

A structural equation model of intuitive eating with adolescents

Un modèle d'équation structurelle de l'alimentation intuitive avec des adolescents

Alexandre Williot^{1,2}, Marie-Ève Blackburn^{1,3}, Julie Auclair³, Marie-Christine Brault^{1,2}, Noémie Carbonneau⁴, and Jacinthe Dion^{1,2}

¹Chaire de Recherche UQAC-Cégep de Jonquière sur les conditions de Vie, la Santé, l'Adaptation et les Aspirations des Jeunes (VISAJ)

²Université du Québec à Chicoutimi, Québec, Canada

³Cégep de Jonquière, Québec, Canada

⁴Université du Québec à Trois-Rivières, Québec, Canada

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Corresponding author at: Department of Health Sciences, Université du Québec à Chicoutimi, 555, boulevard de l'Université, Chicoutimi, Québec, Canada, G7H 2B1.

E-mail address: alexandre_williot@uqac.ca

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Abstract

Introduction. - The tendency to eat by paying attention and respecting the body's hunger and satiety cues is called intuitive eating. This eating behavior has been linked to positive health and well-being outcomes.

Objective. - The purpose of this study was to test a global model linking intuitive eating with self-esteem, body esteem, media influence and including fear of negative appearance evaluation in adolescents' boys and girls.

Method. - In total, 740 adolescent high school students (51.5% girls; M age = 14, SD = 1.5) completed self-report questionnaires with measures of intuitive eating, body esteem, self-esteem, media influence and fear of negative appearance evaluation.

Results. - Structural equation modeling revealed an overall excellent fit for the final four-variable model excluding the fear of negative appearance evaluation variable. Mediation analyses showed an indirect relationship between intuitive eating and body esteem via media influence, for girls but not for boys. Body esteem mediated the relationship between intuitive eating and self-esteem, and this indirect effect was stronger for girls than for boys.

Conclusion. - A new model is proposed where intuitive eating is associated with self-esteem through body esteem and media influence. These findings suggest that regulating attitudes and behaviors toward food may be related to higher psychological well-being.

Résumé

Introduction. - La tendance à manger en portant attention et en respectant les indices de faim et de satiété de son corps est appelée alimentation intuitive. Ce comportement est associé à l'estime corporelle, à l'estime de soi et à l'influence des médias.

Objectif. - Le but de cette étude était d'établir un modèle mettant en relation l'alimentation intuitive, l'estime de soi, l'estime corporelle, l'influence des médias et la peur d'être évalué négativement par autrui chez des adolescents garçons et filles.

Méthode. - Au total, 740 adolescents du secondaire (51.5% de filles ; âge $M = 14.0$, $ET = 1.5$) ont rempli des questionnaires d'auto-évaluation avec des mesures de l'alimentation intuitive, de l'estime corporelle, de l'estime de soi, de l'influence des médias et de la peur d'être évalué négativement par autrui.

Résultats. - La modélisation par équation structurelle a révélé un excellent ajustement global pour le modèle final à quatre variables excluant l'échelle de la peur d'être évalué négativement par autrui. Les analyses de médiation ont montré une relation indirecte entre l'alimentation intuitive et l'estime corporelle via l'influence des médias, chez les filles, mais pas chez les garçons. L'estime corporelle avait un rôle de médiateur dans la relation entre l'alimentation intuitive et l'estime de soi, et cet effet indirect était plus important pour les filles que pour les garçons.

Conclusion. - Un nouveau modèle est proposé où l'alimentation intuitive est associée à l'estime de soi à travers l'estime corporelle et l'influence des médias. Ces résultats suggèrent que la régulation des attitudes et des comportements à l'égard de la nourriture puisse être reliée à des variables de bien-être psychologique.

Keywords: eating behaviors; body image; self-esteem; media influence; appearance evaluation.

Mots-clés: comportements alimentaires; image corporelle; estime de soi; influence des médias; évaluation de l'apparence.

