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**The role of weight self-stigma on the quality of life of women with overweight and obesity:
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Abstract

Weight self-stigma is conceptualized as a multidimensional concept involving experiences of shame, self-devaluation and the perception of being discriminated against in social situations due to one's weight. It has been associated with experiential avoidance, unhealthy eating behaviours, binge eating and diminish quality-of-life (QoL). The current study aims to explore the mediation effect of weight-related experiential avoidance on the relationship between weight self-stigma and obesity-related QoL in women with and without binge eating (BE).

The sample comprised 282 women with overweight or obesity, from which 100 presented BE symptoms. Sample's mean age was 44.24 ($SD = 11.30$), with a mean BMI of 31.40 ($SD = 4.53$). Participants completed a set of self-reported measures regarding BE symptoms, weight self-stigma, weight-related experiential avoidance and QoL.

Results from path analysis supported the mediation of weight-related experiential avoidance on the relationship between weight self-stigma and QoL, even when controlling for BMI. The model accounted 58% of QoL variance. Furthermore, the multi-group analysis revealed that the model was not invariant for both groups. The analysis of the critical ratios showed that the path from weight-related experiential avoidance to QoL was stronger for the BE group. Also the model only explained 39% of QoL for the group without BE and 65% of QoL for the BE group.

This study highlights the pervasive role of weight self-stigma, particularly fear of being discriminated and weight-related experiential avoidance on obesity-related quality-of-life, especially for those women with BE. Additionally, it supports that interventions should focus not only in weight loss but also in improving individual's QoL, promoting the development of adaptive emotional regulation strategies.

Key-words: Weight self-stigma; Obesity; Weight-related experiential avoidance; Obesity-related Quality-of-life; Multi-group analysis

1. Introduction

Weight-related discrimination has been considered inescapable because it is not easily concealed from others' eyes (Andreyeva, Puhl, & Brownell, 2008; Crocker, Cornwell, & Major, 1993). This is especially important for women with overweight or obesity who are more prone to be discriminated against than overweight or obese men (Puhl, Andreyeva, & Brownell, 2008).

Weight-related stigmatization tends to invade all life domains of individuals with obesity, exacerbating disparities and affecting their physical and psychological health outcomes (Crocker et al., 1993; Kolotkin, Meter, & Williams, 2001; Puhl & Brownell, 2001; Puhl & Heuer, 2010). Research has been consistently demonstrating that weight discrimination is associated with eating disordered attitudes and behaviors (Durso, Latner, & Hayashi, 2012; Puhl & Latner, 2007), avoidance of physical activity (e.g., Faith, Leone, Ayers, Heo, & Pietrobelli, 2002), psychopathological symptoms (e.g., Ashmore, Friedman, Reichmenn, & Musante, 2007; Puhl & Heuer, 2009), poorer health care, reduced treatment compliance, medical care avoidance (Dovidio & Fiske, 2012; Lillis, Hayes, Bunting, & Masuda, 2009; Puhl & Heuer, 2010) and may lead to weight gain (Sutin & Terracciano, 2013). Weight stigma may even hold a negative impact on the efficacy of weight loss treatments (Carels, et al., 2009; Puhl & Heuer, 2009).

Additionally, these negative weight stigmatization messages can become internalized, reflecting weight self-stigma (Durso & Latner, 2008; Lillis, Luoma, Levin, & Hayes, 2010). Weight self-stigma can be considered a multidimensional construct involving negative emotions and beliefs about being overweight or obese and fear of enacted stigma (i.e. perception of being discriminated against and that one belongs to a stigmatized group; Lillis et al., 2010; Link & Phelan, 2001; Bos, Pryor, & Reeder, 2013). In fact, some evidence suggests that the self-devaluation dimension is more associated with psychopathology and unhealthy eating behaviors, while fear of enacted stigma is closely linked to diminished quality-of-life. Overall, internalized weight stigma was found to be closely related to the unwillingness to stay in contact with, and attempts to control unwanted weight-related internal experiences (Lillis et al., 2010; Palmeira, Cunha, & Pinto-Gouveia, 2016). In turn, research has been unveiling the pervasive role of experiential avoidance patterns in dealing with eating and weight difficulties (Forman et al., 2007; Lillis & Hayes, 2008; Lillis, Hayes, & Levin, 2011; Weineland, Lillis, & Dahl, 2012).

