Universidade do Minho
Escola de Psicologia

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Disordered eating and dating violence: Relation with emotion regulation and body investment

junho de 2019

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Trabalho efetuado sob a orientação da
Professora Doutora Sónia Gonçalves
E da
Professora Doutora Marlene Matos

junho de 2019

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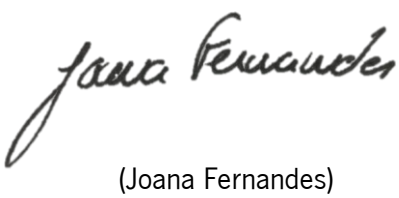

(Joana Fernandes)

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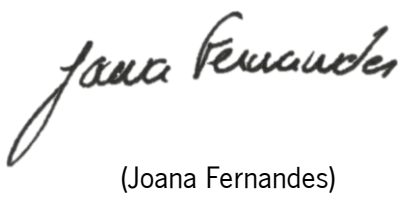
"E sobre a criação do Mundo?
Não sei. Para mim pensar nisso é fechar os olhos
E não pensar. É correr as cortinas
Da minha janela (mas ela não tem cortinas)."
– Alberto Caeiro

STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration.

I further declare that I have fully acknowledged the Code of Ethical Conduct of the University of Minho.



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Mestrado Integrado em Psicologia da Universidade do Minho

Disordered Eating and Juvenile Dating Abuse: Relation with Emotion Regulation and Body Investment

Joana Rita Oliveira Fernandes

Professor Doctor Sónia Gonçalves

Professor Doctor Marlene Matos

Abstract

According to past literature, juvenile dating violence experiences associated with disturbed eating behaviours appear to be related emotion dysregulation and altered perceptions of body image. Two studies were conducted, with the first aiming to analyse the psychometric properties of the BIS in a Portuguese clinical sample of patients with an eating disorder. The main aim of the second study was to analyse the association between disordered eating and dating violence, as well as to create predictive models for such variables. A total of 536 participants constituted a clinical and a non-clinical sample, to whom were applied four instruments analysing the focal variables. Exploratory and confirmatory factor analyses were conducted revealing good internal consistency values and a good model fit for the scale. Results show high prevalence of emotional/verbal abuse experiences. Correlation and multiple regression analyses demonstrated that disordered eating behaviour appears significantly positively associated with and was predicted by dating violence victimization and perpetration, among others. However, eating behaviour did not constitute a significant predictor for dating violence. In conclusion, disordered eating, similarly to eating disorders, could be maintained by several factors and there seems to be an especially important contribution made by past and present abusive dating experiences.

Key words: body investment; dating violence; disordered eating; emotion regulation.

Mestrado Integrado em Psicologia da Universidade do Minho

Comportamento Alimentar Perturbado e Abuso nas Relações Íntimas adolescentes: Relação com Regulação Emocional e Investimento Corporal

Joana Rita Oliveira Fernandes

Professora Doutora Sónia Gonçalves

Professora Doutora Marlene Matos

Resumo

De acordo com passada literatura, experiências de violência no namoro associadas a comportamentos alimentares disfuncionais parecem estar relacionadas com dificuldades de regulação emocional e com perceções de imagem corporal alteradas. Foram realizados dois estudos, tendo o primeiro como objetivo analisar as propriedades psicométricas da Escala de Investimento Corporal numa amostra de pacientes com perturbação do comportamento alimentar. O segundo estudo tem como principal objetivo analisar a associação entre comportamento alimentar disfuncional e violência no namoro, assim como criar modelos preditivos para essas variáveis. Foram aplicados instrumentos para avaliar as principais variáveis numa amostra clínica e não-clínica de 536 participantes. Análise fatorial exploratória e confirmatória revelou bons valores de consistência interna e um bom modelo de quatro fatores. Os resultados mostraram prevalência elevada de violência emocional. Análises de correlação e de regressão linear múltipla mostraram que o comportamento alimentar se encontra significativamente associado e é predito por experiências de vitimação e de perpetração, entre outros. No entanto, o comportamento alimentar não se mostrou como um preditor significativo para a violência no namoro. Portanto, o comportamento alimentar disfuncional, assim como as perturbações alimentares, parece ser mantido por vários fatores, apresentando-se a violência no namoro como um fator de manutenção especialmente importante.

Palavras-chave: comportamento alimentar; investimento corporal; regulação emocional; violência no namoro.

Content

Index of tables

Disordered eating and dating violence: Relation with emotion regulation and body investment

A significant amount of individuals engage in disturbed eating (DE) behaviours, meaning those which are associated with eating disorders and individually do not warrant any specific clinical diagnosis (Quick & Byrd-Bredbenner, 2013). These have been characterized as restricted and binge eating; weight, shape, and eating concerns; and the usage of unhealthy compensatory behaviours to control body weight and shape, such as dietetic pills, purging, and fasting (Ackard & Neumark-Sztainer, 2002; Cha, Ihongbe, & Masho, 2016; Quick & Byrd-Bredbenner, 2013; Trottier, & MacDonald, 2017).

When initiated during adolescence, these subclinical symptoms have the potential to create patterned behaviours that progress into young adulthood or stabilize over time, even though its prevalence and severity may decrease along the way. Such findings were arrived at by Herpertz-Dahlmann, Dempfle, Konrad, Klasen, and Ravens-Sieberer (2015), in a study which additionally reported a significant association between DE behaviours in adolescence and overweight/obesity 6 years later, as well as a higher risk for depression after that same period of time. Moreover, DE is often associated with anxiety and depressive symptoms, obsessive and compulsive behaviours, low self-esteem, suicidal ideation, and suicide attempts (Buddeberg-Fischer, Bernet, Schmid, & Buddeberg, 1996; Quick & Byrd-Bredbenner, 2013).