1 Introduction

Restriction of eating behaviors is believed by many to control body shape. However, research has largely shown that this approach is ineffective and rather may contribute to food and body preoccupation, thus reducing levels of well-being (Bacon & Aphramor, 2011). Given the high prevalence of low body esteem in the general population (Aimé, Cotton, Guitard, & Bouchard, 2012; As-Sa'Edi et al., 2013; Neighbors & Sobal, 2007), and its association with poorer psychoemotional functioning and higher levels of disordered eating that are an important economic and public health burden (Fallon, Harris, & Johnson, 2014; Haddad et al., 2019), research on how to promote healthy eating behaviors is worth pursuing. Intuitive eating — the tendency to follow physical hunger and satiety cues rather than emotional reason (Tylka, 2006) — has been shown to be linked to such variables as body esteem (Andrew, Tiggemann, & Clark, 2015), self-esteem (Schaefer & Magnuson, 2014) and media influence (Tylka & Kroon Van Diest, 2013). However, to date, only few studies have tested a model integrating all these variables together. Testing such a model would be especially relevant for adolescents who may be at greater risk due to their fear of negative peer evaluation (Trompeter et al., 2018). In this paper, we investigated the role of media influence and fear of negative peer evaluation in the association between intuitive eating, body esteem and self-esteem with adolescents as well as potential gender differences. This approach may shed light on the psychological benefits of intuitive eating and help identify processes influencing those relationships. This study will also help clarify how healthy eating may be associated with higher well-being.

1.1 Intuitive Eating and Body Esteem

Eating is much more than a process of bodily nourishment; it is also a social, cultural, and psychological act. Indeed, individuals eat because they are hungry, but also in response to socio-environmental cues or for emotional reasons, such as relieving boredom or anxiety (Gast & Hawks, 1998). Some reasons for eating can lead to adaptive or maladaptive behaviors. However, in contrast, intuitive eating has been consistently related to measures of psychological well-being, such as satisfaction with life, proactive coping, and body esteem (Linardon, Tylka, & Fuller-Tyszkiewicz, 2021; Schaefer & Magnuson, 2014; Tylka, 2006; Van Dyke & Drinkwater, 2014). Indeed, because those who appreciate their bodies are more likely to be receptive to their body signals, intuitive eating has been hypothesized to be related to higher body esteem (Tylka & Kroon Van Diest, 2013). Consistent with this, a group participating in an intervention program during 14 weeks with a focus on intuitive eating concepts reported increased body esteem and a greater association between intuitive eating and body esteem in the short and long term (Bégin et al., 2019). Some studies have found that two intuitive eating components (i.e., eating for physical rather than emotional reasons, and reliance on internal hunger and satiety cues) made specific contributions to indicators of well-being (Tylka & Wilcox, 2006). A systematic review indicated that intuitive eating correlated with higher body image (Bruce & Ricciardelli, 2016), and this relationship was consistent for total scores and subscales and across three different age groups from emerging adulthood to middle adulthood (Augustus-Horvath & Tylka, 2011) as well as adolescents for boys and girls (Andrew et al., 2015; Andrew, Tiggemann, & Clark, 2016; Dockendorff, Petrie, Greenleaf, & Martin, 2012; Williams et al., 2006). Because healthy lifestyle intervention programs targeting

intuitive eating behaviors have been shown to increase well-being (Carbonneau et al., 2017), focusing on intuitive eating for health purposes could help foster body esteem and self-esteem (Van Dyke & Drinkwater, 2014), important variables for the development of young people. It is also important to consider external influence such as media which can be associated with how people should look and on eating behavior (Kwon, 2020).