Overall, research has been highlighting internalized weight stigma as a major predictor of poorer outcomes such as: binge eating symptoms, body image dissatisfaction and diminished quality-of-life (Durso & Latner, 2008; Durso, Latner, & Hayashi, 2012; Hilbert, Braehler, Haeuser, & Zenger, 2013; Latner, Durso, & Mond, 2013; Lillis et al., 2010; Pearl, White, & Grilo, 2014). More specifically, weight self-stigma has been found to play an important role on the

relationship between BMI quality-of-life of individuals with overweight or obesity (Latner, Barile, Durso, & O'Brien, 2014; Lillis, et al., 2011).

These findings seem to be particularly relevant as weight loss is hard to maintain (e.g., Dansinger, Tatsioni, Wong, Chung, & Balk, 2007; Wadden, Butryn, & Byrne, 2004) and may not necessarily diminish weight-related stigma (Fardouly & Vartanian, 2012; Latner, Ebner, & O'Brien, 2012). Thus, recently researchers have been highlighting the importance of shifting the way individuals cope with their weight and weight-related experiences (including weight stigma) in order to increase their health-related quality-of-life (e.g., Blaine, Rodman, & Newman, 2007; Durso, Latner, White, et al., 2012; Hilbert, et al., 2013; Latner, et al., 2014; Lillis et al., 2010; Puhl & Bronwell, 2001; Puhl & Heuer, 2009; Tylka et al., 2014).

Among those who struggle with overweight or obesity, the ones that also present binge eating symptoms tend to have poorer outcomes (e.g., Bulik, Sullivan, & Kendler, 2002; Elfhag & Rossner, 2005). In fact, differences between individuals with and without binge eating have been consistently substantiated in the literature. Even when compared with overweight or obese individuals, those with binge eating (BE) symptoms reveal higher levels of eating psychopathology, body dissatisfaction, greater medical and psychiatric morbidity (e.g., Bulik et al., 2002; Durso, Latner, White, et al., 2012; Herbozo, Schaefer, & Thompson, 2015; Linde et al., 2004; Wilfley, Wilson, & Agras, 2003) and more maladaptive emotional regulation strategies (e.g., Gianini, White, & Masheb, 2013). In addition, recent evidence argues for the central role of experiential avoidance patterns in BE symptoms, as experiential avoidance was found to predict BE episodes (Lillis et al., 2011) and to play a mediating role in the relationship between negative affect and BE (Kingston, Clarke, & Remington, 2010).

Overall the presence of BE poses crucial psychosocial impairments and reduces individuals' quality-of-life beyond the experience of being obese (De Zwaan, et al., 2002). In fact, literature has been consistently showing that BE patients present poorer health-related quality-of-life (HRQoL), which includes physical and mental functioning and well-being, even when compared with patients with obesity without BE (see Baiano et al., 2014 for a meta-analysis; Kolotkin et al., 2004; Mannucci et al., 1999; Rieger, Wilfley, Stein, Marino, & Crow, 2005; Vancampfort et al. 2014; De Zwaan et al., 2002).

The fact that individuals with and without BE tend to present significant differences, led several researchers to argue that individuals with BE should be considered a distinct group from those with obesity without BE and to recommend differentiated treatments (e.g., Leehr et al., 2015). Despite the aforementioned differences, it is still unclear whether weight-related experiential avoidance patterns would mediate the relationship between weight self-stigma and obesity-related quality-of-life, and if it plays a similar role in individuals with and without BE.

The first aim of the present paper was to test the mediating effect of the tendency to control, suppress or avoid weight-related unwanted internal experiences on the relationship between weight self-stigma (both self-devaluation and fear of enacted stigma dimensions) and obesity-related quality-of-life, while controlling for BMI in a sample of women with overweight or obesity seeking help for weight loss. Secondly, the sample was divided into two groups: one including the women without BE and another with the women with BE symptoms. Then, the differences between the two groups regarding BMI, weight self-stigma, weight-related experiential avoidance patterns and obesity-related quality-of-life were explored. Lastly, and given the differences pointed out in the literature regarding individuals with and without binge eating, a multiple-group comparison was conducted to test for the model's invariance.

2. Methods

2.1. Participants

Participants were 282 women with overweight or obesity seeking nutritional treatment in the district of Coimbra, Portugal. The Binge Eating Scale's (BES) cut point was used to split the sample into two groups. According to Duarte, Pinto-Gouveia and Ferreira (2015) BES scores above 17 reflect the existence of significant binge eating symptoms. The total sample was divided in two subsamples: one comprised by the women without binge eating symptoms ($n = 182$) and another group with the women with binge eating symptoms ($n = 100$). This criteria was adopted since research has highlighted that individuals with binge eating seem to represent a distinct group from those with overweight or obesity without binge eating and because binge eating seems to play a prevailing effect on individual's quality-of-life that goes beyond their weight.

