



Does the recall of caregiver eating messages exacerbate the pathogenic impact of shame on eating and weight-related difficulties?

Sara Oliveira¹ · Cláudia Pires¹ · Cláudia Ferreira¹

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Abstract

Purpose The central role of caregiver eating messages has been recognized on later individual's eating behaviour, body image and weight status. Additionally, shame is a painful emotion also associated with the development and maintenance of body image and eating-related difficulties. The main aim of the present study was to explore the moderator effect of the recall of caregiver eating messages on the associations between external shame, body weight and shape-related concerns, and the adoption of inflexible eating rules.

Methods The sample comprised 479 women from the general population, aged from 18 to 60 years, who completed self-report measures.

Results Results of the correlation analyses showed that early caregiver restrictive/critical eating messages were positively associated with external shame, inflexible eating and overvaluation of body weight and shape. Path analysis results demonstrated a moderator effect of early caregiver critical eating messages on the relationship between external shame and both weight and shape-related concerns and inflexible eating. These results revealed that caregiver restrictive/critical eating messages exacerbated the impact of shame on these psychopathological indices, with the tested model accounting for 19% and 38% of the variance of inflexible eating rules and body weight and shape concerns, respectively.

Conclusions These findings seem to suggest important research and clinical implications, contributing to the understanding of disordered eating patterns, and appear to represent a new avenue for the development of prevention and intervention programs. Particularly, these findings support the relevance of targeting caregiver eating-related attitudes and messages in prevention interventions for eating psychopathology.

Level of evidence Level V, cross-sectional descriptive study.

Keywords Caregiver eating messages · External shame · Weight and shape concerns · Inflexible eating · Moderator effect

Introduction

Parents play an important role in the development of children's eating patterns and weight status early in life [1, 2]. In fact, parents/caregivers have the power to manage the kind of food available in the household and act as role models, shaping attitudes and behaviours in this domain [3, 4].

Different strategies can influence or control children's food intake: the strategy of restriction involves limiting access to certain foods, including favourite foods, as well as restricting the amount of food; and the strategy of pressure to eat involves pressuring children to eat certain foods (such as healthy foods) and pressure to eat more in general [3]. Despite aiming to promote healthy eating, these strategies have been linked to negative outcomes in terms of children eating behaviour and weight status [1]. In fact, some evidence supports that early caregiver messages regarding children's weight and eating are associated with their disordered body and eating behaviours [5, 6]. Most importantly, cross-sectional studies have considered how parents' own eating behaviours and body concerns can be related to the ways in which they feed their children [7] with evidence supporting

✉ Sara Oliveira
sara.oliveira.uc@gmail.com

¹ CINEICC, Center for Research in Neuropsychology and Cognitive Behavioural Intervention, Faculdade de Psicologia e Ciências da Educação, Universidade de Coimbra, Rua do Colégio Novo, Apartado 6153, 3001-802 Coimbra, Portugal

a link between parental body dissatisfaction and controlling feeding practices. A study conducted by Webb and Haycraft [8] suggested that the connection between parent body dissatisfaction and maladaptive feeding practices play a role in the intergenerational transmission of body image and eating pathology. Hence, parental practices in eating domain may likely continue to affect children body attitudes and eating behaviours, even after the decrease or end of the direct exposure to them, into adulthood [e.g. 9]. In this line, a study conducted by Kroon Van Diest and Tylka concluded that individuals who report caregiver eating messages, particularly of restriction and criticism, tend to present higher body mass index, body dissatisfaction and disordered eating and less body appreciation and intuitive eating [10]. Furthermore, there is evidence that individuals' perceptions about critical eating messages from their caregivers can be experienced as shaming experiences [10, 11].