1.2 Intuitive Eating and Media influence

Intuitive eating and media influence are connected through the internalization of media appearance ideals. For example, eating for physical rather than emotional reasons and reliance on satiety cues have both associated with lower internalization of media appearance ideals (Tylka & Kroon Van Diest, 2013). It could be that lower internalization of appearance ideals might lead to more intuitive eating, but it is possible that people who eat intuitively may better resist media and social pressure. For instance, one study found that women who eat according to their hunger and satiety cues were less likely to focus on how their body appears to others (Augustus-Horvath & Tylka, 2011). Intuitive eating might therefore create protective cognitive schemas that can buffer individuals against socio-environmental pressure. This view of the relationship between these variables may be useful for adolescents, given the potential impact of media on their health (Strasburger, Donnerstein, & Bushman, 2014), and on their food consumption (Beaudoin, 2014; Qutteina, De Backer, & Smits, 2019), especially with the fact that girls seem to be very sensitive to media influence (Cusumano & Thompson, 2001; Dohnt & Tiggemann, 2006b; Eisenberg, Ward, Linde, Gollust, & Neumark-Sztainer, 2017). If people can follow

intervention programs and eat more intuitively, they can also better resist external social pressure as media influence, which in turn could affect their body and self-esteem.

1.3 Media influence and Body Esteem

A large body of research has shown that media, television, and online video clips affect how people feel about their bodies (Dohnt & Tiggemann, 2006a, 2006b; Eisenberg et al., 2017; Grabe, Ward, & Hyde, 2008; Mulgrew, Volcevski-Kostas, & Rendell, 2014; Peter & Valkenburg, 2014; Thompson & Heinberg, 1999). This media influence has the capacity to change what people think about their physical appearance. Two important factors need to be considered regarding media influence. First, there is the internalization of an ideal body, referring to the adoption of media-publicized ideals as personal standards of attractiveness (Cusumano & Thompson, 2001; Grabe et al., 2008). This variable refers to the endorsement of the media ideal along with behavior modifications to try to reach these standards, as reflected by comparison with ideal images in the media (Rodgers, McLean, & Paxton, 2015; Thompson & Stice, 2001). Second, there is the perception of pressure from the media to emulate the look promoted by models and actors (Cusumano & Thompson, 2001). It seems that the media strongly influence how adolescents feel about their body and the kind of ideals they pursue (Hargreaves & Tiggemann, 2002; Lawrie, Sullivan, Davies, & Hill, 2006; Mulgrew et al., 2014), with a greater influence for girls than for boys (Cusumano & Thompson, 2001; Dohnt & Tiggemann, 2006b; Knauss, Paxton, & Alsaker, 2008).

1.4 Body Esteem, Self-Esteem, and Fear of Peer Evaluation

How people think about their body is important to their well-being. For instance, body esteem has been shown to be associated with lower anxiety and depression, and with higher self-esteem among university students and adolescents (Duchesne et al., 2017; Gilbert & Meyer, 2005; Kostanski & Gullone, 1998). Abdollahi and Abu Talib (2016) have shown that university students with low self-esteem and body esteem are more likely to report social anxiety. A possible interpretation given by the authors is that individuals with low body-esteem and self-esteem are concerned about negative evaluation from others. Consistent with this, a significant correlation between body esteem and higher fear of negative evaluation by others has also been reported (Lundgren, Anderson, & Thompson, 2004). In addition, an association between fear of negative evaluation by others and lower self-esteem has been found (Begley & White, 2003). However, to our knowledge, there have been no studies where fear of negative evaluation by others has been examined as a possible mechanism between body esteem and self-esteem with adolescents' boys and girls.

1.5 The Present Research

In sum, the literature suggests associations between intuitive eating and body esteem, intuitive eating and media influence, media influence and body esteem and finally between body esteem, self-esteem and fear of negative evaluation. The purpose of this study was to consider all those relationships together for adolescent boys and girls by testing a global path from intuitive eating to self-esteem through body esteem, media influence and fear of negative appearance evaluation by others. To do so, we used structural equation modeling

analyses and mediation analyses. The inclusion of intuitive eating as a starting point should contribute significantly to a better understanding of the mechanisms at play in the relationship between intuitive eating and body esteem and self-esteem, both of which are important in the success of intervention programs.