Sample's BMI ranged from 25.1 to 48 ($M = 31.40$; $SD = 4.53$). Participants' mean age was 44.24 ($SD = 11.30$), with a mean of 11.54 ($SD = 3.92$) years of education. Concerning marital status 51.8% of the participants were married and 22.7% was single. The majority came from low to medium socio-economic status, 84.1% in the non-binge-eating group and 81% in the binge-eating group.

2.2. Procedures

The study was approved by all institutions involved before the data collection took place. Participants were invited to participate on the day of their nutritional appointment by a member of the research team. Firstly, the research member informed about the voluntary and confidential nature of the collaboration as well as the general study's goals. After participants signed their informed consent, they completed the self-reported measures in a separate room. When this was

not possible questionnaires were filled out in the waiting room but apart from other people to assure confidentiality. The questionnaires took approximately 20 minutes to be completed.

2.3. Measures

Demographic Data. Participants were asked about their age, educational level, current height and weight (participants were asked to report the weight of their previous appointment). Then BMI (Wt/Ht^2) was calculated.

Binge Eating Scale (BES; Gormally, Black, Daston, & Rardin, 1982; Duarte et al., 2015) is a self-report questionnaire used to measure binge eating symptoms. For each of the 16 items participants are asked to choose which of the given statements best describes their experience. The scale's total score range from 0 to 46 with higher scores reflecting higher severity of binge eating symptoms. Research has pointed out that BES scores above 17 reflect the presence of binge eating symptoms (Duarte et al., 2015). Both the original and Portuguese versions showed high internal consistency ($\alpha = 0.88$). In this study BES internal consistency was high ($\alpha = 0.94$)

Weight self-stigma Questionnaire (WSSQ; Lillis et al., 2010; Palmeira, Cunha, & Pinto-Gouveia, 2016) is a 12 items self-report measure designed specifically to assess weight self-stigma in overweight and obese individuals. It comprises two subscales: self-devaluation (negative thoughts and emotions about being overweight) and fear of enacted stigma (involves the perception of being discriminated, as well as, the identification to a stigmatized group). Items are rated in a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with higher scores reflecting the presence of more weight self-stigma. WSSQ original version showed good psychometric properties, with an internal consistency of 0.88 for the total scale, 0.81 for self-devaluation subscale and 0.87 for fear of enacted stigma subscale (Lillis et al., 2010). The Portuguese version of WSSQ also presented good psychometric properties (Palmeira et al., 2016). In the present study the WSSQ revealed high internal consistency ($WSSQ_{total} \alpha = 0.91$; $WSSQ_{self-devaluation} \alpha = 0.84$; and $WSSQ_{fear\ of\ enacted\ stigma} \alpha = 0.88$),

Acceptance and Action Questionnaire for Weight-Related Difficulties-Revised (AAQW-R; Palmeira, Cunha, Pinto-Gouveia, Carvalho, & Lillis, 2016) is a short version of the original AAQW, that was developed to measure the tendency to avoid, control or suppress unwanted internal experiences related to one's weight. Participants are asked to rate all items in a 7-point scale (1 = "never true" or "not at all believable" and 7 = "always true" or "completely believable"), with higher scores reflecting more experiential avoidance (Lillis & Hayes, 2008). The revised version of AAQW resulted from a confirmatory factor analysis performed with a large sample ($N = 425$) where 10 items were retained. The model presented a very good model

fit to the data and the scale revealed high internal consistency ($\alpha = 0.88$), convergent and divergent validities, temporal stability and sensitivity to clinical change (Palmeira et al., 2016). In the present study only the AAQW-R global score was used. In the present study the AAQW-R showed good internal consistency ($\alpha = 0.81$).

Obesity Related Well-Being Questionnaire (Orwell-97; Mannucci, et al., 1999; Silva, Pais-Ribeiro, & Cardoso, 2008) assesses obesity-related quality-of-life (QoL), through 18 items, in three different areas: physical symptoms, discomfort and the impact on one's family, social relationships and functional functions. Participants rate the frequency and severity of symptoms (occurrence subscale) as well as its importance regarding limitations in one's life (importance subscale) in a four point scale (0 = "not at all" to 3 = "much"). Higher scores indicate diminished QoL. Both the original and the Portuguese version revealed good internal consistency ($\alpha = 0.83$ and $\alpha = 0.85$ respectively). In the present study Orwell-97's Cronbach alpha was 0.87.

