

Personality, emotion-related variables, and media pressure predict eating disorders via disordered eating in Lebanese university students

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Abstract

Purpose Disordered eating behaviors are on the rise among youth. The present study investigates psychosocial and weight-related variables as predictors of eating disorders (ED) through disordered eating (DE) dimensions (namely restrained, external, and emotional eating) in Lebanese university students.

Methods The sample consisted of 244 undergraduates (143 female) aged from 18 to 31 years ($M = 20.06$; $SD = 1.67$). Using path analysis, two statistical models were built separately with restrained and emotional eating as dependent variables, and all possible direct and indirect pathways were tested for mediating effects. The variables tested for were media influence, perfectionism, trait emotional intelligence, and the Big Five dimensions.

Results In the first model, media pressure, self-control, and extraversion predicted eating disorders via emotional

eating. In the second model, media pressure and perfectionism predicted eating disorders via restrained eating.

Discussion Findings from this study provide an understanding of the dynamics between DE, ED, and key personality, emotion-related, and social factors in youth. Lastly, implications and recommendations for future studies are advanced.

Keywords Emotional eating · Restrained eating · Media pressure · Trait emotional intelligence perfectionism

Introduction

Eating disorders (ED), known to mostly affect adolescent and young adult females [1], are caused by a complex interaction of genetic, biological, behavioral, psychological, and social factors. Although marked advances in the study of risk factors that predict ED have been made in the past years, the understanding of how these risk factors work together to predict ED development is still limited. Indeed, few studies incorporated many of the risk factors identified in prospective studies that focused on univariate effects [2]. It is therefore vital to elucidate how risk factors work together to predict ED through mediational etiologic models, since it can help in finding possible preventative measures.

Disordered eating (DE) refers to altered eating patterns, including binge eating, extreme dieting, and inappropriate weight loss techniques [3]. Similarly to ED, these eating derangements are more reported by females rather than males [4]. In the mid-1980s, Van Strien and colleagues [5] defined three types of DE behaviors: restrained, emotional, and external eating [5]. Restrained eating implies mindful control over food consumption to prevent gaining weight;

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emotional eating involves extreme eating in response to certain stimuli; and external eating refers to eating in response to food-related cues irrespective of the actual physical state of hunger or satiety. Severely distorted eating behaviors have been shown to contribute to ED onset (e.g., [6]). Recent studies have revealed a high prevalence of DE in both western and non-western populations [7–10], including Lebanon [4, 11, 12]. It is thus imperative to recognize the underlying factors of DE to seek possible preventative measures for DE as well as ED.

Psychosocial variables

An array of psychosocial risk factors has been linked to the development and maintenance of DE behavior [13], including personality traits (e.g., [14]). Among the Big Five personality dimensions [15], DE behaviors were positively associated with openness to experience and negatively with agreeableness, conscientiousness, and emotional stability (e.g., [16]). Neuroticism and extraversion could be understood as factors that can potentially relate to emotional eating. First, neuroticism implies emotional lability, insecurity, and impulsivity, which might contribute to the alteration of eating patterns (e.g., [17]). In particular, it might prone individuals to eat following emotional cues. Second, research shows that individuals suffering from eating disorders often avoid interpersonal interactions and closeness, fear rejection, and are socially dependent (e.g., [18]), which might be at the roots of a negative relationship between extraversion and DE and predispose individuals to compensate interpersonal needs through emotional eating. Research has also found a close link between neuroticism and extraversion in individuals exhibiting DE behaviors, where neuroticism acts as a moderator between low extraversion and DE [19].

Conscientiousness is closely linked to perfectionism [20], which could explain the tendency to adopt DE behaviors, as perfectionist individuals might be self-demanding regarding their appearance which can then lead to an excessive drive for thinness and binge eating behaviors [21], as indicated by previous research [22, 23]. In fact, a meta-analytical study reported that perfectionism is a risk factor for bulimic pathology and a maintenance factor for eating pathology in general [13]. Thus, it is expected that perfectionism, which implies an excessively regimented and restrictive predispositions, would be linked to restrained eating.