The experience of shame has been associated with negative affect and the development and maintenance of psychopathology [e.g. 12, 13], namely body image and eating psychopathology [14–18], such as anorexia and bulimia nervosa [19]. In an evolutionary perspective, shame can have a defensive function, acting as a warning signal that one may be negatively evaluated by others and therefore devalued, ostracized, or rejected [20, 21]. Also, several studies converge on the idea of shame as a socially focused emotion which emerges in the context of competition for social attractiveness (i.e., perceptions that one is failing in creating a positive and attractive image of the self for others and that certain personal features are evaluated as unattractive or inferior, making one vulnerable to social disapproval or rejection) [12, 20, 22, 23]. However, growing evidence has demonstrated that shame can have a detrimental impact on mental health problems, specifically maladaptive attitudes and behaviours in body and eating [24, 25] in both clinical and non-clinical samples [26]. In this line, strategies such as eating control tend to arise to avoid shame and improve one's social status, to compete for social advantages [e.g. 24, 27]. In fact, eating control and dieting may emerge as a strategy to control one's weight and body image with the purpose of becoming physically closer to the socially ideal figure and to be appreciated by others [e.g. 24, 27]. However, these strategies often have paradoxical effects, seeming to be a source of suffering rather than a resolution [28]. Though some women may believe that if they lose weight they will become more secure and seem more attractive to others [29], literature has demonstrated that women who are often involved in controlling and restricting feeding behaviours have more tendency to have overweight problems and eating psychopathology [30]. In a recent study, Duarte and colleagues explored a new construct that seems to be fundamental in body and eating-related difficulties, called inflexible eating [31]. Inflexible eating is defined as the adherence

to inflexible and idiosyncratic eating rules, while neglecting internal (e.g. hunger) or external (e.g. social contexts) signals, with a sense of control when such rules are followed, and emotional distress when one feels that one has failed to do so [24, 31]. Therefore, inflexible eating refers to a disconnection from contextual cues and the rigid and inflexible adherence to eating rules [31, 32]. Duarte and colleagues demonstrated that individuals who adhere more to inflexible dietary rules, while ignoring other sources of eating regulation, have higher tendency for eating disorders [31]. Indeed, inflexible eating may be conceptualized as a maladaptive control strategy to try to change what is perceived to be the source of shame—one's body weight and/or shape.

To sum up, parent's use of controlling feeding practices have a negative impact on child eating behaviour. In fact, some parental comments, such as those that reinforce dieting, try to restrict certain highly caloric food, or make fun of the child for eating too much, can be perceived by individuals as indicating their defect or being a failure. Hence, considering that caregiver eating messages, particularly of restriction and criticism, may have a negative effect on children's eating behaviours and body image, which may persist into adulthood [10], it is important to explore the role of these variables in eating-related difficulties. The current study aims to innovatively explore whether concerns regarding weight and shape and inflexible eating rules can be exacerbated by the recall of caregiver eating messages. It is expected that the recalling of these messages will exacerbate the relationship of external shame with weight and shape concerns and inflexible eating. In other words, for the same levels of feelings of shame, individuals who recall negative caregiver eating messages (i.e., early memories of shame regarding eating) could present more weight and shape concerns and inflexible eating. In fact, given the pervasive impact of inflexible eating and maladaptive attitudes towards body shape and weight, it is considered that research should focus on the analysis of potential exacerbating factors of these difficulties, so that prevention and intervention programs on these areas can be more comprehensive and helpful.

Materials and methods

Participants

The sample included 479 women from the Portuguese general population, aged between 18 and 60 years ($M = 25.66$; $SD = 8.50$) and with a mean of 14.46 ($SD = 2.20$) years of education. Regarding marital status, most of the participants were single ($n = 400$; 83.5%), 68 (14.2%) were married or living together, 8 (1.7%) divorced and only 3 (0.6%) reported to be widows. Concerning the area of residence, 36.5%

($n = 127$) of the subjects lived in a rural area and 73.5% ($n = 352$) in an urban one.

Participants' BMI ranged between 16.22 and 40.89, ($M = 22.60 \text{ kg/m}^2$; $SD = 3.85$). Moreover, participant's BMI distribution was revealed to be equivalent to the female Portuguese population [33].

Measures

Demographic data

Participants reported their age, sex, education level and current weight and height used to calculate body mass index (BMI).

Body mass index

Participants' BMI was calculated through the Quetelet Index and was based on self-reported weight and height values (kg/m^2).

The Other as Shamer Scale-2 [34]

OAS-2 measures external shame, that is, the perception of being negatively evaluated by others. This scale comprises eight items scored on a five-point scale from 0 ("Never") to 4 ("almost always") which refers to the frequency of the participants' perceptions of negative social evaluations. OAS-2 demonstrated good psychometric characteristics, presenting a Cronbach's alpha of 0.82 in the original study.