2.4. Data analysis

All data analyses were performed using IBM SPSS Statistics 20 and AMOS software. Firstly, preliminary data analyses were performed to explore data adequacy. Secondly, Pearson correlation coefficients were conducted in order to verify the association between WSSQ total score and both subscales (self-devaluation and fear of enacted stigma) and BMI, weight-related experiential avoidance and obesity-related quality-of-life (Cohen, Cohen, West, & Aiken, 2003).

Likewise, independent sample *t* tests and Cohen's *d* effect size were calculated to examine differences between both groups in all study's variables (Field, 2013). According with Cohen's guidelines (1988 cited in Tabachnick & Fidell, 2007) Cohen's *d* between 0.2 and 0.4 represent small effects; between 0.5 and 0.7 medium effects and above 0.8 large effects.

Path analysis was used to explore the mediator role of weight-related experiential avoidance (AAQW-R) on the relationship between weight self-stigma (both self-devaluation and fear of enacted stigma; WSSQ) and obesity-related quality-of-life (ORWELL-97), while controlling for BMI. Path analysis allows the simultaneous examination of structural relationships, as well as the examination of direct and indirect paths (e.g., Schumacker & Lomax, 2004). We chose the Maximum Likelihood method as it allows for the estimation of all model path coefficients and to compute fit statistics. Also, to assess overall model fit a number of goodness-of-fit measures and recommended cut-points were used (Kline, 2005): Chi-Square (χ^2), Normed Chi-Square ($\chi^2/d.f.$), Comparative Fit Index ($CFI \geq 0.90$, acceptable, and ≥ 0.95 , desirable; Hu & Bentler, 1998), Tucker-Lewis Index ($TLI \geq 0.90$, acceptable, and ≥ 0.95 , desirable; Hu & Bentler, 1998), Goodness of Fit Index ($GFI \geq 0.90$, good, and ≥ 0.95 , desirable; Jöreskog & Sörbom, 1996), Root Mean Square Error of Approximation ($RMSEA \leq 0.05$, good

fit; ≤ 0.08 , acceptable fit; Kline, 2005) with a 95% confidence interval. The mediation effects were analyzed using a bootstrap procedure (2000 resamples) with 95% bias-corrected confidence interval. It is considered that if zero is not included on the interval between the lower and the upper bound the effect is statistically significant at $p < 0.05$ (Kline, 2005).

Furthermore, a multiple-group comparison was performed to test whether the model structure was invariant for both groups. The invariance of the structural model for both groups was tested through the chi-square difference test and the critical ratios for differences among all parameter estimates. Significant differences between groups exist when critical ratio values are larger than 1.96 (Byrne, 2010).

3. Results

3.1. Preliminary Data Analyses

No severe bias to normal distribution were found, as all variables presented acceptable values of skewness and kurtosis ($SK < |3|$ and $Ku < |8-10|$) and $VIF < 5$ (Kline, 2005), which excludes the existence of multicollinearity. Also, from the analysis of multivariate outliers using Mahalanobis distance statistic (D^2), some cases indicated the presence of outliers. Nevertheless, extreme values were not detected which lead us to decide to maintain the outliers. This procedure has been considered to make the data more likely to be representative of the population under study (Kline, 2005; Tabachnick & Fidell, 2007).

3.2. Correlation analysis

Pearson's correlation coefficients for all variables in study are presented in Table 1. As can be seen, BMI showed low associations with all self-reported variables in study. $WSSQ_{total}$, as well as both subscales presented moderate and positive associations with ORWELL, AAQW-R and BES, with the exception of the relation between $WSSQ_{fear\ of\ enacted\ stigma}$ with ORWELL that can be considered high. Finally, AAQW-R was positively and moderately correlated with both ORWELL and BES.

Table 1.

Pearson moment correlation on all variables for the total sample (N =282).

Measures	1	2	3	4	5	6	7
1. BMI	-						
2. WSSQ _Total	0.22***	-					
3. WSSQ self-devaluation	0.12*	0.91***	-				
4. WSSQ fear of enacted stigma	0.27***	0.92***	0.67***	-			
5. ORWELL-97	0.22***	0.69***	0.55***	0.71***	-		
6. AAQW-R	0.25***	0.61***	0.55***	0.56***	0.62***	-	
7. BES	0.26***	0.62***	0.54***	0.58***	0.54***	0.49***	-

Note. * $p < 0.05$; *** $p < 0.001$; BMI = Body Mass Index; WSSQ = Weight Self-Stigma Questionnaire; ORWELL-97 = Obesity Related Well-Being Questionnaire; AAQW-R = Acceptance and Action Questionnaire for Weight-Related Difficulties- Revised; BES = Binge Eating –Scale

3.3. Differences between groups

Independent t tests were conducted to explore group differences in all variables in study. Means, standard deviations, t -test differences and Cohen's d for all variables in each group (with and without binge-eating) are displayed on Table 2. Results show that the binge eating group had a significantly higher BMI and higher levels of weight self-stigma and diminished QoL when compared with women with without binge eating symptoms. All differences reflect very large effects, with the exception of BMI differences that represent a small effect (Table 2).