2 Method

2.1 Participants

Of the 908 eligible students recruited from two French semi-urban high schools in Canada, 740 completed questionnaires (81.5% participation rate; 51.5% girls; M age = 14, SD = 1.5). Participants were told that the study would be helpful to better understand body esteem. A total of 293 (of 415) grade 7 students (70.6% participation rate; 52.2% girls; M age = 12.1, SD = 0.4) and 447 (of 493) grade 10 students (90.7% participation rate; 51.0% girls; M age = 15.2, SD = 0.4) were recruited. The difference in response rates between grade 7 and grade 10 could be explained by the parental consent needed for the younger participants. The families' socioeconomic status was not available to the investigators, but participating schools were in middle- and high-class socioeconomic settings (IMSE¹ between 2 and 4). Data were collected online in class (see Table 1 for descriptive statistics on the questionnaires). Electronic informed consent was obtained from the participants and

¹ The IMSE is an official decile ranking of the school socioeconomic index based on the socioeconomic environment index ranging from 1 (the most advantaged) to 10 (the least advantaged). It is made up of the proportion of families with children whose mothers do not have a diploma, certificate, or degree (which is two thirds of the weight of the index) and the proportion of households whose parents were not employed during the Canadian Census reference week (one third of the weight of the index).

written informed consent was obtained from parents of participants under 14 years of age. The Ethics Committee of the Jonquiere College approved this study.

2.2 Measures

- *French-Canadian adaptation of the Intuitive Eating Scale-2* (Carbonneau et al., 2016; Tylka & Kroon Van Diest, 2013): From the original 23-item scale, we used four out of eight items (i.e., items 11, 12, 13 and 15) from the eating for physical rather than emotional reasons (EPR) subscale and two out of six items (i.e., items 7 and 8) from the reliance on hunger and satiety cues (RHSC) subscale. The six items were used to obtain a total score to keep the questionnaire as short as possible. Each item was assessed on a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The rankings were then averaged, with higher scores indicating greater intuitive eating. In this sample, Cronbach's alpha was 0.67 for the total score which is close to the Cronbach's alpha of Carbonneau et al. (2016, study 2) ranging from 0.67 to 0.95 within a sample of men and women. Furthermore, confirmatory factor analysis revealed a good fit of selected items with a Goodness of Fit Index (GFI) of 0.93 and an adjusted GFI of 0.84.
- *Body Esteem Scale for Adolescents and Adults* (Mendelson, Mendelson, & White, 2001; Valls, Rousseau, & Chabrol, 2011). From the original 23-item scale, we used the 10-item body esteem appearance subscale, which captures overall satisfaction with appearance (e.g., I like what I see when I look in the mirror). The items were assessed on a Likert scale ranging from 1 (*never*) to 5 (*always*). The rankings were averaged, with higher scores indicating greater body esteem. Cronbach's alpha was 0.92 in this sample.

- *French-Canadian adaptation of the Global Self-Esteem Scale* (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995; Vallieres & Vallerand, 1990): This 10-item scale measures the extent to which participants feel they possess good qualities and have achieved success (Alessandri, Vecchione, Eisenberg, & Laguna, 2015). The items were assessed on a Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*), with higher scores indicating higher self-esteem. Cronbach's alpha was 0.87 in this sample.
- *Multidimensional Media Influence Scale* (Aimé, 2010; Cusumano & Thompson, 2001): We calculated a total score using two of the original three subscales, the internalization subscale with six items and the media pressure subscale with two items. Each item was assessed on a Likert scale consisting of 1 (*disagree*), 2 (*not sure*), and 3 (*agree*). The rankings were averaged, with higher scores indicating higher media influence. For our sample, we obtained a Cronbach's alpha of 0.86. Confirmatory factor analysis revealed a good fit with a Goodness of Fit Index (GFI) of 0.98 and an adjusted GFI of 0.96.
- *French Adaptation of the Fear of Negative Appearance Evaluation Scale* (Lundgren et al., 2004; Maïano, Morin, Monthuy-Blanc, & Garbarino, 2010): This five-item scale assesses apprehension about having one's physical appearance negatively judged by others. Each item was evaluated on a Likert scale ranging from 1 (*not at all*) to 5 (*extremely*). The rankings were averaged, with higher scores indicating greater fear of having one's physical appearance being evaluated negatively by others. Cronbach's alpha in this sample was 0.91.
- *Figural rating scale* (Collins, 1991): The first scale series of this scale was used to evaluate the adolescents' perceived shape. It comprises two gender-specific scales, each presenting seven men or women figure drawings illustrating different body

