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Thin-Ideal Internalization and Comparison Process as Mediators of Social Influence and Psychological Functioning in the Development of Disturbed Eating Habits in Croatian College Females

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Abstract

This study examined the role of internalization and comparison as mediators of relationships between socio-cultural pressures to be thin, psychological factors, restrictive and bulimic behaviours in college females. Participants were 262 Croatian college females (mean age = 21.22 ± 1.47 years) who completed self-report questionnaires. Regression analysis was used to test a model in which internalization and social comparison mediated the impact of socio-cultural pressure (parents and peers dieting, teasing, pressure to be thin, media influences), self-esteem, anxiety, depression, and perfectionism in restrictive and bulimic behaviours. Internalization is a significant mediator of the relationships between all predictors included in this research and disturbed eating habits. Social comparison is relevant as a mediator between social influence, negative affect, self-esteem, perfectionism and restrictive behaviour but does not mediate bulimic behaviour. These findings could be useful in understanding processes that may predispose young women to develop eating dysfunctions and indicate the need for prevention programs that incorporate formative influences and processes such as internalization of societal norms and comparison in the construction of therapeutic strategies.

Keywords: socio-cultural influence, psychological functioning, internalization, comparison, disturbed eating habits, college females

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INTRODUCTION

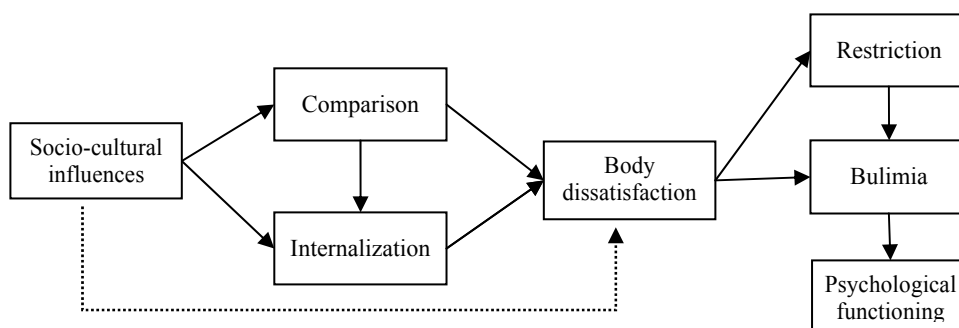
Eating disorders and body dissatisfaction are very common problems in adolescent girls and young women. There is strong evidence from prospective studies that body image dissatisfaction is a causal risk factor for the onset of eating disturbances (Cattarin & Thompson, 1994; Stice & Hoffman, 2004). Stice and Shaw (2002) reviewed this area of research and concluded that body dissatisfaction was a risk factor for eating pathology. In recent years, many variables have been hypothesized to play a role in the onset of body image problems and eating disturbances. Researchers have examined a range of individual attributes (e.g., body mass index, self-esteem, negative affect, depression) and socio-cultural factors (family, media and peers) associated with body image and eating problems (Hutchinson & Rapee, 2007).

Regarding individual attributes, low self-esteem is one of the most frequently considered psychological predisposing factors in people with eating disorders (e.g., Fairburn, Cooper, & Shafran, 2003). In a longitudinal study of women conducted by Gilbert and Meyer (2005), results revealed that low self-esteem predicted an increase in body dissatisfaction and that fear of negative evaluation predicted an increase in bulimic attitudes and depression. These results support the idea that with low self-esteem as a primary catalyst, followed by dissatisfaction of one's body, bulimic symptoms and depression can follow. Depression is often associated with various negative outcomes, including disordered eating behaviour, increased substance use, binge eating, and body image dissatisfaction (e.g., Measelle, Stice, & Hogansen, 2006). Research has also found that depressive disorders and eating disorders share similar risk factors, such as body image dissatisfaction (e.g., Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), low self-esteem (e.g., Muris, Meesters, van de Blom, & Mayer, 2005) and poor social support (e.g., Stice, Ragan, & Randall, 2004). While a review of literature points out many factors predicting eating disturbances, perfectionism is often a salient characteristic in women with eating disturbances (Vohs, Bardone, Joiner, Abramson, & Heatherton, 1999). The relationship between perfectionism and eating disorders is well established and is of theoretical interest. Fairburn et al. (2003) noted that there is often an interaction between perfectionism and eating disorders.

Stice (2001) reviewed the research area of risk factors and concluded that there were actually a limited number (only five) of specific theoretical models of eating disturbance that have been postulated. The socio-cultural perspective is perhaps the most well-documented framework used to explain why eating disorders occur (Becker & Hamburg, 1996). Socio-cultural theory (Thompson et al., 1999), argues that unrealistic standards of attractiveness set by Western society account for the fact that the vast majority of individuals are unable to meet them. Consequently, individuals experience dissatisfaction with their appearance and this can lead to behaviours designed to alter their body shape, which may include disordered

eating. Thompson, Covert, and Stormer (1999) suggested a Tripartite influence model of body image and eating disturbances as an useful theoretical framework for incorporating many of the variables hypothesized as having an effect on body image and eating disturbances into a single model. This model (Fig. 1) proposes that three primary sources of influence - peer, parents and media - affect body image and eating problems through two mediational mechanisms: internalization of societal standards of appearance and excessive appearance comparison. In this model, three influences (peers, parents, and media) are thought to have a direct effect on body image dissatisfaction, and affect body dissatisfaction indirectly, through two mediational processes. Thin ideal internalization leads to body dissatisfaction and disturbed eating attitudes and behaviours (Vander Wal, Gibbons, & del Pilar Grazioso, in press).

Figure 1. Hypothetical Model based on Thompson et al. (1999).