Table 2.

Means (M), standard deviations (SD), t-test differences and Cohen's d effect size by group based on Binge eating scores (BES) for all variables (N = 282).

	BES < 17		BES ≥ 17		<i>t(df)</i>	<i>p</i>	Cohen's d
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
	(n = 182)		(n = 100)				
BMI	30.74	4.56	32.59	4.25	-3.344 (280)	<0.001	0.42
BES	6.97	4.58	26.32	8.41	-21.336 (280)	<0.001	3.12
WSSQ-Total	28.09	8.37	37.21	9.75	-8.243 (280)	<0.001	1.03
WSSQ Self-devaluated	15.79	4.85	20.05	5.09	-6.935 (280)	<0.001	0.86
WSSQ fear of enacted stigma	12.30	4.52	17.16	5.73	-7.322 (280)	<0.001	0.98
AAQW-R	32.23	10.73	42.31	11.19	-5.884 (280)	<0.001	0.93
ORWELL-97	38.78	12.00	51.56	14.31	-7.581 (280)	<0.001	0.99

Note. BMI = Body Mass Index; BES = Binge Eating –Scale; WSSQ = Weight Self-Stigma Questionnaire; AAQW-R = Acceptance and Action Questionnaire for Weight-Related Difficulties- Revised; ORWELL-97 = Obesity Related Well-Being Questionnaire.

3.4. Path analysis

To test the mediator effect of weight-related experiential avoidance on the relationship between weight self-stigma and obesity-related quality-of-life, controlling for the effect of BMI, a path analysis was performed. The initial model was tested through a fully saturated model with 15 parameters. Model fit indices were neither examined nor reported as fully saturated models always have a perfect model fit. The analysis of the path coefficients from the first (fully saturated) model revealed that two path coefficients were not statistically significant and were progressively removed. First we removed the direct path from BMI → QoL (*t* statistics = -0.002; *p* = 0.982 and then the direct path from WSSQ_{self-devaluation} → QoL (*t* statistics = 0.104; *p* = 0.447). The model was then respecified with all the remaining individual path coefficients being statistically significant. The final model can be seen in Fig. 1. Overall the model presented an excellent model fit to the data: $\chi^2(2, N = 282) = 0.516, p = 0.772; \chi^2/d.f. = 0.258; GFI = .999; CFI = 1.000; RMSEA = 0.000, [CI = 0.000; 0.078]; p = 0.877$.

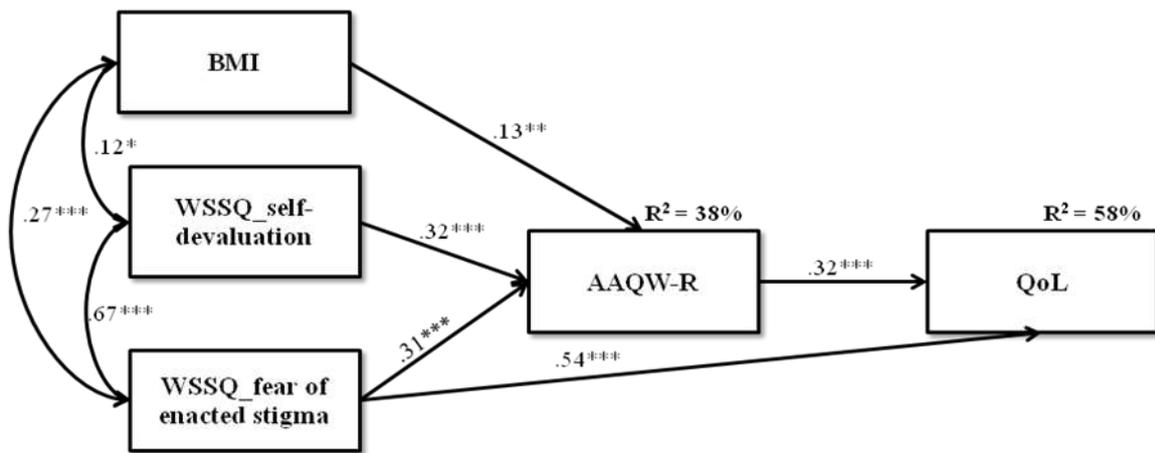


Fig. 1. Final Path Model ($N = 282$).