weights, ranging from the thinnest silhouette on the left side to the heaviest silhouette on the right side (Zitsman & Warschburger, 2018). The students were asked, using the gender-appropriate drawings, to identify the figure that best matched their current body, that is, their *perceived body*. We considered their perceived body image as a substitute for the measure of the body mass index due to extensive missing data for the latter variable.

2.3 Procedure

The participants completed the above-mentioned questionnaires and specified their age, gender, and school grade (7 or 11). The data were collected in 2016.

2.4 Data analyses

To achieve our research objectives, we used structural equation modeling analyses using the maximum likelihood (ML) estimation procedure in EQS for testing the global model. We conducted path analyses with observed variables (five scales plus school grade and self-perception of the body as covariable). Model fit was assessed using a chi-square test in addition to the following indices: the Normed Fit Index (NFI), the Non Normed Fit Index (NNFI), the Comparative Fit Index (CFI), the Incremental Fit Index (IFI), the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR). According to Tabachnick and Fidell (2007) as well as Kline (2011), CFI and IFI values above 0.90 indicate acceptable model fit. NFI and NNFI values above 0.95 indicate good fit. An RMSEA and SRMR value below 0.05 is indicative of a good fit and 0.08 is indicative of acceptable model fit (e.g., Kline, 2011). We first tested a model (referred to as the original model) that reflected the associations among variables outlined

in the introduction. We also used conditional process analyses based on Hayes’ work to test the indirect effects (Hayes, 2018). To examine the significance of indirect effects, we used 95% bootstrap confidence intervals with 5,000 iterations. When zero is not contained in the confidence interval, the indirect effect is considered significant. A visual examination of residuals for each model revealed that there was no serious deviations from the linearity and homoscedasticity assumptions. All the analyses were conducted on standardized variables and we controlled for school grade and body self-perception in all the models. The missing data represented less than 4.8% of the sample for all analyses and were omitted from the analyses.

3 Results

3.1 Descriptive statistics

Table 1 presents descriptive statistics of the questionnaires. There were significant differences between girls and boys for each scale (all $p < 0.001$).

Table 1. Descriptive statistics of the questionnaires for boys and girls.

Questionnaire	Boys			Girls		
	n	<i>M</i>	<i>SD</i>	n	<i>M</i>	<i>SD</i>
Intuitive eating	344	3.7	0.7	371	3.3	0.7
Body esteem	359	2.8	0.7	381	2.3	0.9
Self-esteem	359	32.8	4.8	381	29.1	5.5

Media influence	359	0.2	0.3	381	0.5	0.5
Fear of negative appearance evaluation	352	10.6	4.9	378	14.2	5.9

3.2 An integrated model with intuitive eating to self-esteem

Results indicate that intuitive eating was negatively related to media influence and positively related to body esteem (which was positively associated with self-esteem) and self-esteem. Results also showed that body esteem was negatively associated with media influence and fear of negative evaluation. Contrary to hypothesized, fear of negative evaluation was positively associated with self-esteem. This model yielded fit indices that were not optimal. The chi-square value was significant, χ^2 (df = 21, N = 705) = 45.36, $p < .001$, and the other fit indices were not fully satisfying: NFI = .97, NNFI = .74, CFI = .97, IFI = .97, SRMR = .03 and RMSEA = .17 (90% CI: [.13; .22]). The high value of RMSEA indicated a poor fit. Then we adjusted the model according to the empirically driven Wald and Lagrange Multiplier test (Bentler, 1995) recommendations. The Wald test indicates which parameters should be dropped and the Lagrange Multiplier test indicates which parameters should be added to enhance model fit. Here, the Wald test suggested we remove the association between fear of negative evaluation and self-esteem from the model.