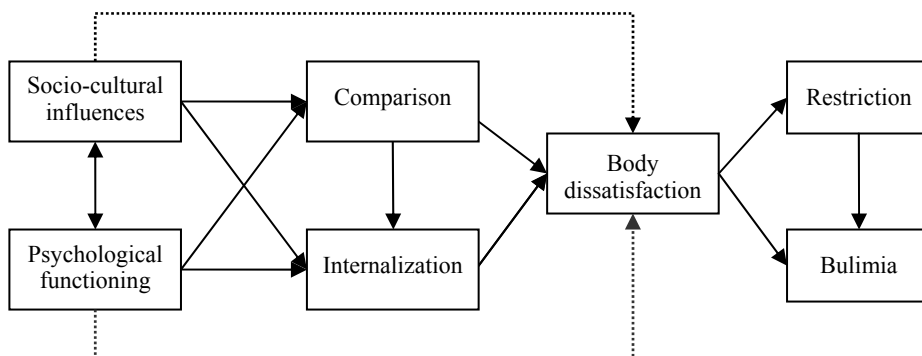


Twamley and Davis (1999) found that some young women were particularly susceptible to internalization of socio-cultural ideals. Internalization was most strongly related to body dissatisfaction among female students who perceived themselves to be 'heavy'. Interestingly, self-reported actual body weight did not moderate this relationship, suggesting it is the perception that your body is overweight rather than actual body size which is associated with vulnerability to body dissatisfaction.

Regarding the primary sources of influence, there is mounting evidence that parental social reinforcement of a thin ideal is related to eating pathology. Parental pressure to lose weight was positively correlated with children's eating pathology (Thelen & Cormier, 1995), and family criticism regarding weight and maternal investment in daughter's slenderness predicted eating problems in the daughter (Levine, Smolak, Moodey, Shuman, & Hessen, 1994). Similarly, perceived pressure to be thin from family, friends, dating partners and the media was positively related to bulimic symptoms (Stice, Ziemba, Margolis, & Flick, 1996). Finally, there is evidence that the media also promotes eating pathology through social reinforcement of the thin ideal. Peer and media influences are more important than parental influences (Shroff & Thompson, 2006).

Up to the present, different versions of the original Tripartite influence model have been evaluated. One of these is presented in Figure 2 (Keery, van den Berg, & Thompson, 2004) and includes a variation of the model: psychological functioning has been moved alongside socio-cultural influences and conceptualized as a second formative influence on comparison and internalization. This model has received support with adult and adolescent female samples (e.g., Keery, van den Berg, & Thompson, 2004; van den Berg, Thompson, Brandon, & Coovert, 2002).

Figure 2. Hypothetical model of Kerry et al. (2004) based on Thompson et al. (1999)



In this research, we started with the Tripartite influence model because our goal was to explore the contribution of social influences and psychological functioning to development of eating pathology, directly or indirectly across mediation of internalization and comparison processes. In view of the fact that body dissatisfaction highly correlated with eating disorders and in some cases was part of criteria or measures of eating disorders, it has been omitted in the present research.

A major aim of the study was to extend and replicate earlier work that had investigated the role of internalization and comparison as potential risk factors for eating problems. In our study, we distinguished between different sources of influence: family, media and peers. We also expanded on the original model by including psychological functioning as proposed by Kerry et. al. (2004). In the current investigation, the Tripartite influence model was tested using a series of regression analyses. Appearance comparison was hypothesized to play a mediational role between influence (peer, family and media) and body image and eating disturbances. In all, we examined ten variables including family influence, media influence, peer influence, social comparison and internalization processes, perfectionism, anxiety, depression, restrictive eating behaviours and bulimic behaviours.

The second goal of the current study was to test the role of some socio-cultural factors (family, media and peers influences) and individual attributes (self-esteem, perfectionism, anxiety and depression) in eating problems. In particular, we were

concerned with factors that may predict two different types of eating habits: a desire to be thin or restrictive behaviour and bulimic behaviour. Most importantly, we examined the association between personal functioning, socio-cultural factors and eating habits, including testing to ascertain whether these associations are mediated by mechanisms of internalization and comparison.

METHOD

Participants

The sample consisted of 262 Croatian female university students, 114 from the University of Rijeka and 148 from Juraj Dobrila University in Pula. The mean age of the participants was 21.22 ± 1.47 years, ranging from 18 to 25. Questionnaires were completed in groups of approximately 30 students and participation was voluntary and confidential.

Instruments

Predictor variables

Tripartite influence scale (peer, parent, and media). Keery, van den Berg, and Thompson (2004) developed a 43-item questionnaire for measurement of the three influences (peer, parents, and media) thought to lead to body image and eating disturbances. Since this was the first translation of this scale into the Croatian language, some psychometric analyses were undertaken. A principal axis factor analysis using an Oblimin rotation was performed to determine the factor structure of the socio-cultural influence scales (e.g., peer, parental, media) on a Croatian sample. An analysis of the Scree plot and Eigen values determined the number of factors retained. Factor analysis yielded eight factors with Eigen values greater than 1.00. These eight factors accounted for 58.99% of variance. However, the Scree test indicated the existence of only three factors (Eigen values 9.81, 4.73, 2.78, 2.32, 1.88, and 1.52). Factor analyses were run for three factor solutions. Visual inspection of the Scree plot, ease of interpretation and theory indicated that the three-factor solution was the best fit. These factors account for 22.4%, 10.6%, and 5.5% of variance respectively. The first factor contained 13 items relating to peers; the second factor comprised 20 items relating to parents, while the third factor contained 10 items regarding media pressure. *Peer and parental influence* contains components of criticism or teasing, modelling of dieting or body image concerns, and investment in thinness. *Media influences* include information provided by the media related to appearance norms and/or dieting practices and internalization of media images and messages. Reliability analyses (Cronbach alpha) indicated that they had high internal consistencies (peer .93, parent .88, and media .83).

Correlations between scales are from .29 to .42. In this study, a composite influence variable was utilized as the sum of individual predictors (media, parents, and peers).

Self-esteem. The Rosenberg Self-Esteem Inventory was used to measure general feelings of self-worth. This is a ten-item measure of general feelings of self-esteem (Rosenberg, 1979). It has been widely used with adolescent samples and has high reliability. We obtained an internal consistency of .89 on this sample.

Perfectionism in eating disturbance. The Eating Disorder Inventory – Perfectionism Scale (EDI-P, Garner, 1991) contains six-items that measure expectations for achievement and attitudes associated with eating disturbance. The Cronbach alpha of the EDI-P for the current sample was .69.

