fully accept one’s body as it is, embracing body-related thoughts and feelings with a non-judgmental stance. Items are rated on a 7-point Likert scale, ranging from 1 (never true) to 7 (always true). Higher scores indicate higher BIF. Cronbach’s alpha for the Brazilian version was 0.92 (Lucena-Santos et al., 2017). In the present study, the internal consistency assessed by Cronbach’s alpha was 0.95.

Self-compassion

The Self-Compassion Scale – SCS (Neff, 2003; Souza & Hutz, 2016) is a 26-item self-report measure consisting of a 5-point Likert scale ranging from 1 (rarely) to 5 (almost always), with higher scores indicating greater self-compassion. The Brazilian Portuguese version of this scale has an excellent internal consistency of 0.92 (Souza & Hutz, 2016). Cronbach’s alpha in the present study was also excellent (0.94). As recommended by Neff et al. (2019), we used the total score (one-factor structure) in our analyses.

Social connectedness

The Social Connectedness Scale Revised – SCS-R (Lee et al., 2001; Francisco et al., 2011) is a 20-item scale used to assess the individual’s general sense of belonging and interpersonal closeness (e.g., “I feel understood by the people I know”). Each item is rated on a 6-point scale (1 = Strongly disagree, 6 = Strongly agree). Higher scores represent a strong sense of belonging. This instrument was adapted to Brazilian Portuguese for this study. The Cronbach’s alpha for the Brazilian Portuguese version was 0.90 (Francisco et al., 2011). The Cronbach’s alpha obtained in our study was excellent (0.93).

Procedure

Data were collected via an online survey (SurveyMonkey, www.surveymonkey.com/) available to participants from September 27, 2019, to April 9, 2020. The time to complete the survey was estimated as 25 minutes. After reading an introductory information page and providing informed consent, participants completed the questionnaires described above. Questionnaires were presented in a fixed order (i.e., demographics, DASS-21, FRS, BI AAQ, SCS, and SCS-R). Of the 247 people who completed the survey, the following were excluded: two who were not students, five with age above 36 years, and five respondents with abnormal responses in the SCS-R (e.g., extreme responses and missing). Therefore, the final sample consisted of 235 participants.

Data Analysis

Descriptive statistics and analysis of skewness and kurtosis revealed that some variables were non-parametric (e.g., IMC). Therefore, Spearman correlations were used to test for associations between variables. Two analyses of variance (ANOVA) were used to evaluate differences in SC and BIF between participants with distinct BID classifications. These analyses were done using Statistical Package for Social Sciences v. 22 (IBM) for Windows. Predictors of SC were identified with a multivariate regression model using robust path analysis in the Mplus 8.11 software. The sample size was estimated based on the minimum recommended number (200 participants) for structural equation analysis, and the goodness of fit was reported (Kline, 2011). In all analyses, $p < 0.05$ was adopted for significance, and effect sizes were reported.

Results

BMI [weight (kg)/height (m²)] was calculated based on self-reported weight and height. Most participants (57%) had normal weight range ($n = 134$, $M = 21.88$, $SD = 1.83$, minimum = 18.59 kg/m², maximum = 25.00 kg/m²), while 5.5% had underweight ($n = 13$, $M = 17.70$, $SD = 0.75$, minimum = 15.81 kg/m², maximum = 18.43 kg/m²), 25.5% had overweight ($n = 60$, $M = 26.82$, $SD = 1.48$, minimum = 25.08 kg/m², maximum = 29.98 kg/m²), and 11.9% had obesity ($n = 28$, $M = 33.62$, $SD = 3.05$, minimum = 30.11 kg/m², maximum = 41.51 kg/m²). The results from Stunkard's scale revealed dissatisfaction with overweight in 69.4% of the participants ($n = 163$), while dissatisfaction with underweight and satisfaction were reported by 15.7% ($n = 37$) and 14.9% ($n = 35$) of participants, respectively. It's important to highlight that although 134 participants had a normal weight range, only 37 were satisfied with their body image.