Caregiver Eating Messages Scale [10, 35]

CEMS is a ten-item measure of participants' recalled childhood experiences concerning messages expressed by their caregivers about actions related to food. This scale comprises two subscales: restrictive/critical eating messages

and pressure to eat messages. Participants respond to each item using a six-point scale ranging from 1 ("never") to 6 ("always"). Higher item scores indicate greater perceived pressure to eat or criticalness/restriction of food choice/intake. CEMS showed good psychometric characteristics, presenting a Cronbach's alpha of 0.82 and 0.86 for the restrictive and pressure to eat subscales, respectively, in the original work. In the Portuguese version, CEMS presented a Cronbach's alpha of 0.88 and 0.85 for the restrictive and pressure to eat subscales, respectively.

Eating Disorder Examination Questionnaire [36, 37]

EDE-Q is a 36-item self-report version of EDE which assesses the frequency and intensity of disordered eating attitudes and behaviours. It comprises four subscales: restraint, weight concern, shape concern and eating concern. The items are rated for the frequency of occurrence (items 1–15, on a scale ranging from 0 = "None" to 6 = "every day") or symptom severity (items 29–36, on a scale ranging from 0 = "None" to 6 = "extremely"). The current study used the weight concern and shape concern scores of the questionnaire. EDE-Q has demonstrated good psychometric properties both in the original study and Portuguese version (with Cronbach's alpha values of weight and shape ranging from 0.84 to 0.93, respectively).

Inflexible Eating Questionnaire [31]

IEQ is an 11-item self-report scale developed to measure the inflexible adherence to subjective eating rules. Participants respond to each item using a 5-point Likert scale ranging from 1 ("totally disagree") to 5 ("totally agree"). IEQ has shown strong psychometric characteristics, presenting a Cronbach's alpha value of 0.95 in the original study.

Internal consistency of these measures in the current study is reported in Table 1.

Table 1 Means (M), standard deviations (SD), Cronbach's alpha (α), and intercorrelation scores on self-report measures ($N = 479$)

	M	SD	α	1.	2.	3.	4.	5.	6.
1. Age	25.66	8.50	–	–	–	–	–	–	–
2. Body Mass Index	22.60	3.85	–	0.30***	–	–	–	–	–
3. Restrictive/critical eating messages	8.88	4.57	0.89	–0.11*	0.33***	–	–	–	–
4. Pressure to eat messages	16.27	5.59	0.86	–0.10*	–0.05	0.03	–	–	–
5. External shame	7.83	6.31	0.93	–0.03	0.15**	0.30***	0.08	–	–
6. Weight and shape concerns	1.58	1.45	0.93	–0.05	0.43***	0.39***	0.02	0.46***	–
7. Inflexible eating	30.12	10.28	0.93	0.06	0.27***	0.33***	0.06	0.30***	0.54***

Restrictive/critical eating messages and pressure to eat messages (as measured by Caregiver Eating Messages Scale); external shame (assessed by the Other as Shamer Scale-2); weight and shape concerns (as measured by Eating Disorder Examination Questionnaire); inflexible eating (assessed by Inflexible Eating Questionnaire)

* $p < .50$, ** $p < .010$, *** $p < .001$

Procedures

Data collection and other study procedures considered all ethical and deontological requirements inherent to scientific research and the study was approved by the Ethical Board of the Faculty of Psychology and Education Sciences of the University of Coimbra. The sample comprised university students and participants from the general community. An invitation to participate in this study, advertised as: “The aim of this research is to investigate how people’s body attitudes and eating behaviours may be influenced by the early experiences with parents or caregivers”, was electronically sent through social networks and e-mail to potential participants (i.e. the exponential non-discriminative snowball sampling method was used to spread invitations among potential participants). Attached to the invitation were detailed information regarding the purpose and procedures of the study, data conditional-ity, the voluntary nature of the participation and a link to the online platform with the informed consent form and self-report questionnaires to be answered. All individuals ($n = 613$) who accepted to take part in this study provided their written informed consent before answering an online version of self-report measures. However, considering the aims of the present study, the database was cleaned to exclude: (i) male participants; (ii) participants who were not of Portuguese nationality and (iii) participants younger than 18 and older than 60 years. This process resulted in a final sample of 479 female participants. There were no missing data because the platform only allows the submission of the questionnaires when all data are complete.

Data analyses

Descriptive and correlational analyses were performed using the software IBM SPSS (v.22; SPSS Inc., Chicago, IL), to examine the characteristics and the links among age, BMI, external shame, restrictive and critical eating messages, weight and shape concerns and inflexible eating.