Psychological functioning. Hospital Anxiety and Depression Scale (HADS, Zigmond & Snaith, 1983) detects the presence and severity of mild degrees of mood disorder, anxiety and depression. The scale is specifically developed for use with patients with somatic comorbidity; it consists of seven-item subscales for both depression and anxiety. Authors for both subscales recommended a cut-off result of 11. The HADS total score (both subscales together) has also been used as a general measure of distress. On this sample we obtained an internal consistency of .80 for anxiety, .68 for depression and .84 for the total scale. Correlation between scales is .64. In this sample, 74.8% of female students obtained results greater than cut-off on the anxiety scale and 30% on the depression scale.

Mediational variables

Internalization. The Croatian version of the Sociocultural Attitudes towards Appearance Questionnaire (SATAQ; Heinberg, Thompson, & Stormer, 1995) assessed perception and acceptance of societal standards regarding thinness and attractiveness through two dimensions: awareness and internalization. In this study, we used only the eight-item internalization scale. Internal consistency coefficient (Cronbach alpha) obtained on this female student sample was .88.

Appearance comparison. The Physical Appearance Comparison Scale (PACS, Thompson, Heinberg, & Tantleff, 1991) is a five-item measure that assesses an overall tendency to compare one's own appearance with the appearance of others in social situations (e.g., parties and social gatherings). The Cronbach alpha for the current sample was .68.

Outcome measures

Eating disturbances. Two measures of eating disturbances were used: a measure of restrictive behaviour and a measure of bulimic behaviour. The Eating Disorder Inventory – Drive for Thinness Scale (EDI-DT, Garner, 1991) measures restrictive tendencies, a desire to lose weight and fear of weight gain. It has an

internal consistency of .83 for a combined sample of eating disordered individuals and .81–.91 for four samples of non-patient female controls (Garner, 1991). The Cronbach alpha for the current sample was .87. The Eating Disorder Inventory–Bulimia Scale (EDI-BN, Garner, 1991) assesses tendency towards overeating, bingeing and the impulse to engage in self-induced vomiting. Shore and Porter (1990) found a Cronbach alpha of .69 for 11–18-year-old females. The Cronbach alpha for the EDI-BN was .49 for the current sample. On EDI scales, the cut-off result is eight, and in our study 11.8% girls obtained this result on EDI-DT and 0.8% girls on EDI-BN.

RESULTS

Means, standard deviations and ranges for all used measures are presented in Table 1 and correlations between variables in Table 2. As Table 2 shows, EDI-DT and EDI-BN scores correlated significantly with scores on all other measures (ranging from .15 to .62). EDI-DT scores most highly correlated with social influence and thin ideal internalization, and the EDI-BN score with internalization.

Table 1. Means, standard deviations and ranges for all measures

Scale name	<i>M</i>	<i>SD</i>	<i>Range</i>
Social influence – total (peer, parents, media)	110.07	25.45	62 - 175
Peer influence	41.98	12.15	15 - 75
Parental influence	38.55	12.30	20 - 89
Media influence	29.63	9.47	10 - 60
Rosenberg Self-Esteem Inventory	30.27	6.48	10 - 40
EDI – Perfectionism Scale	2.46	3.01	0 - 15
Hospital Anxiety and Depression Scale	24.46	5.64	14 - 48
SATAQ - Internalization	8.59	7.06	0 - 32
Physical Appearance Comparison Scale	11.36	3.58	5 - 21
EDI – Drive for Thinness Scale	3.03	4.65	0 - 21
EDI – Bulimia Scale	0.95	1.73	0 - 12

An analysis of the correlation matrix reveals significant relationships among social influence variables (peer, parents, and media), psychological functioning, internalization, social comparison and both measures of eating disturbances. As expected, higher scores on self-esteem were associated with lower scores on internalization, perfectionism, anxiety and depression, drive for thinness and bulimic behaviour.

Table 2. Correlation coefficients among all the variables

Variables	HADS	Self-esteem	EDI-P	Comp.	SATAQ-I	EDI-DT	EDI-BN
Soc. influence	.24***	-.23***	.25***	.45***	.53***	.40***	.29***
HADS		-.62***	.29***	.30***	.34***	.30***	.23***
Self-esteem			-.18*	-.33***	-.39***	-.34***	-.27***
EDI-P				.23***	.31***	.26***	.25***
Comparison					.54***	.32***	.15*
SATAQ-I						.57***	.36***
EDI-DT							.41***

*p < .05 ***p < .001

HADS – Hospital Anxiety and Depression Scale; EDI-P – Eating Disorder Inventory – Perfectionism; Comp. – Comparison; SATAQ-I – Internalization from Sociocultural Influence toward Appearance; EDI-DT - Eating Disorder Inventory – Drive for Thinness; EDI-BN- Eating Disorder Inventory – Bulimia nervosa

In order to explore the mediational effects of internalization and comparison in relation between social influences and personality traits as predictors of eating behaviour, we conducted a series of regression analyses for each of the two measures of eating disturbances (drive for thinness and bulimic behaviour) as criteria and for each of the two measures selected as mediators - internalization and comparison.

The role of internalization as mediator in relation between social influence, psychological functioning and disturbed eating habits

The result of the first regression analysis (Table 3) shows that social influences of peers, parents and media were significantly related to internalization of the thin ideal. From the second regression, we can see that social influence is significantly related to the desire to be thin (restrictive behaviour, dieting, fear of fatness and weight gain) – β was .40. The result of the third regression shows that internalization of the thin ideal significantly predicted restrictive behaviour. The beta coefficient which indicated the relationship of social influences and desire to be thin was lower in the third than in the second regression (.40 > .12) and indicated the mediational role of internalization of the thin ideal in relation between social influences and desire to be thin.