To understand the association between all relevant variables, a Spearman correlation analysis was performed. The results are presented in Table 1. Confirming one of our hypotheses, SC correlated significantly and with BIF ($r_s(235) = .335$, $p < 0.001$) and self-compassion ($r_s(235) = .552$, $p < 0.001$), indicating that flexibility with one's body image and behavior increased together with the feeling of SC. In accordance with the literature about negative affect and social connectedness (Santini et al., 2015; Fulginiti et al., 2018), a significant negative correlation was observed between SC and stress ($r_s(235) = -.437$, $p < 0.001$), anxiety ($r_s(235) = -.409$, $p < 0.001$), and depression ($r_s(235) = -.621$, $p < 0.001$).

Table 1 – Correlation between the main study variables

	SC	BMI	BIF	Self-Compassion	Stress	Anxiety	Depression
SC	1	-.085	.335**	.552**	-.437**	-.409**	-.621**
BMI		1	-.274**	-.054	.031	.063	.064

BIF	1	.390**	-.347**	-.360**	-.404**
Self-compassion		1	-.481**	-.439**	-.536**
Stress			1	.694**	.710**
Anxiety				1	.631**
Depression					1

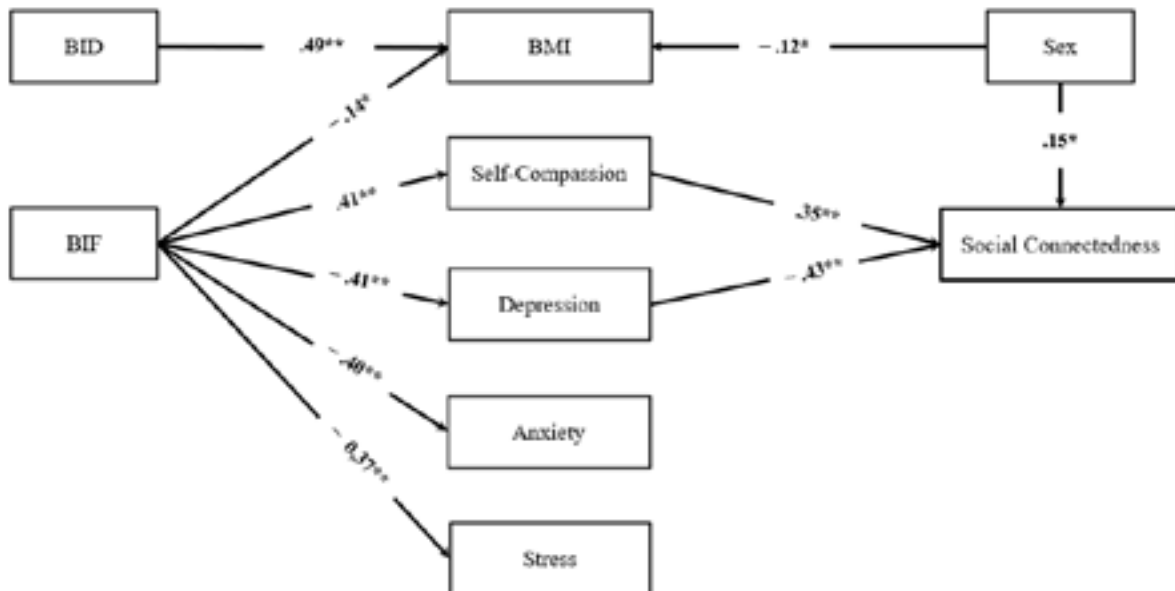
Note SC: Social connectedness score; BMI: body mass index; BIF: body image flexibility. * $p < .05$. ** $p < .001$

Participants with distinct BID classifications were compared to evaluate how body image perception relates to social connection. The results revealed a marginal, but no significant group difference ($F [2, 232] = 2.441, p = 0.089$, partial $\eta^2 = 0.021$), suggesting that social connection was not significantly different among BID groups. A second ANOVA was performed to test for differences in BIF among BID groups. A significant between-group difference was observed ($F [2, 232] = 8.351, p < 0.001$, partial $\eta^2 = 0.067$). Post hoc analyses showed that participants dissatisfied with overweight had a significantly ($p = 0.002$ and $p = 0.017$, respectively) lower BIF ($M = 46.11, SEM = 1.42$) than participants dissatisfied with thinness ($M = 57.43, SEM = 2.97$) and participants satisfied with body ($M = 55.54, SEM = 3.06$). This result is in accordance with previous studies showing that BID is negatively related to BIF and that this association is even stronger in people with obesity (Butryn et al., 2013; Ferreira et al., 2011; Pellizzer et al., 2018; Tan et al., 2019).