To test the moderator effect of restrictive and critical eating messages (RCM) in the association between external shame and weight and shape concerns and inflexible eating, a path analysis was performed (Figs. 1, 2) using the software AMOS (version 21, SPSS; Armonk, NY: IBM Corp.) The models examined three causal paths to weight and shape concerns and inflexible eating (endogenous, dependent variable): (a) the impact of external shame; (b) the impact of restrictive and critical eating messages; (c) the impact of the interaction term of external shame and restrictive and critical eating messages (obtained through the product of these variables). The moderation effect is corroborated if the interaction path is significant. The maximum likelihood method was used to estimate all model path coefficients, and effects with $p < 0.05$ were considered statistically significant. Finally, two graphs were plotted to better understand the relationships between the predictor (external shame) and outcome variables (weight and shape concerns and inflexible eating), at different levels—low, medium and high—of the moderator (restrictive and critical eating messages). In these graphical representations, and since there were no theoretical cut points for restrictive and critical eating messages, the three curves were plotted taking into account the following cut-point values of the moderator variable on the x axis: one standard deviation below the mean, the mean and one

Fig. 1 Path model: the moderator role of the perceived early restrictive/critical eating messages on the association between external shame and weight and shape concerns, while controlling for the effect of age and BMI. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

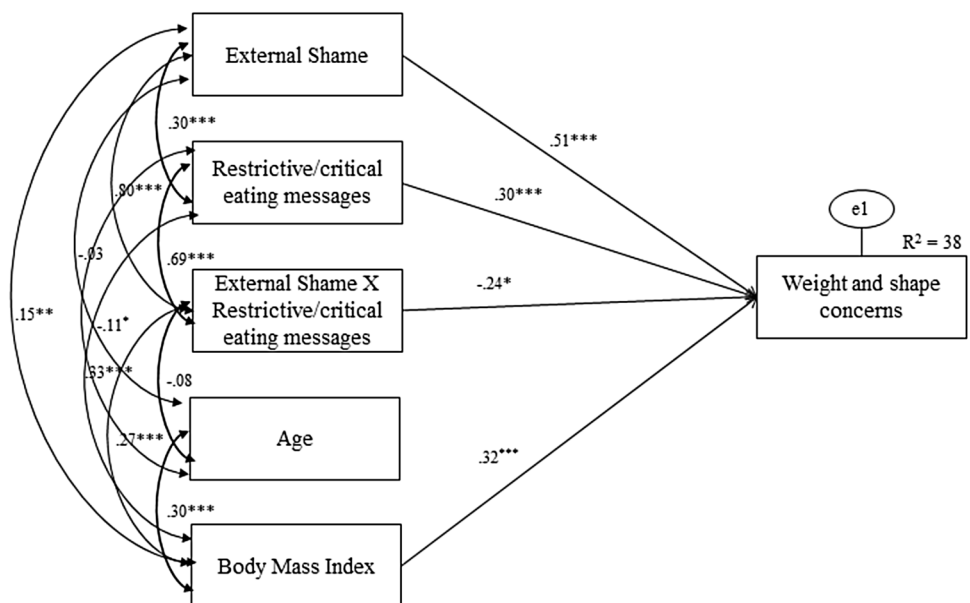
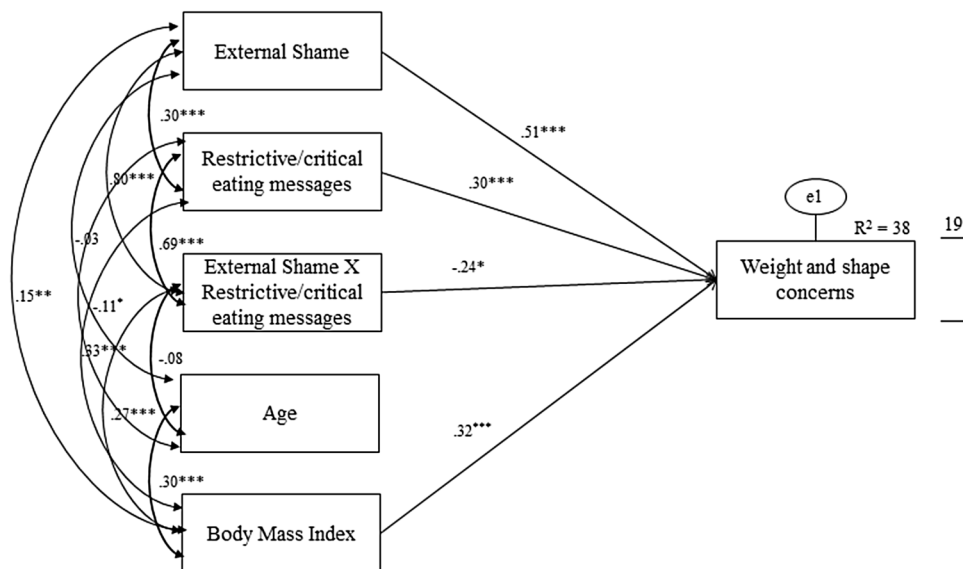