Table 3. Results of regression analysis – evaluation of mediational effects of internalization in relation between predictors and drive for thinness (restrictive behaviour) as criteria

Predictor/Outcome	R	R ²	Beta
1. regression analysis	.53	.28	
Social influence / internalization			.53**
2. regression analysis	.40	.16	
Social influence / drive for thinness			.40**
3. regression analysis	.60	.35	
Social influence, internalization / drive for thinness			.12* .52**
1. regression analysis	.34	.11	
Negative affect / internalization			.34**
2. regression analysis	.30	.09	
Negative affect / drive for thinness			.30**
3. regression analysis	.58	.34	
Negative affect, internalization / drive for thinness			.12* .53**
1. regression analysis	.39	.15	
Self-esteem / internalization			-.39**
2. regression analysis	.34	.12	
Self-esteem / drive for thinness			-.34**
3. regression analysis	.59	.34	
Self-esteem, internalization / drive for thinness			-.14* .52**
1. regression analysis	.31	.10	
Perfectionism / internalization			.31**
2. regression analysis	.26	.07	
Perfectionism / drive for thinness			.26**
3. regression analysis	.58	.33	
Perfectionism, internalization / drive for thinness			.09 .54**

*p < .05 **p < .01

Note: The results of 2nd and 3th regression analysis are signed with bold

To verify the significance of the indirect effect of the mediator in the model, we have to test the significance that is mathematically equivalent to a test of whether a drop in the total effect is significant upon inclusion of the mediator in the model (Holmbeck, 2002; MacKinnon & Dwyer, 1993). MacKinnon and Dwyer (1993) use the following mathematical relationship: if Total effect = Indirect effect + Direct effect then Indirect effect = Total effect – Direct Effect. The indirect effect is the product of the predictor → mediator and mediator → outcome path coefficients (the latter path coefficient is computed with the predictor in the model (Cohen & Cohen, 1983; Holmbeck, 2002).

To conduct the statistical test for mediation, we need unstandardized path coefficients from the model, as well as standard errors for these coefficients. We

also need standard error of the indirect effect. Sobel (1988) presents an equation as follows:

$$Se_{\text{indirect effect}} = [(b_{yz}^2) \times (se_{zy.x}^2) + (b_{zy.x}^2) \times (se_{yx}^2)]^{1/2}$$

where b = unstandardized beta, se = standard error, yx = the prediction of y from X , $zy.x$ = the prediction of z from y with x in the model (Holmbeck, 2002).

Once we have the standard error of indirect effect, the following is computed: $z = b_{\text{indirect effect}} / se_{\text{indirect effect}}$. The b for indirect effect is simply the product of the two bs used in the Sobel equation (1988). The z -value is used to determine significance.

In this combination of variables, the post-hoc analysis shows that internalization is a significant mediator in relation between social influences and desire to be thin (restrictive behaviour) ($z = 6.5$; $p < .01$). This means that higher level of social influences (criticism or teasing, modelling of dieting or body image concerns and investment in thinness) increases the probability of internalization of the thin body ideal and with mediation of internalization, the probability of restrictive behaviour, dieting, weight awareness and fear of fatness increases, which in time become a risk factor for development of eating disorders.

The regression analysis (Table 3) shows that negative affect (anxiety and depression) is significantly related to internalization of the thin body ideal. Negative affect is also significantly related to restrictive behaviour (desire to be thin and to diet) – beta coefficient is .30. The beta coefficient which shows the connection between negative affect and restrictive behaviour is lower in the third regression analysis compared with that in the second one (.30 > .12), indicating that internalization of the thin ideal mediated the association between negative affect and restrictive behaviour. A statistical test for mediation showed that the decrease of beta coefficient is significant ($z = 4.49$, $p < .01$). Girls with a higher level of anxiety and depression are inclined to internalize the thin ideal and through mediation of internalization increase the probability of restrictive behaviour.

Regression analysis (Table 3) indicates that self-esteem is significantly related to internalization of the thin ideal and negatively related to restrictive behaviour ($\beta = -.34$). The result of the third regression analysis indicates that internalization is a significant predictor of restrictive behaviour. The beta coefficient which shows the connection between self-esteem and restrictive behaviour is lower in the third compared with that in the second regression analysis ($-.34 > -.14$), indicating that internalization of the thin ideal mediated the association between self-esteem and restrictive behaviour. A post-hoc analysis shows that the decrease of beta coefficient is statistically significant ($z = 4.9$, $p < .01$). Namely, girls with lower self-esteem are more prone to internalization of the thin ideal, which in turn increases the probability of restrictive behaviour.

Regression analysis (Table 3) indicates that perfectionism as a personality trait is significantly related to internalization of the thin body ideal. In addition, perfectionism is positively related to restrictive behaviour ($\beta = .26$) and

internalization predicts restrictive behaviour. The beta coefficient which shows the connection between perfectionism and restrictive behaviour is significantly lower in the third regression analysis compared to that in the second analysis and is not significant (.26 > .09). This change indicates the mediational role of internalization of the thin ideal in relation between perfectionism and restrictive behaviour. A statistical test for mediation shows that decrease of beta coefficient is significant ($z = 4.68, p < .01$). A higher level of perfectionism increased internalization of the thin ideal, while with mediation of internalization, the probability of restrictive behaviour increased.

Table 4. Results of regression analysis – evaluation of mediational effects of internalization in relation between predictors and bulimic behaviour as criteria

Predictor/ Outcome	R	R ²	Beta
1. regression analysis	.53	.28	
Social influence / internalization			.53**
2. regression analysis	.29	.09	
Social influence / bulimic behaviour			.29**
3. regression analysis	.39	.15	
Social influence, internalization / bulimic behaviour			.13 .31**
1. regression analysis	.34	.11	
Negative affect / internalization			.34**
2. regression analysis	.23	.06	
Negative affect / bulimic behaviour			.23**
3. regression analysis	.38	.15	
Negative affect, internalization / bulimic behaviour			.13* .32**
1. regression analysis	.39	.15	
Self-esteem / internalization			-.39**
2. regression analysis	.27	.07	
Self-esteem / bulimic behaviour			-.27**
3. regression analysis	.39	.15	
Self-esteem, internalization / bulimic behaviour			-.15* .30**
1. regression analysis	.31	.10	
Perfectionism / internalization			.31**
2. regression analysis	.25	.06	
Perfectionism / bulimic behaviour			.25**
3. regression analysis	.39	.15	
Perfectionism, internalization / bulimic behaviour			.15* .32**