Figure 1 presents the final model based on the present data without fear of negative evaluation. Overall, the final model fit was excellent, χ^2 (df = 15, n = 705) = 1.8, $p = 0.41$,

NFI = 1, NNFI = 1, CFI = 1, IFI = 1, SRMR = .01 and RMSEA = 0.00 (90% CI: [0.00, 0.07]). We then compared this final model to the original model using the Akaike's Information Criterion (AIC). Between two models, the one with the lowest AIC value should be chosen as it is more parsimonious (Kline, 2005). The original model yielded an AIC of 41.36 whereas the final model yielded an AIC of -2.2. Therefore, the final model should be preferred. Intuitive eating was negatively related to media influence ($\beta = -0.27, p < .001$), which was negatively related to body esteem ($\beta = -0.43, p < .001$). In turn, body esteem was positively related to self-esteem ($\beta = 0.73, p < .001$). Intuitive eating was positively related to body esteem ($\beta = 0.24, p < .001$) and self-esteem ($\beta = 0.11, p < .001$). All these effects were found controlling for school grade and self-perception of the body.

We then examined whether the final model was invariant across gender. Results showed that the final model was significantly different from the conditional model for each gender ($\Delta\chi^2 (19) = 82,0682, p < 0.001, SRMR = .01$ and $RMSEA = 0.04$ (90% CI: [0.00, 0.09])) with 337 boys and 368 girls. A significant relationship was found between intuitive eating and media influence for girls ($\beta = -0.28, p < .001$) but not for boys ($\beta = -0.09, p = .1$).

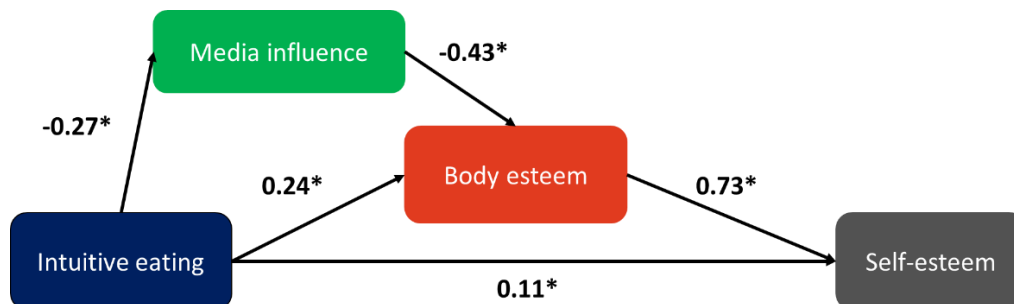


Figure 1. Final model from intuitive eating to self-esteem with media influence and body esteem as mediators. Standardized path coefficients from structural equation analysis.

Note: * $p < .05$.

3.3 Mediating role of media influence and body esteem

Bootstrapping of 5,000 samples using PROCESS macro (Hayes, 2018) was used to examine the mediating role of media influence and body esteem controlling for school grade and body self-perception. Media influence was found to influence the relationship between intuitive eating and body esteem for girls (95% bootstrap CI = 0.09 – 0.18) but not for boys (95% bootstrap CI = -.003 – 0.05). An indirect effect between intuitive eating and self-esteem via body esteem emerged both among boys (95% bootstrap CI = 0.07 – 0.23) and girls, among whom the effect appears stronger as suggested by the coefficient estimates (95% bootstrap CI = 0.17 – 0.32).

4 Discussion

The purpose of this study was to test a path from intuitive eating to self-esteem through body esteem, media influence and fear of negative appearance evaluation among adolescent boys and girls. The results of the fit indices of the final model excluding fear of negative appearance evaluation were excellent. Intuitive eating was associated with higher body esteem for both boys and girls. Intuitive eating was also indirectly associated with body esteem through media influence, but only for girls. The results showed a direct relationship between intuitive eating and higher self-esteem, which was not dependent on gender. Moreover, body esteem may be a mechanism at play in the relationship between intuitive eating and self-esteem; this effect appeared stronger for girls. We proposed a final general model where the path went from intuitive eating to self-esteem, with two mediators of these relationships: media influence and body esteem. This global model suggests the possibility that modifying behaviors and attitudes related to why and how people eat could have a direct and indirect impact on body esteem and self-esteem.