A robust path analysis (multivariate regression model) was performed to test our model of SC

predictors. Based on the assumption that body image is a relevant predictor of SC, we included two body-related variables, BIF scores, and BID groups, as the main predictors together with sex. BMI, DASS-21 distress factors, and SCS total scores were used as mediators. Two steps were followed to test whether the predictor and mediators influenced SC variance. First, all relationships between the observed variables were tested in a full model. After that, all non-significant estimates with very low effect sizes (i.e., lower than 0.10) were constrained to zero to obtain a parsimonious representation of the data (Gunzler & Morris, 2015). The parameters obtained with the path analysis indicated an excellent fit: $\chi^2(17) = 15.41, p = 0.566$, RMSEA = 0.01, CFI = 1.000, TLI = 1.005. Our final model revealed that BIF had an indirect impact on SC variance, mediated by self-compassion and depression, while sex (i.e., being female) had a direct effect on SC. BID did not significantly impact SC variance but did influence BMI variance. The final model explained 47.9% of SC variance, and all significant effects can be seen in Figure 1. Figure 2 shows the main predictors of SC found in our model.

Figure 1 – Path analysis model showing significant effects



Note. Standardized regression weights (β) are shown only for significant values (* $p < 0.05$; ** $p < 0.001$). Indirect effects of BIF mediated by self-compassion and depression were 0.14 and 0.18, with a total indirect effect of 0.32. BID: Body image dissatisfaction; BIF: body image flexibility; BMI: body mass index.

Figure 2 – Final model containing the variables that significantly predicted social connectedness variance



Discussion

The purpose of this study was to test how distinct measures of body image associates with social connectedness. The results of the path analysis indicate that our first hypothesis was not supported, since BID did not predict SC. Our

second hypothesis was also not supported, given that BIF did not directly predict SC variance. Conversely, our third hypothesis was confirmed, with self-compassion mediating the relationship between BIF and SC. The fourth hypothesis was

only partially corroborated since only depression mediated the association between BIF and SC. Considering our path analysis results, our analysis indicates that body image flexibility relates to SC in women with lower depression symptoms or high self-compassion scores. We highlight that these are novel data since we were unable to identify any study focusing simultaneously on BIF, BID, and SC.

Sex, body image variables, and social connectedness

The effect of sex on SC variance is in accordance with previous research in which women were found to have slightly higher levels of SC (Lee et al., 2001). As assessed in this study, SC reflects the general sense of belonging and interpersonal closeness, and our results show that women seemed to be more prone to this feeling. This is particularly important for the present study because while women are more prone to SC they also are more susceptible to have problems with body image (Cash & Smolak, 2011). Therefore, one might assume that problems with body image might be notably detrimental to the SC in women. We notice, however, that BID is not directly or indirectly associated with SC, which indicates that the presence of dissatisfaction with the body might not be so detrimental to SC even in women samples when BIF and other variables are controlled.

Contrary to our first hypothesis, BID did not impact SC when groups with different BID classifications were compared. It is important to note that BID was previously related to other measures of social connection, such as adult attachment and connectedness. In a study by Cash et al. (2004), a poor body image, measured through BID, was moderately associated with higher levels of social-evaluative anxiety and concerns about acceptance in social interactions, regardless of BMI. Furthermore, longitudinal, and bidirectional effects of body satisfaction on the perception of family connectedness, defined as a family's sense of belonging and closeness between members, were reported by Crespo et al. (2010). Even though

these studies suggest a link between BID and social connection, it is important to note that different constructs of social bonding and connectedness were assessed in these papers and BIF was not controlled in these studies.