While many studies have focused on traditional personality dimensions, much less efforts have been put on systematically investigating the emotion-related factors that influence DE. Trait emotional intelligence (trait EI or emotional self-efficacy) is a compilation of emotion-related self-perceptions found at the lower levels of the

personality hierarchies [24]. In other words, trait EI refers to how well we think we process our emotions [25] and has been linked to a myriad of psychological outcomes [26]. Moreover, females are commonly reported to score higher than males on EI, irrespective of other covariates, such as age [27, 28].

Healthy behaviors such as physical activity and healthy diet have been linked to trait EI [29, 30]. Moreover, a recent study indicated a negative correlation between body image dissatisfaction and global trait EI [31]. There is evidence that university students with low scores on trait EI are at higher risk of manifesting DE [32]. In particular, trait EI aspects such as emotional awareness seem to be associated with DE among college females [33]. In addition, emotion regulation has predicted body image dissatisfaction as well as DE in a number of studies (e.g., [34]). In sum, there is evidence that trait EI is associated with DE, and in particular DE behaviors with an emotional component (i.e., emotional eating), but there is need for more systematic studies exploring such a relationship.

The role of media, in a variety of its forms (TV, magazines, and Internet), has also been pivotal in predisposing individuals toward adopting DE attitudes and behaviors [14, 35, 36]. Media messages often spread the ideal of thinness while associating overweight with negative connotations [37]. This, in turn, has been linked to body image concerns and dissatisfaction, especially among females [38]. In addition, in a study conducted by Jung [39], college students who were exposed to images of thin models and ‘perfectly shaped’ famous figures were shown to be dissatisfied with their bodies after the media exposure and later on exhibited changes in their eating behaviors. Similar findings were recently reported among Lebanese university students, whereby media influence to become slimmer and to eat less to lose weight was significantly associated with both restrained and emotional eating [11]. Therefore, it can be said that media has a negative impact on body image and DE, and can potentially contribute to ED.

The role of parenting styles and attitudes in DE is complex, and research on this topic has yielded contradictory results [40]. However, researchers agree that parental influences do contribute to the prevention or exacerbation of DE [41]. In particular, studies have revealed that individuals with DE behaviors report higher levels of maternal and paternal rejection, and unhealthy family functioning as compared to individuals who do not manifest such behaviors [42]. In general, lower parental care and higher parental protection could reflect on low self-efficacy and vulnerability in the offspring, which could, in turn, contribute to the development of disordered eating [40].

Weight-related variables

Recent studies have shown that body mass index (BMI) and body image are associated with DE behaviors [43–45] and more severe signs of ED [46]. Moreover, a high BMI in childhood can prone individuals to pay more attention to their weight at a younger age [47].

Several studies have supported an association between body image dissatisfaction and DE (e.g., [48]). Indeed, extreme concern about body image perception was reported among Lebanese female university students [4] and body image dissatisfaction was found to be a significant predictor of ED vulnerability in this population [12]. Other researches have provided evidence that BMI predicts poor body image which, in turn, predicts distorted dietary habits and DE (e.g., [49, 50]). A recent study reported that the effect of body image on DE is not direct but rather through several mediating variables such as experiential avoidance of body image [51].

The present study

In previous studies, Lebanese university students have shown high preoccupation with weight and a strong desire to become thinner [4, 52]. Building on such studies, the present work aims at examining the underlying factors that contribute to ED in Lebanese youth by investigating psychosocial (i.e., personality dimensions, trait EI, and media pressure) and weight-related variables (i.e., BMI and body image dissatisfaction) as predictors of eating disorders (ED) through disordered eating (DE) dimensions (namely restrained eating and emotional eating). We expect that the mediational effects of the psychosocial and weight-related variables will change across DE dimensions. In light of previous literature findings, we hypothesize the following regarding the mediational model:

(H1) Trait EI, emotional stability, and extraversion will relate to ED via emotional eating.