This is the first study leading to an over-arching model based on intuitive eating as a starting point and with psychological variables outcome as body esteem and self-esteem, which are important for well-being (Olenik-Shemesh, Heiman, & Keshet, 2018; Rosenberg et al., 1995). Intuitive eating has been considered the final outcome of models in several studies (Avalos & Tylka, 2006; Carbonneau, Carbonneau, Cantin, & Gagnon-Girouard, 2015; Schoenefeld & Webb, 2013). For instance, Avalos and Tylka (2006) posited in their acceptance model of intuitive eating that perception of body acceptance by others predicts body function (focusing on how the body feels internally rather than monitoring

appearance) and body appreciation. The two latter variables both predicted intuitive eating. Those authors highlighted external influences that lead to healthy eating behaviors. Indeed, they considered that body acceptance by others would help people to be less preoccupied with their appearance and thus to focus more on how they felt internally. People would then be more likely to appreciate their bodies and be more aware of their bodily needs, such as internal hunger and satiety signals, which lead to intuitive eating. Other researchers have considered external influences, such as acceptance by others, mother's controlling style, or partner's controlling style, as direct or indirect influences on intuitive eating (Avalos & Tylka, 2006; Carbonneau et al., 2015). Although this view of the relationship between variables is relevant, it is difficult for individuals to control external factors that influence their propensity to eat intuitively. Acting on internal factors would be more powerful and effective, and would thus place individuals in an active process (Walton, 2014).

4.1 Intuitive eating, body esteem, and media influence

When conducting research on the relationship between eating and one's body, it is relevant to consider the influence of media and gender. The results of this study suggest that the more extensive the intuitive eating, the stronger the cognitive structure to protect individuals from such external influences as the media, which in turn could positively affect body esteem among girls. Past experimental research has shown that exposing participants to images promoting appearance-related beauty reduced appearance satisfaction and increased depression compared with viewing neutral images or non-appearance commercials (Birkeland et al., 2005; Groesz, Levine, & Murnen, 2001; Hargreaves & Tiggemann, 2002). One mechanism accounting for this is that viewing such images may lead to appearance comparisons with the thin ideal (Cattarin, Thompson, Thomas, &

Williams, 2000; Festinger, 1954). However, individual's variation in the tendency towards appearance comparisons cannot explain all the variance in body esteem. Appearance comparisons occur between an idealized image and a cognitive representation of the body related to a global self-schema. This self-schema, resulting from knowledge of the self, may modulate the importance of information related to the body (Jung & Lennon, 2003), and thus influence the way information is processed. Indeed, all individuals are likely to compare themselves with others, but not all with the same emphasis on appearance. Some people are cognitively sensitive to and concerned with their appearance, while others are less so (Ahadzadeh, Pahlevan Sharif, & Ong, 2017; Markus, Hamill, & Sentis, 1987). The possibility of altering the body self-schema through intuitive eating may help youth, particularly girls, being less vulnerable to media pressure and enable them to have a more positive view of their body appearance. Markus et al. (1987) showed that individuals highly concerned about their body self-schema were more likely to perceive themselves as overweight than less concerned people. Regarding the gender effect, boys may be less targeted than girls by the media, or they may simply be less exposed, for example, girls going to malls more often than boys do (Biolcati, 2017), or being influenced differently by social medias. Social medias have different effects on boys' and girls' perceptions, cognitions, and behaviors pertaining to one's appearance. For example, girls (vs. boys) are likely to report higher appearance-related social media consciousness (i.e., awareness of whether one looks attractive to a social media audience; Choukas-Bradley, Nesi, Widman, & Galla, 2020). Girls are also more likely than boys to post pictures in which they display seductive behavior (Kapidzic & Herring, 2015). Self-schema construction in boys could also be influenced by the media differently from the way it is in girls.