Fig. 2 Path model: the moderator role of the perceived early restrictive/critical eating messages on the association between external shame and inflexible eating, while controlling for the effect of age and body mass index. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$



standard deviation above the mean, as recommended by Cohen and colleagues [38].

Results

Preliminary analysis

Univariate and multivariate normality was examined by the values of skewness and kurtosis, which indicated that there was no severe violation of the normal distribution [39].

Descriptive and correlations analyses

Descriptive statistics referring to the study’s variables are presented, for the total sample ($n = 479$), in Table 1.

Correlation results demonstrated that age revealed non-significant associations with most variables in the study, except with BMI and with restrictive/critical and pressure to eat messages. BMI presented a non-significant correlation with pressure to eat messages and significant associations with external shame, inflexible eating and weight and shape concerns. Pressure to eat messages revealed non-significant associations with restrictive/critical eating messages, external shame, weight and shape concerns and inflexible eating. Restrictive/critical eating messages presented positive and moderate correlations with external shame, weight and shape concerns and inflexible eating. Moreover, external shame was positively and moderately associated with weight and shape concerns and inflexible eating, which, in turn, were positively and strongly associated with each other.

Path analysis

The purpose of the path analysis was to examine whether restrictive/critical caregiver eating messages moderated the impact of external shame on weight and shape concerns and inflexible eating, while controlling for the effect of age and BMI. Because pressure to eat messages was not correlated with most of the variables in the study, we did not include it within our model.

Firstly, the associations between external shame, restrictive/critical eating messages (RCM) and weight and shape concerns (as measured by EDE-Q), while controlling for the effect of age and BMI, were analysed. This model was tested through a fully saturated model (i.e. with zero degrees of freedom) and comprised 27 parameters, which explained 38% of the variance of weight and shape concerns (Fig. 1). In this model, all path coefficients were statistically significant ($p < 0.05$), except the direct effect of age on weight and shape concerns ($b_{age} = -0.00$; $SE_b = 0.07$; $Z = -0.60$; $p = 0.55$). This path was eliminated and the model was readjusted. Results indicated that all path coefficients in the model were statistically significant ($p < 0.05$) and explained 38% of the variance of weight and shape concerns (Fig. 1).

The final model presented an excellent model fit [$\chi^2(1) = 0.36$, $p = 0.55$, $CMIN/DF = 0.36$; $TLI = 1.007$; $CFI = 1.000$; $RMSEA = 0.000$, $p = 0.73$; 95% CI = 0.00–0.10, Kline 2005]. BMI presented a direct effect of 0.32 ($b_{BMI} = 0.12$; $SE_b = 0.04$; $Z = 8.44$; $p < 0.001$) on weight and shape concerns. External shame presented a direct effect of 0.51 ($b_{OAS-2} = 0.12$; $SE_b = 0.017$; $Z = 6.89$; $p < 0.001$) on weight and shape concerns and RCM had a direct effect of 0.30 ($b_{RCM} = 0.48$; $SE_b = 0.10$; $Z = 4.77$; $p < 0.001$) on weight and shape concerns. Also, results showed that the interaction effect between the two variables was significant

($b_{\text{OAS-2} \times \text{RCM}} = -0.004$; $SE_b = 0.002$; $Z = -2.43$; $p = 0.015$; $\beta = -0.24$). These effects were significant and suggested the existence of a moderator effect of restrictive/critical eating messages on the relationship between external shame and weight and shape concerns, while controlling for the effect of age and BMI.