(H2) Conscientiousness and perfectionism will indirectly influence ED via DE restrained eating.

(H3) Media pressure will have an important role as a mediator between DE and ED.

Methods

Participants

Participants were recruited from a Lebanese university with campuses in different areas in the region. The sample consisted of 244 undergraduates (143 female) aged from 18 to 31 years ($M = 20.06$; $SD = 1.67$). Participants were enrolled in business (45.07%), architecture and engineering

(24.88%), arts and social sciences (18.79%), and natural/health sciences (11.28%). Family income was classified into ‘less than \$50,000’ (17.46%), ‘between \$49,000 and \$75,000’ (34.39%), and ‘more than \$75,000’ (48.15%). The mean BMI of the participants was 24.54 kg/m² ($SD = 3.82$) for males and 22.16 kg/m² ($SD = 11.37$) for females.

Measures

Self-reported height and weight were used to calculate body mass index.

Body image was measured through the Contour Drawing Rating Scale (CDRS; [53]). This scale consists of nine female and nine male silhouettes increasing in size as they go along. Participants are asked to circle the body figure that best matches their current body shape and then to circle the figure that best matches their ideal body shape. The CDRS has shown good to excellent test–retest and construct validity [54].

Eating behaviors were measured through the Dutch Eating Behaviour Questionnaire (DEBQ; 5). The DEBQ is a 33-item questionnaire, measuring the various aspects of disordered eating, namely restrained eating ($\alpha = 0.94$), emotional eating ($\alpha = 0.94$), and external eating ($\alpha = 0.83$). Item responses range from 1 (‘Never’) to 5 (‘Very Often’). For example, an item concerning emotional eating read, ‘Do you have the desire to eat when you are irritated?’ The DEBQ has shown good internal consistency and test–retest reliability scores in a number of studies (e.g., [55]). The internal consistency of the scores on this questionnaire was 0.90.

Eating disorders were measured through the Eating Disorder Examination Questionnaire (EDE-Q; [56]). The EDE-Q consists of a 28-item, self-report questionnaire that tests for symptoms associated with eating disorders. This test includes four subscales, namely restrained eating, eating concern, shape concern, and weight concern, as well as a global score. Questions refer to the frequency of behaviors suggestive of an eating disorder over a 28-day period. The test is scored on a seven-point scale ranging from 0 (‘No days’) to 6 (‘Every day’). An example of an item concerning restrained eating is, ‘Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?’ The EDE-Q has shown good concurrent validity and acceptable criterion validity in a number of studies (e.g., [57]), including those conducted in Lebanon [58]. The internal consistency of the EDE-Q scores was 0.88.

Personality traits were measured through the IPIP Big Five Personality Factor Markers, short form [59]. This is a 30-item questionnaire with five subscales corresponding to

the personality dimensions of extraversion, agreeableness, conscientiousness, emotional stability (i.e., neuroticism reversed), and openness. For example, an item concerning extraversion read, 'I talk to many different people at parties.' The items are rated on a five-point scale ranging from 1 ('Very Inaccurate') to 5 ('Very Accurate'). The IPIP scales have shown good internal consistency and correlations with other Big Five tests [60]. This scale has recently been applied to the Lebanese population [31] showing good internal consistencies for all dimensions. The internal consistencies of the Big Five dimensions were as follows: extraversion, $\alpha = 0.65$; agreeableness, $\alpha = 0.56$; conscientiousness, $\alpha = 0.61$; and emotional stability, $\alpha = 0.67$.