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; Standardized path coefficients among variables are presented. All path coefficients are statistically significant.

3.5. Mediation Analysis

The analysis of the total, direct and indirect effects showed that the direct effect of WSSQ_{fear of enacted stigma} on QoL was $\beta = 0.536$ based on 95% CI: (0.439; 0.622, $p = 0.001$). Also, AAQW-R presented a significant direct effect on QoL ($\beta = 0.315$; based on 95% CI: 0.277; 0.409, $p = 0.001$). Moreover, three positive and statistically significant indirect effects on QoL through AAQW-R were found, namely between: BMI and QoL ($\beta = 0.041$; based on 95% CI: 0.004; 0.028, $p = 0.028$); WSSQ_{self-devaluation} and QoL ($\beta = 0.101$; based on 95% CI: 0.056; 0.157, $p = 0.001$); and WSSQ_{fear of enacted stigma} and QoL ($\beta = 0.099$; based on 95% CI: 0.050; 0.157, $p = 0.001$). Finally, the total effect of WSSQ_{fear of enacted stigma} on QoL was $\beta = 0.635$ based on 95% CI (0.550; 0.710, $p = 0.001$), representing the sum of the standardized direct effect with the standardized indirect effect. Overall, the final model (Fig. 1) accounted for 38% of weight-related experiential avoidance and 58% of obesity-related quality-of-life.

3.6. Multi-group analysis

A multi-group analysis was used to verify if there were differences in the final model between the two groups (women with and without binge eating). The tested model presented a very good fit to the data for both groups: $\chi^2(4) = 6.148$, $p = 0.188$; $\chi^2/d.f. = 1.537$; CFI = 0.995; TLI = 0.975; RMSEA = 0.044, [CI = 0.000; 0.108]; $p = 0.480$.

The multi-group analysis allows to test whether the path coefficients are equal or invariant between groups. The unconstrained model (i.e., with free structural parameter coefficients) and

the constrained model (i.e., where the parameters are constrained equal across groups) were compared (Byrne, 2010). Results from the Chi-square difference test revealed that the model was not invariant for the two groups ($\chi^2 \text{ dif}(5) = 7.198, p = 0.206$). Moreover, in the group without binge eating the model accounted for 30% of AAQW-R and 39% of women's obesity-related QoL (Fig. 2). On the other hand, for the group with binge eating the model explained 33% of the AAQW-R and 65% of women's obesity-related QoL (Fig. 3).

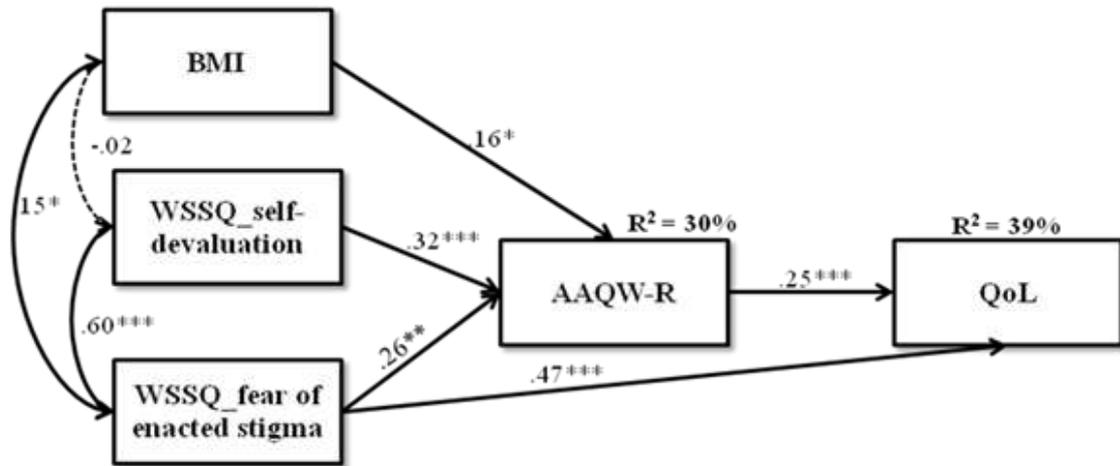


Fig. 2. Path Model for the group without Binge Eating ($n = 182$).

Note. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$; Standardized path coefficients among variables are presented. All path coefficients are statistically significant.