* $p < .05$ ** $p < .01$

Note: The results of 2nd and 3th regression analysis are signed with bold

The result of the first regression analysis (Table 4) shows that social influences are significantly related to internalization of the thin body ideal. From the second regression analysis, it is possible to see that social influence of media, parents and peers are significantly positively related to bulimic behaviour (binge eating

behaviour, vomiting, using laxatives and diuretics) ($\beta = .29$). The result of the third regression analysis indicates that internalization is a significant predictor of bulimic behaviour (binge eating and compensatory behaviour). The beta coefficient which indicates the relation between social influence (influence of parents, peers, and media) and bulimic behaviour is lower in the third regression analysis compared with that obtained in the second regression (.29 > .13) indicating that internalization of the thin ideal mediated the association between social influence and bulimic behaviour. A statistical test for mediation showed that the decrease of beta coefficient is significant ($z = 4.02, p < .01$). The influence of parents, peers and media directly increased the probability of bulimic symptoms, but at the same time, the higher levels of social influences increased the probability of internalization of the thin body ideal, which mediated the development of bulimic symptoms (binge eating behaviour, vomiting, laxatives and diuretics abuse).

The results of regression analysis (Table 4) show that negative affect (anxiety and depression) is significantly related to internalization of thinness body ideal. Negative affect as a predictor is significantly associated with bulimic behaviour ($\beta = .23$). The result of the third regression analysis shows that internalization as mediator significantly predicted bulimic behaviour (binge eating and compensatory behaviour). The beta coefficient which indicates an association between negative affect (anxiety and depression) and bulimic behaviour in the third regression is lower compared with that obtained in the second one (.23 > .13). In this case, internalization of the thin ideal mediated the association between negative affect (anxiety and depression) and bulimic behaviour. A statistical test for mediation shows that a previously significant beta coefficient reduced its effect and this change in regression coefficient is statistically significant ($z = 3.86, p < .01$). Girls in which negative affectivity dominates have a greater probability to internalize social standard of thinness, and internalization mediated between negative affect and bulimic behaviour.

Regression analysis shows that self-esteem is significantly negatively associated with internalization of a thin ideal of appearance (Table 4). Self-esteem as a predictor is significantly negatively associated with bulimic behaviour ($\beta = -.27$). Internalization as mediator is significantly associated with bulimic behaviour. The impact of self-esteem as a predictor is lower after controlling the mediator, internalization ($-.27 > -.15$). A statistical test for mediation indicated that reduction of the beta coefficient is statistically significant ($z = 3.98, p < .01$). In other words, internalization of the thin ideal mediated the association between self-esteem and bulimic behaviour. Girls with lower self-esteem are more prone to internalize societal appearance standards, which in turn has a positive effect on development of bulimic symptoms.

The result of regression analysis (Table 4) shows that perfectionism as a personality trait is significantly related to thin ideal internalization. Perfectionism is significantly positively associated with bulimic behaviour ($\beta = .25$). Internalization

as mediator is significantly associated with bulimic behaviour. The impact of perfectionism as a predictor is lower after controlling for the mediator – internalization (.25 > .15). In this case, internalization mediated the association between perfectionism and bulimic behaviour. A statistical test for mediation indicated that reduction of the beta coefficient is statistically relevant ($z = 3.76, p < .01$).

The role of social comparison as mediator in relation between social influence, psychological functioning and disturbed eating habits

The result of the first regression analysis (Table 5) shows that social influences are significantly related to social comparison ($\beta = .45$) and a drive for thinness ($\beta = .40$). Comparison, as mediator, significantly predicted restrictive behaviour. The beta coefficient which indicates the relation between social influence (influence of parents, peers, and media) and restrictive behaviour is lower in the third regression analysis compared with that obtained in the second regression (.40 > .31). A statistical test for mediation showed that the decrease of beta coefficient is significant ($z = 2.78, p < .01$). This result indicates that social comparison mediated the association between social influence and restrictive behaviour. The influences of parents, peers and media directly increased the probability of social comparison, which mediated the development of restrictive symptoms (dieting, desire to lose weight, food concern).

Table 5. Results of regression analysis – evaluation of mediational effects of comparison in relation between predictors and drive for thinness (restrictive behaviour) as criteria

Predictor/Outcome	R	R ²	Beta
1. regression analysis	.45	.20	
Social influence / comparison			.45**
2. regression analysis	.40	.16	
Social influence / drive for thinness			.40**
3. regression analysis	.43	.19	
Social influence, comparison / drive for thinness			.31** .19**
1. regression analysis	.30	.09	
Negative affect / comparison			.30**
2. regression analysis	.30	.09	
Negative affect / drive for thinness			.30**
3. regression analysis	.38	.15	
Negative affect, comparison / drive for thinness			.22** .26**

Table 5. Continued

Predictor/Outcome	R	R ²	Beta
1. regression analysis Self-esteem / comparison	.33	.11	-.33**
2. regression analysis Self-esteem / drive for thinness	.34	.12	-.34**
3. regression analysis Self-esteem, comparison / drive for thinness	.41	.17	-.26** .24**
1. regression analysis Perfectionism / comparison	.23	.05	.23**
2. regression analysis Perfectionism / drive for thinness	.26	.07	.26**
3. regression analysis Perfectionism, comparison / drive for thinness	.37	.14	.19** .28**

**p < .01

Note: The results of 2nd and 3th regression analysis are signed with bold

Regression analysis (Table 5) shows that negative affect (anxiety and depression) is significantly related to social comparison and drive for thinness ($\beta = .30$). The beta coefficient which indicates an association between negative affect (anxiety and depression) and restrictive behaviour in the third regression is lower compared with that obtained in the second one ($.30 > .22$). A statistical test for mediation shows that the previously significant beta coefficient reduced its effect and this change in regression coefficient is statistically significant ($z = 3.25, p < .01$). Girls with dominantly negative affectivity have a greater probability of increasing social comparison, which in turn has a direct effect on the development of restrictive behaviour.