Perfectionism was measured through the IPIP Perfectionism Scale [61]. This scale consists of ten items rated on a five-point scale ranging from 1 ('Very Inaccurate') to 5 ('Very Accurate'). An example of an item is 'I want every detail to be perfect'. Previous studies have reported good internal consistencies for this test ($\alpha = 0.76$; [62]). The internal consistency of this scale's scores was 0.66. Trait emotional intelligence was measured through the Trait Emotional Intelligence Questionnaire (TEIQue; [63]). The TEIQue consists of 30 items rated on a seven-point Likert scale ranging from 1 ('Completely Disagree') to 7 ('Completely Agree'). The TEIQue also provides scores on four broad factors (i.e., well-being, emotionality, sociability, and self-control) and 15 facets. For example, an item concerning emotionality was 'I am normally able to 'get into someone's shoes' and experiences their emotions'. The TEIQue has been used in a variety of youth samples from different countries such as UK [64], Spain [65], and Cyprus [26]. The internal consistency for the TEIQue scores was 0.84.

Media influence (MI) was measured through the Sociocultural Attitudes towards Appearance Questionnaire (SATAQ-3; [66]). This test consists of 30 questions and has subscales that evaluate internalization (general and athlete), pressures, and information. The general internalization subscale reflects generic media influence while the athlete internalization subscale reflects internalization of sports figures. Items are rated on a five-point rating scale ranging from 1 ('Definitely Disagree') to 5 ('Definitely Agree'). Sample items included 'I have felt pressure from TV or magazines to be thin' (pressures subscale) and 'I wish I looked as athletic as a sports star' (athlete internalization subscale). The SATAQ-3 has shown excellent convergent validity with measures of body image and eating disturbance in previous studies (e.g., [67]), and scores have shown adequate internal consistency (e.g., [68]). The internal consistency of the scores of this questionnaire was 0.94.

Parental acceptance/rejection was measured through the Parental Acceptance-Rejection Questionnaire (PARQ;

[69]). This is a 48-item self-report instrument designed to measure individuals' perceptions of parental acceptance-rejection (i.e., the warmth dimension of parenting). This instrument consists of four scales: (1) warmth/affection, (2) hostility/aggression, (3) indifference/neglect, and (4) undifferentiated rejection. Together these scales constitute the total warmth dimension of parenting. Items are responded to on a rating scale from 1 ('Almost Never True') to 4 ('Almost Always True'). Sample items included 'My mother made me feel what I did was important' (1; warmth/affection) and 'My father felt other children were better than I was no matter what I did' (3; indifference/neglect). This scale has demonstrated good internal consistency for both versions of the test in a study conducted in Lebanon [70] and others using international samples (e.g., [71]). The internal consistency of the scores of this questionnaire was 0.66 for Maternal Acceptance/Rejection and 0.61 for Paternal Acceptance/Rejection.

Procedure

After obtaining the ethical approval of the university IRB, which is constituted in accordance with the US Code of Federal Regulation (45CFR 46.107, 21CFR 56.107), and Good Clinical Practice ICH (Sect. 3), a convenient sample of undergraduates enrolled in arts and sciences majors was asked to participate voluntarily in the study. Data were collected during class time and testing sessions lasted around 50 min. Each student received a survey pack with an informed consent. The questionnaires were administered in the following order: IPIP Big Five Personality Factor Markers, IPIP Perfectionism Scale, TEIQue, CDRS, DEBQ, EDE-Q, SATAQ-3, and PARQ.