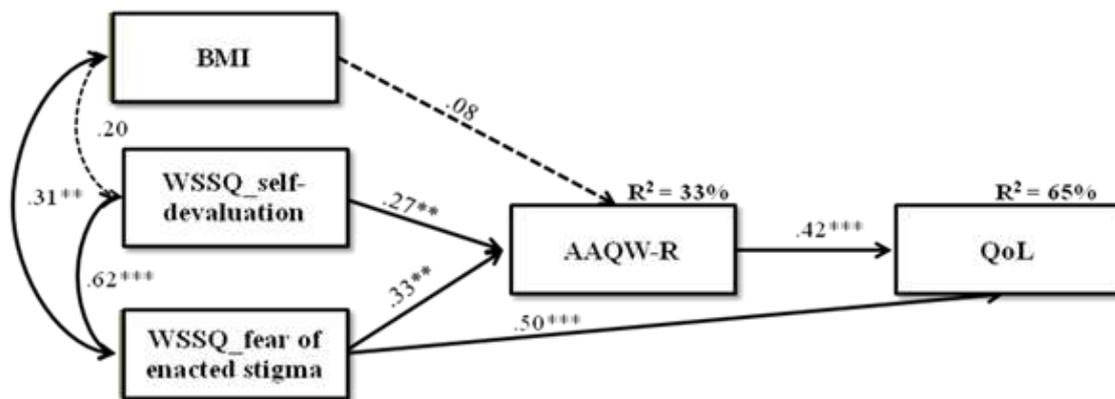


Fig. 3. Path Model for the group with Binge Eating ($n = 100$).

Note. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$; Standardized path coefficients among variables are presented. Dotted lines represent non-significant path coefficients.

Finally, the critical ratio differences were calculated to test for differences between both groups among all parameter estimates. Results showed that only the parameters coefficients in

the path between AAQW-R and QoL had a statistically significant difference ($Z = 2.257, p < 0.05$). For the group without binge eating the standardized regression weight was $\beta = 0.277, p < 0.001$ whereas for the group with binge eating was $\beta = 0.537, p < 0.001$. This suggests that the relationship between AAQW-R and QoL seems to be stronger in the group with binge eating than in the group without binge eating.

4. Discussion

The negative consequences of the widespread weight-related stigmatization are well known and can lead to the development of weight self-stigma (e.g., Puhl & Heuer, 2009; Puhl & Latner, 2007; Sutin & Terracciano, 2013), which has been related to poorer health-related outcomes (Durso & Latner, 2008; Lillis et al., 2010). Moreover, literature emphasizes differences between individuals with and without binge eating (e.g., Bulik et al., 2002; Elfhag & Rossner, 2005; Herbozo et al., 2015; Wilfley et al., 2003). The current study contributes to the understanding of these differences by testing the mediator role of weight-related experiential avoidance on the relationship between self-weight-stigma (both self-devaluation and fear of enacted stigma) and obesity-related quality-of life (while controlling for BMI). Furthermore, the model was tested in two groups of women with overweight or obesity, one group with binge-eating symptoms and another without binge-eating symptomatology.

As expected, weight-self-stigma showed moderate and positive associations with weight-related experiential avoidance, binge-eating symptomatology and poorer obesity-related quality-of-life. Similarly, individuals with internalized weight stigma had already been found to present unhealthy eating patterns, shame, experiential avoidance patterns related to their own weight and reduced health-related quality-of-life (e.g., Durso, Latner et al., 2012; Latner, et al., 2013; Lillis et al., 2010).

On the other hand, BMI was only weakly related with all the study's variables. Interestingly, evidence on BMI in relation to weight self-stigma and weight-related experiential avoidance has been somewhat inconsistent. While some studies found positive and moderate associations (Lillis et al., 2009, 2010, 2011), others failed to find significant correlations (e.g., Weineland et al., 2012). On the other hand, BMI has been found to be related to lower physical functioning (QoL dimension), but not with psychosocial status and social adjustment (e.g., Mannucci et al., 1999).

Furthermore, results from our independent *t*-tests are in line with previous research that consistently points to differences in overweight or obese individuals with and without binge-eating (e.g., Durso, Latner, White et al., 2012; Herbozo et al., 2015; Vancampfort et al., 2014). In fact, in our sample, women with binge eating showed higher BMI and significantly more

internalized weight-stigma and weight-related experiential avoidance patterns and poorer quality-of-life, than women without binge-eating. Previous research had already established that among those struggling with overweight and obesity those with BE symptoms tend to present higher BMI, weight self-stigma (Durso, Latner, White et al., 2012) and reduced physical and psychological quality-of-life (Kolotkin et al., 2004; Mannucci et al., 1999; De Zwaan et al., 2002). However, as far as we know, no study had yet explored differences between these two groups concerning experiential avoidance patterns. Thus, our results add to previous knowledge by suggesting that women with BE symptoms tend to use more avoidance, control or suppression strategies to deal with their unwanted weight-related thoughts and emotions, even when compared to overweight or obese women without binge-eating. In fact, binge-eating episodes have been considered as attempts to control, suppress or avoid difficult and unwanted internal experiences (e.g., Gianini et al., 2013; Lillis et al., 2011). Also, these results seem to corroborate the emotional regulation model of binge-eating that proposes that binge-eaters have additional emotional regulation difficulties and may be considered a distinctive neurobiological phenotype within obesity (Lehr et al., 2015).