Concerning the relationships between external shame (OAS-2), restrictive/critical eating messages (RCM) and inflexible eating (as measured by IEQ), while controlling the effect of age and BMI, the model was tested through a fully saturated model (i.e. with zero degrees of freedom) and comprised 27 parameters. In this model, all path coefficients were statistically significant ($p < 0.05$), except the direct effect of age on inflexible eating ($b_{\text{age}} = 0.04$; $SE_b = 0.05$; $Z = 0.79$; $p = 0.43$). This path was eliminated and the model was readjusted. Results indicated that all path coefficients in the model were statistically significant ($p < 0.05$) and explained 19% of the variance of inflexible eating (Fig. 2). The final model presented an excellent model fit [$\chi^2(1) = 0.62$, $p = 0.43$, CMIN/DF = 0.62; TLI = 1.005; CFI = 1.000; RMSEA = 0.000, $p = 0.65$; 95% CI = 0.00–0.11, Kline 2005]. BMI had a direct effect of 0.17 on inflexible eating ($b_{\text{BMI}} = 0.46$; $SE_b = 0.12$; $Z = 3.94$; $p < 0.001$). OAS-2 had a positive direct effect of 0.41 on inflexible eating ($b_{\text{OAS-2}} = 0.67$; $SE_b = 0.14$; $Z = 4.88$; $p < 0.001$). RCM presented a direct effect of 0.37 ($b_{\text{RCM}} = 0.84$; $SE_b = 0.16$; $Z = 5.23$; $p < 0.001$) towards inflexible eating. Furthermore, the interaction effect between external shame and restrictive/critical eating messages presented significant direct effects on inflexible eating ($b_{\text{OAS-2} \times \text{RCM}} = -0.04$; $SE_b = 0.01$; $Z = -2.85$; $p = 0.004$; $\beta = -0.32$). These effects were significant and results seem to indicate a moderator effect of restrictive/critical eating messages on the association between external shame and inflexible eating, while controlling for the effect of age and BMI.

To better understand the relationship between external shame with weight and shape concerns and inflexible eating in the presence of different levels of reported caregiver restrictive and critical eating messages, two graphs were plotted (Fig. 3 for body weight and shape concerns, Fig. 4 for inflexible eating), considering three levels of perceived early restrictive/critical eating messages (low, medium and high), as assessed by The Caregiver Eating Messages Scale.

The graphic representation of the moderation analyses results revealed that, for the same levels of external shame, women who perceive more early restrictive/critical eating messages tend to present higher weight and shape concerns (Fig. 3) and adopt more inflexible eating rules (Fig. 4).

Discussion

Literature has highlighted that parents/caregivers have an important influence on children's eating behaviour and body image [10, 40, 41], through parenting feeding practices [42, 43] or the transmission of direct messages regarding their eating behaviours and weight [44–46]. The main purpose of this study was to explore the moderator role of these early messages regarding eating. Given the known relationship between shame and eating-related difficulties, the present study examined the moderator effect of the recall of caregiver eating messages of restriction/criticism in the relationship between external shame and weight and shape concerns and inflexible eating.

Correlation results were consistent with previous research, suggesting that external shame is linked to eating-related difficulties [18, 31, 47] (namely, weight and shape concerns and inflexible eating) and provide further information by revealing a positive association between the recall of restrictive/critical caregiver eating messages and external

Fig. 3 Graphic for the relation between external shame and weight and shape concerns considering three levels of the perceived early restrictive/critical eating messages (RCM)