Statistical analysis

To test causal models of ED total, two path analyses with structural equation modeling methodology were conducted separately with restrained and emotional eating as dependent variables, respectively, using STATA 13. The casual ordering of predictors in the model was consistent with the previously reviewed literature and hypotheses. Specifically, path analyses were specified to indicate variables that would lead to the DE dimensions of emotional and restrained eating separately, which in turn would lead to ED total. Standardized path coefficients for these pathways were estimated using maximum likelihood estimation. Two full models were estimated with all possible direct and indirect pathways to test the mediating effects in line with the above-mentioned hypotheses. The external eating, DE dimension, was not associated with ED total; thus, the mediating effect of this variable was not tested. The following goodness-of-fit indices were used to evaluate the

adequacy of the models' fit: the Comparative Fit Index (CFI) with >0.90 and 0.95 for acceptable and excellent fit, respectively; the Root Mean Square Error of Approximation (RMSEA), with <0.05 and <0.80 for close and reasonable fit, respectively, along with its corresponding PCLOSE statistic; best if above 0.05 ; and the standardized root mean square residual (SRMR), with <0.08 and 0 for acceptable and perfect fit, respectively. Such combination of goodness-of-fit indices is recommended and widely reported when conducting structural equation modeling analysis [72]. The χ^2 test was not used due to its dependency on the sample size [73].

Gender differences

In order to test for gender differences, independent sample *t* tests were carried out to check for any gender differences in the sample. No significant differences were found; thus, the sample was not split to avoid compromising the sample size.

Results

Main results from the correlational analyses are presented in Table 1. Global ED positively correlated with restrained and emotional eating ($r = 0.60$, $p < 0.001$ and $r = 0.32$, $p < 0.001$, respectively), but not with external eating. Global ED correlated positively with body image scores ($r = 0.39$, $p < 0.001$), perfectionism ($r = 0.17$, $p < 0.05$), and all subscales of media influence (Table 2). The strongest correlation was with the media pressure subscale ($r = 0.53$, $p < 0.001$).

Restrained eating correlated positively with body image dissatisfaction scores ($r = 0.15$, $p < 0.05$) and perfectionism ($r = 0.14$, $p < 0.05$) and negatively with emotional stability ($r = -0.19$, $p < 0.05$) and self-control trait EI ($r = -0.17$, $p < 0.05$). Emotional eating correlated negatively with extraversion ($r = -0.23$, $p < 0.01$), emotional stability ($r = -0.24$, $p < 0.01$), well-being trait EI ($r = -0.20$, $p < 0.01$), and self-control trait EI ($r = -0.17$, $p < 0.05$). Both restrained and emotional eating correlated positively with all subscales of media influence, except the information subscale which was only correlated with restrained eating ($r = 0.18$, $p < 0.05$). The strongest correlation was with media pressure ($r = 0.45$, $p < 0.001$ for restrained eating and $r = 0.37$, $p < 0.001$ for emotional eating).

External eating correlated positively with conscientiousness ($r = 0.15$, $p < 0.05$), agreeableness ($r = 0.16$, $p < 0.05$), and perfectionism ($r = 0.18$, $p < 0.05$). In addition, external eating correlated positively with two subscales of media influence: the information subscale

($r = 0.29$, $p < 0.001$) and internalization general ($r = 0.17$, $p < 0.001$).

Path analysis

Figure 1 represents the significant pathways for ED total through emotional eating. The full model provided a good fit to the data: CFI = 1.00, RMSEA = 0.00 with PCLOSE of 0.87, and SRMR of 0.009. Media pressure had a positive direct effect ($\beta = 0.29$), whereas both extraversion and trait EI self-control had direct negative effects on emotional eating ($\beta = -0.20$ and -0.17 , respectively), which in turn predicted ED total. Media pressure had a direct positive effect on ED total ($\beta = 0.52$), whereas both extraversion and trait EI self-control did not exhibit direct effects on ED total ($\beta = 0.04$ with 95% CI $-0.09:0.18$ and -0.02 with 95% CI $-0.16:0.13$, respectively). Therefore, the latter pathways were removed from the model. Thus, the link between trait EI self-control, extraversion, and ED total was partially mediated by emotional eating. These relationships accounted for meaningful proportions of variance in ED total (41.8%).