Moreover, our study contributes to the existent literature by finding a mediator effect of the tendency to use avoidance and inflexible strategies to deal with weight-related unwanted thoughts and emotions on the relationship between weight self-stigma (both self-devaluation thoughts and fear of discriminated against due to one's weight) and quality-of-life in women with overweight or obesity seeking nutritional treatment, even when controlling for BMI. Overall, our model explained 38% of weight-related experiential avoidance and 58% of obesity-related quality-of-life.

In addition, results from the mediational analysis revealed that the relationship between weight self-stigma (self-devaluation) on quality-of-life was fully mediated by the tendency to control or avoid weight-related undesirable thoughts and emotions. Therefore, it seems that the internalized negative weight stigma messages are related to poorer quality-of-life, when women become trapped in avoidance and inflexible strategies to deal with their weight-related unwanted internal experiences.

Remarkably, fear of enacted stigma presented both a direct and indirect effect (through weight-related experiential avoidance) on obesity-related quality-of-life. The direct effect was the largest, suggesting the important impact that being afraid of being discriminated against in social situations due to one's own weight holds on one's quality-of-life. Although less dominant, and partial, this relationship is also mediated by the tendency to escape, avoid or control their weight-related thoughts and feelings.

Particularly interesting in this study was the fact that our model was not invariant across groups. This finding adds to previous knowledge highlighting the crucial role that weight-related self-stigma and weight-related experiential avoidance play on quality-of-life, especially for women with BE. Previously, Lillis et al. (2011) suggested that binge eating behaviors may arise, at least partially, from the use of food as a disrupted attempt to regulate negative emotions. Our findings seem to support this assumption, corroborating the emotional regulation model that advocates that individuals with binge-eating have poorer emotional regulation strategies, even when compared with other individuals without binge-eating. In turn, these disturbed emotional regulation strategies (such as experiential avoidance) have been consistently linked to poorer outcomes (e.g., Leehr et al., 2015; Gianini et al., 2013).

Taken together, these findings emphasize the negative role of weight self-stigma, particularly fear of being discriminated by others in social situations and weight-related experiential avoidance on obesity-related quality-of-life. Moreover, even when controlling for BMI, the presence of binge-eating symptoms seems to be accompanied by higher levels of weight self-stigma and experiential avoidance strategies and reduced quality-of-life. This seems to support the awareness that BE impairs individuals' lives beyond their weight.

The present study has some limitations. The first relies on the cross-sectional nature of the data used, which prevents assumptions of causality. Clearly, these results need to be replicated using longitudinal designs, in order to properly confirm the results found. Furthermore, the assessment of binge-eating symptoms relied on BES scores. Ideally, other methods (e.g., structured interview) should be used to confirm binge-eating severity. However, a recent study (Duarte et al., 2015) found that BES scores above 17 are indicative of significant binge eating symptomatology. Likewise, the sample is comprised only of adult women, which compromises data generalization to overweight and obese male or adolescent populations. Also, it is known that self-reported measures can introduce bias, which may influence results. Finally, our model can be considered limited as other variables (e.g., unhealthy eating patterns, self-criticism, self-disgust) may contribute to decrease obesity-related quality-of-life. Nonetheless, we specifically intended to explore the role of internalized stigma and weight-related experiential avoidance patterns on obesity-related quality-of-life.

To sum up, the present study makes a relevant contribution for professionals working with adult populations seeking to lose weight, by highlighting the role of weight self-stigma and weight-related experiential avoidance tendencies on quality-of-life, especially for those with binge-eating symptoms. Furthermore, it provides empirical support for the need to have differentiated interventions when treating individuals trying to lose weight, as those with binge-eating seem to pose distinct clinical challenges. Overall, interventions should target individual's

weight self-stigma and experiential avoidance patterns, by cultivating a more accepting and compassionate way of dealing with those unwanted weight-related thoughts and emotions, in order to improve their quality-of-life.

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