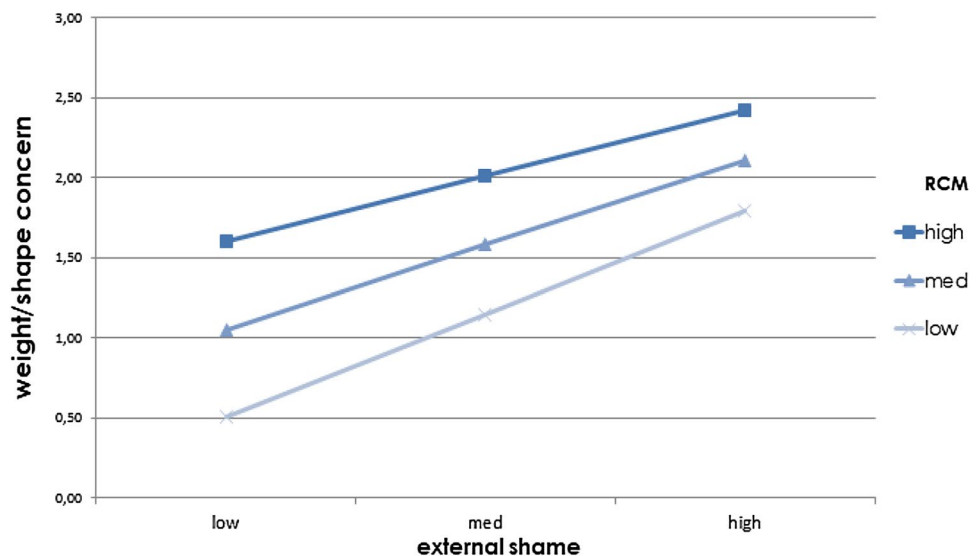
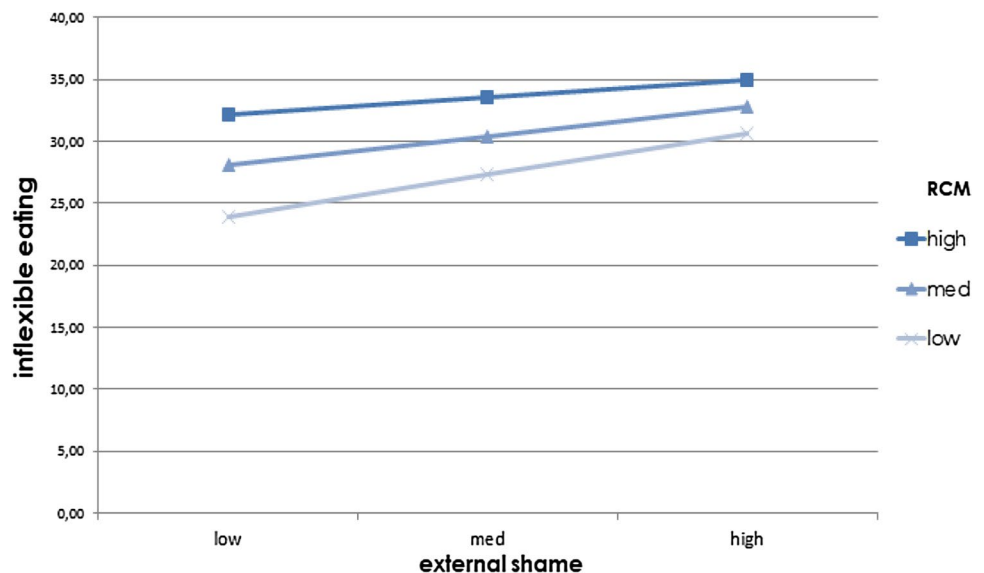


Fig. 4 Graphic for the relation between external shame and inflexible eating considering three levels of the perceived early restrictive/critical eating messages (RCM)



shame. Thus, our findings align with previous studies, confirming the negative effects of restrictive eating messages on psychopathological indicators [10, 48], but also providing new data regarding the association between caregiver eating messages, specifically and higher levels of weight and shape concerns and inflexible eating, which were revealed as important indicators to eating psychopathology [31, 49].

The moderator effect of restrictive/critical eating messages on the relationships of external shame with weight and shape concerns and inflexible eating was tested through path analysis, which confirmed our hypothesis. The tested models accounted for 38% and 19% of the variance of weight and shape concerns and inflexible eating, respectively. Data also suggested that the recall of early restrictive/critical eating messages had a significant moderator effect on shame's positive association with weight and shape concerns and with inflexible eating. These results seem to suggest that, for the same levels of external shame, women who perceived higher early restrictive and critical eating messages present higher weight and shape concerns and tend to adopt more inflexible eating rules comparatively to those who perceived less. This model underlines the effect of recall caregiver eating messages on attitudes regarding body weight and shape and on eating behaviours, which previous studies have shown [40–43]. Also, the present study extends literature, showing that in situations in which individuals feel inferior or perceive the self as defective, if these parental memories (shame memories related to food) are triggered, they might exacerbate the impact of these inferiority feelings, which in turn explains a higher worry regarding weight and body shape and also engagement in inflexible eating rules. Therefore, results seem to suggest that caregiver restrictive/critical eating messages can exacerbate the pervasive effect of external shame on these indicators of body and eating difficulties.