Figure 2 represents the significant pathways for ED total through restrained eating. The full model provided an acceptable fit to the data: CFI = 1.00, RMSEA = 0.00 with PCLOSE of 0.96, and SRMR of 0.002. Perfectionism and media pressure had direct positive effects on restrained eating ($\beta = 0.18$ and 0.42 , respectively), which in turn predicted ED total. Both body image and perfectionism had indirect effects on restrained eating and ED total ($\beta = -0.02$ with 95% CI $-0.17:0.13$ and 0.003 with 95% CI $-0.12:0.12$, respectively). Therefore, these pathways were removed from the model. Thus, the link between perfectionism and ED total was partially mediated by restrained eating. These relationships accounted for meaningful proportions of variance in ED total (37.5%).

Discussion

To our knowledge, the present study is the first to combine psychosocial and weight-related variables to explore their direct effects on ED and the moderating role of DE subscales on ED.

First, we found that DE and ED correlated significantly in our sample, except for external eating. This is in line with previous literature and shows that DE behaviors put individuals at risk of more severe eating disturbances and are important contributors of future psychopathology [74].

Since external eating was not related to ED, we further explored restrained and emotional eating. Among the personality traits, emotional stability correlated negatively to restrained eating, and emotional eating to a greater extent,

Table 1 Descriptive statistics and intercorrelations among the key study variables

Variable	1	2	3	4
Eating disorders				
Global ED	–	–	–	–
Eating behaviors (DE)				
Restrained eating	0.60***	–	–	–
Emotional eating	0.32***	0.32***	–	–
External eating	0.09	–0.07	0.18*	–
Body mass index	0.10	0.06	0.06	–0.04
Body image scores	0.39***	0.15*	0.13	0.06
Personality traits				
Big five—extraversion	–0.06	–0.05	–0.23**	0.02
Big five—agreeableness	–0.02	0.05	0.09	0.16*
Big five—conscientiousness	–0.11	–0.06	–0.08	0.15*
Big five—emotional stability	–0.15	–0.19*	–0.24**	–0.14
Big five—perfectionism	0.17*	0.14*	0.02	0.18*
Trait emotional intelligence				
Well-being	–0.18	–0.002	–0.20*	0.13
Emotionality	–0.07	0.01	–0.01	0.05
Sociability	–0.11	–0.09	–0.02	0.07
Self-control	–0.18	–0.17*	–0.17*	–0.04
Media influence				
Intern—general	0.44***	0.38***	0.24**	0.17*
Intern—athlete	0.31***	0.22**	0.17*	0.13
Pressure	0.53***	0.45***	0.37***	0.12
Information	0.18*	0.18*	0.13	0.29**
<i>M</i>	13.13	35.44	43.30	41.58
<i>SD</i>	9.78	12.25	15.10	7.38

Only significant results were reported in the table. *ED* eating disorders, *DE* disordered eating, *1*: global ED, *2*: restrained eating, *3*: emotional eating, *4*: external eating * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

as expected and in line with the previous literature [75] as well as with H1. This could be explained by several facets of emotional stability such as vulnerability and impulsivity which could lead to episodes of DE behavior. Extraversion was found to be negatively associated with emotional eating. These findings are supported by the previous literature [75], which indicated that individuals with distorted eating behaviors score low on the facets of assertiveness and positive emotions. One potential explanation of this is that introverted individuals might have less social support and thus use emotional eating as a coping mechanism. In addition, perfectionism was also linked to both restrained eating and ED, which accords well with earlier findings (e.g., [23, 45]).

As for trait EI, the well-being factor correlated negatively with emotional eating, which means that individuals with low self-esteem, happiness, and optimism tend to eat more in response to emotional stimuli. The self-control factor correlated negatively with both restrained and emotional eating in line with the results obtained regarding

emotional stability and regarding the well-being factor of trait EI. These results are in line with H1. Indeed, the link between negative emotions triggering disordered eating in general [34], and emotional eating in specific [76] has been previously explained through defective means of emotion regulation rather than emotions themselves, which is a characteristic facet of low self-control. Media pressure also had a significant relationship with ED, restrained eating, and emotional eating, which replicates recent research (e.g., [11, 14, 35]). Lastly, body image dissatisfaction was found to be associated with both restrained eating and ED. This is in line with Cooley and Toray's study [48] stressing the impact of body image in DE and ED.