4.2 Intuitive eating, body esteem, and self-esteem

We found that body esteem significantly mediated the relationship between intuitive eating and self-esteem. Thus, the greater the intuitive eating, the higher the level of body esteem, which in turn predicted higher self-esteem. This effect was greater for girls than for boys. The difference between genders can be explained by the fact that body esteem is more important in the definition of self-esteem for girls than boys (Murnen & Don, 2012) or that girls and boys do not focus on the same body characteristics (Dion et al., 2014). Indeed, among adolescent boys body esteem is more related to physical attractiveness, upper body strength, and physical condition, whereas adolescent girls focus on sexual attractiveness, weight concern, and physical fitness (Franzoi & Shields, 1984; Mendelson et al., 2001).

4.3 Clinical implications

Given the study findings, working on intuitive eating and promoting healthy eating behaviors and attitudes may positively impact psychological well-being, including body esteem and self-esteem. These findings are in line with a recent meta-analysis in which intuitive eating was found to be associated with less disordered eating, a more positive body image, better emotional functioning, and several other psychosocial correlates (Bruce & Ricciardelli, 2016). Targeting intuitive eating may affect long-term outcomes and constitute “a wise intervention” (Walton, 2014). It is also important to consider people’s emotions while they eat, which can be powerful tools affecting behaviors and attitudes. A person who feels ashamed or guilty while eating would probably be more likely to develop

anxiety and have a less positive body image and lower self-esteem. Eating by desire in the absence of hunger may perhaps also be associated with positive outcomes, however, it was not evaluated in our study. Also, the reasons for adopting intuitive eating can probably influence the success of this mechanism because weight loss and harmony with one's body are two distinct goals that can hinder or favor the outcome.

4.4 Study Limitations

The originality of this study lies in the inclusion of different potential outcomes of intuitive eating. Other strengths include a large sample size and the use of psychometrically sound instruments. Yet more extensive results might have been obtained using all items and subscales of the global intuitive eating scale, body image scale, and media influence scale. Possible question order effect in classical global scales, were not present in this research. Although the Cronbach's alpha for the intuitive eating scale was a little low, the other psychometric measurements for all scales were adequate. Furthermore, the scale assessing media influence did not consider social media, which seems to affect body image and mental health (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Fardouly & Vartanian, 2016; Ghaznavi & Taylor, 2015; Perloff, 2014). Due to the higher rates of social media usage among adolescents, future studies should definitively consider TikTok, Instagram, Snapchat, and other social media very carefully. In this research, we have considered intuitive eating as the first step in our model. However, the cross-sectional and correlational nature of the data cannot demonstrate causality even if we used statistical tests with a causal sequence with mediations (Hayes, 2018). The tested models examine one possible combination of all the variables that we used, and the converse causal relation would be possible. For instance, having a positive self-esteem or body esteem could lead

to a better intuitive eating. This view supporting intuitive eating as an outcome is proposed by other authors (Andrew, Tiggemann, & Clark, 2015; Avalos & Tylka, 2006). Future longitudinal studies would be able to give a clearer vision of the best position of intuitive eating as a first step or outcome.

4.5 Conclusion

The novel pathway we proposed from intuitive eating to self-esteem, may have practical implications for healthy eating program development. For example, our results suggest that working on intuitive eating, that is, educating adolescents to follow their physical hunger and satiety cues rather than their emotions, could lead to several benefits, such as being less influenced by media, and having better body esteem and self-esteem. Those parameters are very important for positive personal development. Recent research in this area has suggested that mindfulness (Sairanen et al., 2015), yoga (Mahlo & Tiggemann, 2016; Ostermann, Vogel, Starke, & Cramer, 2019), and mobile applications (Brevers et al., 2017) as potential interventions for increasing intuitive eating. Future studies should center on how to promote intuitive eating effectively, for instance, by including parents or teachers in the interventions. In conclusion, efforts should continue to promote positive eating behaviors and body image during adolescence, which is a crucial development phase for youths and their families.

Disclosure of interest

The authors declare no conflict of interest.

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