In fact, parental messages regarding eating behaviour (e.g. “commented that you were eating too much”; “told you that you shouldn't eat certain foods because they will make you fat”) can activate feelings of inadequacy or the perception that the self fails or presents a defect. It is important to note that these early messages may likely continue to affect body attitudes and eating behaviours even after the lessening of the individual's direct exposure to them. Thus, it is possible to suggest that these specific messages may have a pervasive effect on body image and eating behaviours, even in adulthood and after these messages cease. In fact, the present data show that women who perceived more restrictive and critical eating messages tend to present more weight and shape concerns and adopt more inflexible eating rules, as a strategy to cope with these concerns.

The moderator effect of the recall of early specific messages seems to be a key finding to guide future research. Parents are, frequently, concerned with their child's weight status and more likely to control their feeding by restricting their food intake [1, 50, 51]. However, caregivers' attempts to restrict children's eating may have a pervasive effect, disconnecting the individual from their internal signals of satiety and hunger [52, 53]. Therefore, it is possible that food intake becomes regulated by external factors (i.e. comments of parental eating control; food available), rather than internal clues of hunger and satiety (intuitive eating), which may persist into adulthood [10].

Nonetheless, some limitations should be considered in these results. Firstly, the cross-sectional design does not allow for causal interpretations of our findings; hence future studies should have longitudinal designs to determine the directionality of the relationships and to corroborate the moderation effect of these specific messages from caregivers. Secondly, our sample only comprises women from the

general population. Even though eating and weight-related difficulties are more prevalent in women, they are also experienced by men, and our sample does not allow generalization of results. Future studies should be conducted using different samples (e.g. male and eating disordered samples). In fact, it would be important to explore this model in other clinical samples, namely in orthorexia nervosa and reverse anorexia samples, which have been described as sharing nuclear clinical features, such as weight and shape concerns, restrictive diet, and inflexible and ritualized patterns of eating [54, 55]. Additionally, the use of self-reported measures may compromise the validity of the data, representing an important limitation. Also, it should be important to collect the participants' parents' education level. In fact, this comprises a limitation of the study and future studies should collect these data to explore possible differences in the proposed model across different levels of parents' education.

Finally, eating and weight difficulties have multi-determined and complex natures, so other variables (e.g. negative life events, humiliation experiences, shame proneness, guilt) [19, 56] and emotional regulation processes (e.g. rumination, self-criticism) may be involved in this relationship. Moreover, recent studies have highlighted, beyond the relevance of environmental factors, the importance of the influence of neurobiological/genetic underpinnings in the development of eating disorders; therefore, taking these factors into account, these model would be important to explore [57]. Nevertheless, the model's design was intentionally limited to explore the moderator effect of specific early eating messages on the relationship of external shame with weight and shape concerns and inflexible eating.

To sum up, the present study seems to support that early restrictive/critical messages may exacerbate the pathogenic impact of shame on body and eating difficulties. These results appear to offer significant research and clinical implications, contributing to the understanding of disordered eating patterns and seem to represent a new avenue for future research and the development of prevention and intervention programs. Our findings support the relevance of evaluating caregiver eating messages, external shame, weight and shape concerns and inflexible eating, especially due to its paradoxical defensive and maladaptive function. Treatment approaches should focus on helping individuals understand these functions, develop more adaptive strategies to regulate negative emotional experiences and promote psychological flexibility in the context of eating regulation. The development of compassionate abilities and attitudes towards body and eating related difficulties might work as a more adaptive affect regulation strategy [11, 58]. Also, this study seems to suggest, in the field of parenting programmes, the importance of promoting parental methodologies focused on adaptive strategies to regulate their children's eating behaviours that allow the development of psychological flexibility in the

context of eating behaviour, such as intuitive eating abilities. In this sense, first it is crucial increase caregivers' awareness of the destructive nature of restrictive eating messages and teaching them how to replace these maladaptive messages with adaptive messages about food and eating. Hence, helping parents to adopt more compassionate strategies rather than critical ones (e.g. restrictive and critical eating messages) may act as a more effective alternative to regulate children's eating behaviour.

Author contributions SO and CF designed the study, prepared the measures and designed the research battery. SO recruited the sample and conducted the statistical analysis. SO and CF conducted the literature research. SO and CP wrote the manuscript. Cláudia Ferreira approved the final manuscript.

Compliance with ethical standards

Conflict of interest The authors of this manuscript declare no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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