The main aim of the present study was to explore weight-related and psychosocial variables as predictors of ED via DE. Emotional eating mediated the effect of trait EI self-control on ED. These results emphasize the potential negative impact of unmanaged stress, impulsiveness, and lack of emotion regulation, which could lead to emotional eating and contribute to global ED. In agreement, emotion

Table 2 Standardized coefficients for pathways in causal model of global ED through restrained and emotional eating

Pathway—global ED through emotional eating (<i>N</i> = 163)	β
Emotional eating—global ED	0.15*
MI pressure—global ED	0.52**
BF extraversion—global ED	0.04
Trait EI self-control—global ED	-0.02
MI pressure—emotional eating	0.29**
Trait EI self-control—emotional eating	-0.17*
BF extraversion—emotional eating	-0.20**
Pathway—global ED through restrained eating (<i>N</i> = 180)	β
Restrained eating—global ED	0.42**
MI pressure—global ED	0.38**
BF perfectionism—global ED	0.003
MI pressure—restrained eating	0.42**
Bf perfectionism—restrained eating	0.18*
BIS—restrained eating	-0.02

ED eating disorders, MI media influence, BIS body image score, BF Big Five, EI emotional intelligence. **p* < 0.05, ***p* < 0.01

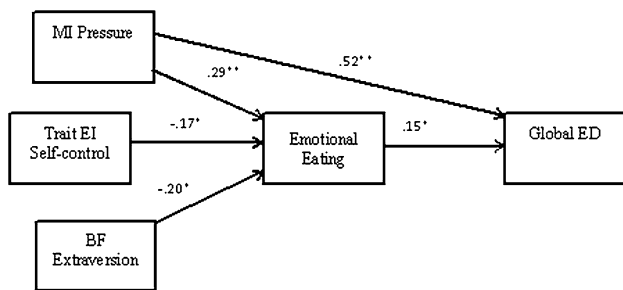


Fig. 1 Structural model with standardized path coefficients of ED total via DE emotional eating. **p* < 0.05, ***p* < 0.01

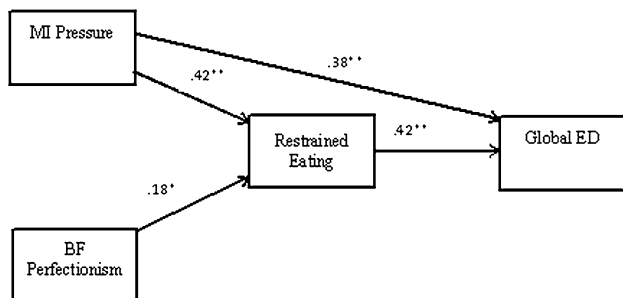


Fig. 2 Structural model with standardized path coefficients of ED total via DE restrained eating

regulation difficulties have been previously reported to contribute to development and maintenance of ED [77]. Extraversion also negatively predicted ED via emotional eating, which is in line with H1. Scoring low on some

extraversion facets such as positive emotions could explain this relation, in which case individuals could be using emotional eating as a source of reward. Low extraversion can also lead to poor social interactions, and individuals could be manifesting emotional eating as a coping mechanism. In sum, low sociability and self-control scorers might be reacting in maladaptive ways such as emotional eating.

On the other hand, restrained eating mediated the effect of perfectionism on ED, which is in agreement with H2. Perfectionists set and strive toward high standards such as the ideal of thinness [21], which could lead to excessive dieting and control over the amount and type of food consumed. The previous literature supports this relationship between perfectionism and restrained eating of DE (e.g., [23]), and the current study builds on earlier evidence by highlighting the indirect effects of perfectionism on ED.