Regression analysis (Table 5) shows that low self-esteem is significantly associated with social comparison ($\beta = -.33$) and restrictive behaviour ($\beta = -.34$). The beta coefficient which indicates a relation between self-esteem and restrictive behaviour is lower in the third regression analysis compared with the coefficient obtained in the second one ($-.34 > -.26$). A statistical test for mediation shows that a previously significant beta coefficient reduced its effect and this change in regression coefficient is statistically significant ($z = 3.29, p < .01$). Lower self-esteem increased social comparison and with mediation of comparison, the probability of restrictive behaviour increased.

Regression analysis (Table 5) shows that perfectionism is significantly related to social comparison ($\beta = .23$) and drive for thinness ($\beta = .26$). The impact of perfectionism as a predictor is less after controlling for the mediator, comparison ($.26 > .19$). In this case, comparison mediated the association between perfectionism and restrictive behaviour. A statistical test for mediation indicated that a reduction

of the beta coefficient is statistically relevant ($z = 2.99$, $p < .01$). A higher level of perfectionism increases social comparison and with mediation of comparison the probability of restrictive behaviour increases.

Table 6. Results of regression analysis – evaluation of mediational effects of comparison in relation between predictors and bulimic behaviour as criteria

Predictor/ Outcome	R	R ²	Beta
1. regression analysis	.45	.20	
Social influence / comparison			.45**
2. regression analysis	.29	.09	
Social influence / bulimic behaviour			.29**
3. regression analysis	.29	.09	
Social influence, comparison / bulimic behaviour			.28** .03
1. regression analysis	.30	.09	
Negative affect / comparison			.30**
2. regression analysis	.23	.06	
Negative affect / bulimic behaviour			.23**
3. regression analysis	.25	.06	
Negative affect, comparison / bulimic behaviour			.21** .09
1. regression analysis	.33	.11	
Self-esteem / comparison			-.33**
2. regression analysis	.27	.07	
Self-esteem / bulimic behaviour			-.27**
3. regression analysis	.28	.08	
Self-esteem, comparison / bulimic behaviour			-.24** .07
1. regression analysis	.23	.05	
Perfectionism / comparison			.23**
2. regression analysis	.25	.06	
Perfectionism / bulimic behaviour			.25**
3. regression analysis	.26	.07	
Perfectionism, comparison / bulimic behaviour			.22** .10

** $p < .01$

Note: The results of 2nd and 3th regression analysis are signed with bold

The result of the first regression analysis (Table 6) shows that social influences are significantly related to social comparison ($\beta = .45$) and bulimic behaviour ($\beta = .29$). Comparison significantly predicted bulimic behaviour. The beta coefficient which indicates the relation between social influences (influence of parents, peers, and media) and bulimic behaviour is lower in the third regression analysis compared with that obtained in the second regression ($.29 > .28$). A statistical test for mediation showed that the decrease of beta coefficient is not significant ($z = 0.50$, $p > .05$). Girls who experienced higher levels of social influences are more inclined to social comparison, and social influence conduct to bulimic behaviour.

Social comparison neither predicts bulimic behaviour nor mediates the effect of social influence on the development of bulimic symptoms.

Regression analysis (Table 6) shows that negative affect is significantly associated with social comparison ($\beta = .30$) and bulimic behaviour ($\beta = .23$). The beta coefficient which indicates an association between negative affect and bulimic behaviour is lower in the third regression compared with that obtained in the second regression analysis (.23 > .21) but a statistical test for mediation, shows that reduction of beta coefficient is not statistically significant ($z = 1.33$, $p > .05$). Girls with higher levels of anxiety and depression are more inclined to social comparison and to bulimic behaviour. Social comparison does not mediate the effect of negative affectivity in the development of bulimic symptoms.

Regression analysis (Table 6) shows that low self-esteem is significantly negatively associated with social comparison ($\beta = -.33$) and bulimic behaviour ($\beta = -.27$). The beta coefficient which indicates a relation between self-esteem and bulimic behaviour is lower in the third regression analysis compared with the coefficient obtained in the second one (-.27 > -.24). A statistical test for mediation shows that a reduction of the beta coefficient is not significant ($z = 1.12$, $p > .05$). Lower self-esteem increased social comparison and bulimic behaviour but social comparison does not mediate self-esteem in development of bulimia nervosa.

Regression analysis (Table 6) shows that perfectionism is significantly related to social comparison ($\beta = .23$) and bulimic behaviour ($\beta = .25$). The impact of perfectionism as a predictor is lower after controlling for the mediator – social comparison (.25 > .22). A statistical test for mediation indicated that reduction of beta coefficient is statistically not relevant ($z = 1.50$, $p > .05$). A higher level of perfectionism increases social comparison and bulimic behaviour, but social comparison neither predicts bulimic behaviour nor mediates the effect of perfectionism in the development of bulimic behaviour.

DISCUSSION

Investigations regarding the role of potential risk factors for body image and eating disorders have proliferated in recent years. However, studies have often been limited by the lack of a theoretical model to guide testing of various hypotheses. For this reason, development of the Tripartite influence model (Thompson et al., 1999) represents an important attempt to elaborate a model that would incorporate many variables hypothesized to have an effect on body image and eating disturbances.

The primary aim of this research was to study the potential mediating effect of thin-body ideal internalization and social comparison between socio-cultural pressures, different psychological characteristics, and disturbed eating habits. Results of regression analysis and post-hoc analyses indicated that internalization

mediates the relationship between social influence, negative affect, self-esteem, perfectionism and disturbed eating habits (drive for thinness and bulimic symptoms); however, social comparison does not mediate the relationship between social influence, negative affect, self-esteem, perfectionism, and bulimic behaviour.

One of the aims of the study was to distinguish between predictors of bulimic and restrictive behaviours. In some research, this was made difficult by the fact that the original scales seemed to be a mix of bulimic behaviour, restrictive behaviours, and body dissatisfaction. The distinction between restrictive and bulimic behaviours was assumed to be important, so measures to assess "restrictive" and "bulimic" behaviours were chosen.

This study also sought to expand measurement of the influence variables so that they could be more comprehensive. Previous studies have often used narrow indicators to examine parent, peer and media influences on body dissatisfaction and eating disturbances. In some cases, a single item was used to define a construct as broad as media influence. In the present study, we used a multidimensional scale developed by Kerry et al. (2004), and results indicated high reliability of subscales.