Congruent with one of our hypotheses, we observed a positive correlation between BIF and SC, although this association was better explained by the mediation of self-compassion in the path analysis model. Psychological flexibility towards one's own body, as measured by BIF, represents the openness to experience and constructive behaviors believed to be a central mechanism of change in psychological treatments like Acceptance and Commitment Therapy (Hayes et al., 1999). Psychological flexibility was previously associated with SC in women with lipoedema (Dudek et al., 2016) and it is important to note that one of the main features that differentiate BIF from BID is the focus on psychological flexibility and acceptance in the first. Thus, people with higher levels of BIF might be more able to engage and build social bonds even when experiencing negative emotions about their bodies. Some negative items in the BI-AAQ, for instance, signal this possibility: *My relationships would be better if my body weight and/or shape did not bother me* (Sandoz et al., 2013).

Self-compassion and depression as mediators

Previous studies have also reported a significant positive association of self-compassion with SC in undergraduates, adolescents, and young adults (Bloch, 2018; Neff & McGehee, 2010). A new finding from our study is that BIF predicts SC through higher levels of self-compassion. Self-compassion may foster people's sense that all bodies are unique and that some body-related negative experiences are shared — thus decreasing the need to avoid social and self-judgment, to seek status in the social group, or to adjust to external sociocultural influences about attractiveness and beauty patterns.

The negative association between BIF and distress makes sense since BIF has been asso-

ciated with lower levels of psychological distress and is considered as a reliable predictor of good psychosocial functioning (Rogers et al., 2018). In accordance with the assumption that SC prevents distress symptoms (Liu et al., 2020, Townsend & McWhirter, 2005), SC also correlated negatively with all distress variables, and depression was the only factor that explained SC variance after controlling for correlations between variables in our path analysis model. Based on the negative associations between BIF and depression, we could argue that when the relationship established with one's body involves non-judgmental stance and acceptance, depression symptoms are less observed and SC connectedness is more likely to occur.

Sample characteristics and limitations

As is the case in any study, sample characteristics can limit the generalizability of the findings. For instance, the fact that 40.4 % (n = 95) of the sample were undergoing mental health treatment may have increased the relationship between self-compassion and SC, as well as attenuated the relationship between depression and social connection. Thus, the type and duration of mental health treatment might need to be controlled in future studies. Our sample was composed of undergraduate students, mostly females, and these factors can reflect both advantages and limitations. Given the fact that adult life is relevant for the development of both SC (Lee et al., 2001; Lee & Robbins, 2000) and body image dissatisfaction (Bucchianeri et al., 2013; Grogan, 2012), our study contributes to the literature because it provides answers regarding how these variables related to each other in an important developmental stage. However, the generalization for children, adolescents, and older adults is limited. Notwithstanding, we hope that our novel insights about how SC and body image factors relate to each other will incentive researchers and clinicians to conduct new investigations about these topics.

Some limitations of the present research should be noted. First, the cross-sectional nature of this investigation constrains the establishment of cau-

sal relationships between the variables, and we used path analysis to test an a priori theoretical model. Thus, our conclusions reflect the actual state of the data and we strongly suggest that other researchers test our model using similar methods with various samples, or using data from longitudinal studies to confirm our findings. Three limitations regarding data gathering need to be noted: The exclusive use of self-report measures, the use of self-reported weight and height to determine weight status, and the lack of control over participant responses during the online assessment.

Conclusion

The present study provides important insights regarding body image and social connection. In fact, to the best of our knowledge, this is the first study to explore the associations between BID, BIF, and SC. The tested model can contribute to clinical practice and promotes applied research aimed to test if body image intervention programs can promote, via self-compassion and reduction in depressive symptoms, the development of supportive and warm interactions with others. Given the importance of SC for social relationships, future research is needed to explore the potential for body image interventions to address how one's relationship with the body impacts the sense of belonging in social interactions.

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