The pressure subscale of media influence was also linked to ED via both emotional and restrained eating in the two statistical models. This result is in agreement with H3. It is also in line with previous findings from a similar sample of Lebanese University students [11]. Despite being a Middle Eastern country, Lebanon has a significant Western influence evident in its society due to globalization. Therefore, similar to Western culture all different types of media (e.g., magazines, television and social media) spread the idea of the ‘perfect body’ and increase individuals’ concerns about losing weight and/or build muscle [14]. The fact that media had such an important role in both models is indicative of its pervasive effects. Whether it leads to controlling one’s eating to lose weight as seen in the media or eating in response emotional stimuli, media influence pressure has an effect on both restrained and emotional eating and is a risk factor for ED.

The effects of other psychosocial and weight-related variables were not significant in the two structural models. For example, the majority of the Big Five traits lost significance when put together in the models, which might be due to the suppression effect. In addition, body image did not reach significance in the structural models, as it was expected given previous findings [50]. A potential explanation is that body image could be a mediator between DE and other variables in the causal pathway to ED. Also, the measure used to assess body image might have not been ideal, as some researchers have pointed out its modest ecological validity compared to other tools [78], as well as its focus on body fat rather than other aspects that might trigger dissatisfaction such as lack of muscularity [79]. The lack of significant results concerning parental variables could be explained by the fact that they are mediated by variables that were not tested for. For example, some studies have shown that maternal care and protection as well as beliefs of vulnerability could mediate the

relationship between parental bonding and eating disorder symptomology [40]. In addition, the lack of significance of some results can be explained by the fact that eating behaviors are complex phenomena influenced by multiple variables simultaneously; therefore, one single variable might not explain enough variance to reach significance.

A number of limitations must be acknowledged when interpreting the present findings. First, as this study was exploratory in nature, more studies need to be conducted to reach conclusive data. Second, the psychological tools used showed adequate to excellent internal consistencies in the present sample, but need to be adapted to the Lebanese population to yield more accurate results. Third, relying solely on self-reported measures introduces the possibility of mono-method bias. Thus, future studies would benefit from using longitudinal or mixed-method designs, culturally valid instruments, and the addition of direct measures.

The present study can serve as a starting point for future research. Forthcoming work could test similar models in other populations in the region including clinical populations diagnosed with ED such as Anorexia Nervosa or Bulimia Nervosa. Moreover, it would be beneficial to test our model on a diverse sample of patients to compare the different ED as each one has its own specific symptomatology and might interact with other variables differently. In addition, the most predictive variables found can be studied in depth in future studies. For example, different types of media can be tested since the Internet has recently been shown to be as harmful as TV and magazines [36].

Conclusion

To our knowledge, this study is the first attempt at merging previous findings into one exploratory model of the direct and indirect effects of weight and psychosocial variables on ED. The present study enhances the understanding of the dynamic and complex relationships between DE and ED: In particular, perfectionism, self-control, extraversion, and media influence pressure were found to be major predictors in these relationships. This shows the need for specialized ED clinics in Lebanon and the region as a whole providing multidisciplinary counseling such as nutrition, psychological, and psychiatric counseling for youth dealing with DE and ED. At the national level, the results imply the need for public health interventions for university students that include both nutritional and psychological aspects. The current study also sheds light on the importance of early detection through screening at the university level to detect DE behaviors before they worsen. Moreover, training health professionals and university health personnel is a vital step in raising awareness about ED among youth. The region could also benefit from media

literacy programs that aim at adopting a more critical view of the media and its messages (e.g., ideal of thinness).

Compliance with ethical standards

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethical approval All procedures performed were in accordance with the ethical standards of the US Code of Federal Regulation (45CFR 46.107, 21CFR 56.107) and Good Clinical Practice ICH (Sect. 3).

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

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