Internalization of a thin-body ideal, social comparison and restrictive behaviour

University females, in general, reported high levels of perceived social influence to lose weight, social comparison, internalization of socio-cultural attitudes towards appearance, and a high-level drive towards thinness. Femininity is primarily displayed through thinness; consequently, one would expect young girls to perceive greater pressure to lose weight and be more inclined to alternating behaviours in attempts to change their weight (Halliwell & Harvey, 2006).

In our research, higher level of social influences (criticism or teasing, modelling of dieting, and investment in thinness) increased the probability for internalization of a thin ideal and with mediation of internalization, the probability also increased of restrictive behaviour, dieting, weight awareness and fear of fatness, which became a potential risk factor for the development of clinical eating disorders. Perceived pressure to lose weight was associated with eating behaviours through internalization and social comparison. In addition, perceived weight pressure was directly, as well as indirectly, associated with internalization and eating behaviours. This pattern is consistent with previous research indicating that perceived pressure to be thin is an important risk factor in the development of body dissatisfaction and eating dysfunction among adolescent girls (e.g. Stice & Whitenton, 2002).

The girls in this study with a higher level of anxiety and depression were more inclined to internalization, and internalization increases the probability of restrictive behaviour. It is well known that some forms of anxiety have an etiological role in the development of eating disorders. For example, Schwalberg, Barlow, Algar, & Howard (1992) suggest that anxiety about social evaluation might lead to excessive

concerns over eating, shape, and weight (all of which are known to be key elements in the pathology of eating disorders; e.g., Fairburn, Cooper, & Shafran, 2003). Accordingly, social anxiety could be hypothesized to be a potential pathway to, or risk factor for, eating disorders. Fairburn et al. (2003) in their Transdiagnostic model of eating disorders, describe how some individuals with eating disorders are unable to cope appropriately with intense emotional states such as anxiety. As a result, they engage in mood modulatory behaviour, e.g. alcohol or drug use, self-harm, or dysfunctional eating behaviours such as bingeing. The persistent use of these behaviours is likely to result in increased negative affect, which further reinforces their use (i.e., according to this model there is likely to be a bidirectional relationship between negative affect and eating behaviours).

Girls with lower self-esteem are most inclined to internalization, which in turn increases the probability of restrictive behaviour. Heatherton and Polivy (1992) suggest that dieting (emerging from body dissatisfaction, in particular among those with low self-esteem) typically leads to dietary failure, and that successive dietary failures lead to decreased self-esteem and increased negative affect, which, in turn, make future diet failures more likely. Over time, this – diet, negative affect, low self-esteem spiral – propels the dieter toward more extreme efforts at weight loss (e.g., more severe restriction).

Higher level of perfectionism increases internalization of a thin ideal, and with mediation of internalization, the probability of restrictive behaviour increases. Prospective studies represent the best attempts to identify personality traits that may be predisposing factors for later development of eating disorders. These identified traits include negative emotionality (neuroticism), poor interoceptive awareness, perfectionism, ineffectiveness, drive for thinness, and obsessive-compulsive personality traits (Lilenfeld, Wonderlich, Riso, Crosby, & Mitchell, 2006).

Internalization mediated the effects of all measures that we have selected as predictors (social influences, anxiety, depression, self-esteem, and perfectionism) and influenced restrictive behaviour. It is important to say that not only do social influences contribute to restrictive behaviour, as proposed by the Tripartite model, but our results also indicate that there is a set of personality factors that significantly contributes to the development of restrictive behaviour.

To date, only a few studies have assessed the role of social appearance comparison as a potential risk factor for eating disturbance and body image dysfunction. Social comparison, as a tendency to examine others in the environment and compare the self to others on specific attributes, has a long and rich theoretical history in psychology (Festinger, 1954). In an early study on body image and appearance comparison, Striegel-Moore, McAvay, & Rodin (1986) included a single item about social comparison in a study on undergraduates and found that it was positively correlated with "feeling fat". Relating comparison to eating behaviour, Muir et al. (1999) found that comparison with others' appearance

or one's own self-ideal was cited by adolescent girls as the most frequent trigger for first diets (Muir, Wertheim, & Paxton, 1999).

In van den Berg et al's research, (2002) social comparison was found to be a potent predictor of body dissatisfaction and eating disturbances. This study, when combined with previous research, points to comparison as an important individual difference variable, which serves as a mechanism by which environmental influences (family, peers and media) affect eating and weight-related behaviour. In line with this research, we have found that comparison is a significant mediator of effects of social influences, negative affectivity, self-esteem and perfectionism in development of restrictive behaviour. All these data highlight the importance of addressing comparison processes in the treatment of body image and eating disturbance. Influences of parents, peers and media directly increase the probability of social comparison, which mediates the development of restrictive symptoms (dieting, desire to lose weight, food concern). Girls with higher negative affectivity and lower self-esteem have a greater probability of increased social comparison and, with mediation of comparison, an increased probability of developing restrictive behaviour.

The above-mentioned relation between perfectionism and comparison makes theoretical sense. It is plausible that those who are higher on perfectionism need a way to evaluate their status or performance relative to their goals or standards and appearance comparison is just such a mechanism. High levels of maladaptive perfectionism involve doubts about the quality of one's behaviour, excessive concerns over mistakes and heightened sensitivity to the expectations of others. These characteristics may lead to a search for more objective or external sources of self-validation. Such sources may include social feedback in the form of comparisons on easily quantifiable dimensions like body weight. Several investigators have found that perfectionism, especially socially prescribed perfectionism, predicted heightened body comparisons among adolescent girls (Schutz, Paxton, & Wertheim, 2002).

The effects of all the measures that we have selected as predictors are mediated by social comparison and represent a set of significant predictors in the development of restrictive behaviour in female students. Girls with a higher level of internalization of societal appearance standards and with a higher tendency to compare their own appearance to those of generic others in social situations, are more prone to develop dieting behaviour, a desire to be thinner and fear of weight gain, which in time increase the probability of development of eating disorders.

Internalization of a thin-body ideal, social comparison and bulimic behaviour

Concerning the mediation effects of internalization between social influences, negative affect, self-esteem, and perfectionism as predictors and bulimic behaviour as criteria, the higher level of social influences increased the probability of

internalization of a thin-body ideal, which mediated the development of bulimic symptoms (binge eating, vomiting, laxatives and diuretics abuse). At the same time, our results have shown that parental, peer, and media influences directly increased the probability of bulimic symptoms.

For girls dominated by negative affect, there was a higher probability to internalize societal standard of slenderness and internalization mediated between negative affect and bulimic behaviour. We can explain these results with some of the previous works in this area. For example, Stice and Bearman (2001) hypothesized that there are risk factors for depression that are specific to females, such as body mass, pressure to be thin, thin ideal internalization, body dissatisfaction, dieting and bulimic symptoms. They hypothesize that these factors might help explain the gender differences in depression during adolescence (Stice & Bearman, 2001).

In Dobbmeyer and Stein's research (2003), increases in depressed mood over time were related to greater bulimic and global eating disorder symptoms. The authors found no relationship between changes in depressed mood over time and subsequent anorexic symptoms (e.g. restrictive behaviour, dieting, and fear of fatness). It appears that subjects who experienced a worsening of depression have higher severity of bulimia, rather than anorexic symptoms (Dobbmeyer & Stein, 2003). Increases in depression, however, were more related to higher severity of later bulimic symptoms. Perhaps the frustration over chronic failure to control one's dieting and eating disorder symptoms, along with the embarrassment over loss of impulse control (e.g., bingeing, purging), may lead to feelings of low self-esteem and depression after women develop an eating disorder. The fact that girls with lower self-esteem were more inclined to internalization has a significant effect on bulimic symptoms. This is in line with the investigation of Button, Sonuga-Barke, Davies, & Thompson (1996) using Rosenberg's self-esteem questionnaire (Rosenberg, 1979) that revealed a significant contribution of self-esteem to the prediction of later eating disorder symptoms.

Perfectionist girls were more prone to internalization of a societal appearance ideal that has a significant positive effect on bulimic behaviour. Minarik and Ahrens (1996) proposed that generalized perfectionism (and especially a concern about making mistakes) might be focused by societal influences toward a fear of not meeting socio-cultural appearance ideals, which may then result in the adoption of disturbed eating patterns. Bardone-Cone et al. (2007) in their review concluded that eating disorders are characterized by high-level perfectionism that endures after recovery and appears to be familiar as well as predispositional significance for the development of eating disorders, but there is little evidence to suggest that perfectionism characterizes any particular eating disorder (Bardone-Cone, Wonderlich, Frost, Bulik, Mitchell, Uppala et al., 2007).

Our results regarding comparison and bulimic behaviour showed interesting relationships. Girls who experienced higher levels of social influences are more

inclined to social comparison and bulimic behaviour. Nevertheless, social comparison neither predicts bulimic behaviour nor mediates the effect of social influence in the development of bulimic symptoms; it does, however show mediation effect in the development of restrictive, dieting behaviour.

Higher levels of anxiety and depression are important predictors of social comparison and bulimic behaviour; however, social comparison does not mediate the effect of negative affectivity in the development of bulimic but in development of restrictive behaviour. Lower self-esteem increases social comparison and bulimic behaviour but social comparison does not mediate the effect of self-esteem in the development of bulimia nervosa. However, it is an important mediator in the drive towards thinness and dieting behaviour.

Although perfectionism is significantly related to social comparison and bulimic behaviour, in our research, social comparison does not predict either bulimic behaviour or mediate the effect of perfectionism in the development of bulimic behaviour. It is interesting to mention the results of some previous research that evaluated the role of perfectionism in bulimia and subclinical levels of problematic eating. In one such research, female college students diagnosed with bulimia were found to score higher on measures of perfectionism than either normal controls or general psychotherapy patients (Rosch, Crowther, & Graham, 1991). Addressing perfectionism's relationship to subclinical levels of eating disturbance, Hewitt, Flett, & Ediger (1995) found significant correlations between subscales of a perfectionism measure and scores on a scale measuring disordered eating in a sample of psychology students. In a sample of undergraduate women, Davis et al. (2000) found that neurotic perfectionism predicted a composite variable consisting of body dissatisfaction, a drive for thinness and bulimic behaviour (Davis, Claridge, & Fox, 2000).

In conclusion, we can say that social comparison emerged as a mediator between social influence, negative affect, self-esteem, perfectionism and restrictive behaviour but it does not mediate bulimic behaviour. These findings could be useful in understanding processes that may predispose young women to develop eating dysfunctions and indicate the need for prevention programs that incorporate formative influences and processes such as internalization of societal norms of a thin-body ideal and comparison in treatment designs.

Limitations and future directions

Before closing, we wish to outline some of the limitations of the present study. One limitation of the present data is that they are based solely on self-report measures and a few of the measures had lower than ideal reliability coefficients, which may have affected some results. In addition, the external validity of the current study is limited to female undergraduate students. Future research using

other populations would be beneficial in expanding the knowledge of risk factors for eating disorders in alternative groups of individuals.

The distinction between restrictive and bulimic behaviours is assumed to be, to a certain extent, parallel to the distinction between the clinical syndromes of anorexia nervosa and bulimia nervosa and so measures used to assess "anorexic" and "bulimic" behaviours were chosen, as is common in research in this field. However, scales designed to assess the clinical constructs of anorexia and bulimia may not serve as well in the research setting. It may be that the distinction between restrictive and bulimic behaviours does not necessarily correspond to the clinical syndromes of anorexia and bulimia, and consequently is not captured by measures of anorexia and bulimia.

In addition, as with all cross-sectional studies, temporal precedence, and causation cannot be established. Further prospective and experimental studies need to be conducted to confirm our results. Prospective research is time-consuming and costly, but necessary to identify true predispositional factors. However, even given these limitations, we believe that the current findings offer significant support for the Tripartite influence model of body image and eating disturbances and contribute to our understanding of traits and processes involved in eating problems. Given the significant relations shown between societal influence (media awareness, family and peer influence), thin-body ideal internalization and social comparison, these results support the continued inclusion of different forms of social pressure in both prevention and treatment programs.

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