Eating behaviour alterations related to eating disorders are frequently associated with traumatic/adverse experiences. For instance, a literature review study conducted by Trottier and McDonald (2017) concluded that childhood (i.e. physical, sexual, and emotional abuse) and adulthood (i.e. sexual abuse, military-related trauma) traumatic experiences are strongly correlated with the psychopathology of eating disorders.

One such adverse experience, lived by many adolescents and young adults, is that of dating violence (DV). Attention to this social issue became much more salient due to an article published by James Makepeace (1981), reporting that 21,2% of a university sample had experienced such abuse, while also stressing the importance of premarital relationships on establishing future marital roles. Many developments were made along the years, such as the inclusion of other types of aggression (i.e. emotional and sexual) in research efforts. In recent years, it has become relevant to address violence perpetrated through new technologies. High rates of cyber DV have been reported regarding high school and university samples, ranging from 26% to 50% of students reporting at least one online abusive behaviour in a romantic relationship,

and are related to several psychosocial issues, as well as to offline abuse (Barter, Stanley, Wood, Lanau, 2017; Smith et al., 2018; Zweig, Dank, Yahner, & Lachman, 2013).

Fewer studies have investigated experiences of DV perpetration. Nevertheless, Mumford, Liu, and Taylor (2019) developed a longitudinal study, finding an increase in DV perpetration over a period of three years (from 23.4% at baseline to 26.9%) in a nationwide sample of high school students (aged between 10 and 18 years). These authors stressed the importance of understanding both sides of an abusive relationship in order to prevent such behaviours and its consequences.

In Portugal, some studies have been conducted to assess the prevalence of DV, with results pointing to high rates of victimization – from 25.4% to 56.5% – and perpetration – from 30.6% to 56.5% (Machado, Caridade, & Martins, 2010; Neves, Correia, Ferreira, Borges, 2018).

In all of its forms, experiences of DV are associated with more than a few mental health problems, such as substance abuse, depression symptomatology, unhealthy weight control behaviours, suicidal ideation and suicide attempts (Barter & Stanley, 2016; Cha et al., 2016); low self-esteem and low levels of emotional wellbeing (Ackard & Neumark-Sztainer, 2002).

As we can see, the construct of dating violence has been operationalized in various different ways depending on the study considered. In this research, dating violence constitutes a set of physical, sexual, emotional/verbal, threatening, relational, and cyber abusive behaviours that happen within a juvenile romantic relationship.

Traumatic experiences have been considerably researched in association with DE (Trottier & McDonald, 2017) and have been considered as both risk and maintenance factors. Intimate partner violence during adolescence and young adulthood has not warranted as much attention. In any case, the existing literature about this possibility has shown that adolescents and young adults who experience DV, in comparison with those in non-violent relationships, report higher prevalence of engagement in DE (cf., Ackard & Neumark-Sztainer, 2002; Barter & Stanley, 2016; Cha, Ihongbe, & Masho, 2016).

Regarding the underlying factors that could contribute to the better understanding of this association, Trottier and MacDonald (2017) observed that DE behaviours have frequently been considered in past literature as a mechanism for distraction and avoidance of trauma-related negative emotions and cognitions. Explanatory models of eating disorders already incorporate the thesis that DE behaviours can distract from and temporarily alleviate negative moods, such is the case of the Dual-Pathway Model (Stice, 2001), but most notably Fairburn's Transdiagnostic

Maintenance Model (Fairburn, Cooper, & Shafran, 2003; Murphy, Straebler, Cooper, & Fairnburn, 2010).

Most studies researching emotion regulation in the association between DE and adverse experiences are regarding the latter as risk factors (Mills, Newman, Cossar, and Murray, 2015), rather than maintenance factors, and mainly investigate the impact of childhood abusive experiences on the later onset of eating disorders (Trottier and MacDonald, 2017).

Another matter must be taken into thought when discussing eating behaviour: the nuclear feature characterizing its psychopathology, which is the over-evaluation of body weight and shape to measure one's self-worth, and their control (Fairburn, Cooper, & Shafran, 2003; Murphy, Straebler, Cooper, & Fairnburn, 2010). This over-evaluation leads to extreme preoccupations with weight gaining and, consequently, to several weigh control behaviours imposing extremely restricted feeding rules and unattainable weight goals. This refers to issues such as poor body image and body dissatisfaction, which have both been related to involvement in DE behaviours (Cha et al., 2016; Quick & Byrd-Bredbenner, 2013; Wyssen, Bryjova, Meyer, & Munsch, 2016) and to the experience of abuse (Cha et al., 2016; Kremer et al. al., 2013). When referring to body image, it is meant the way one perceives and evaluates their own body, being body dissatisfaction a negative self-evaluation one has towards their body (Wyssen et al., 2016).

Few investigations have delved into the study of body-related issues associated with trauma or abuse and most are concerning physical and/or sexual childhood abuse (Scheffers, Hoek, Bosscher, van Duijin, Schoevers, & van Busschbach, 2017). Kremer, Orbach, and Rosenbloom (2013), in their study about body image issues on adult victims of reiterated physical and sexual abuse, found that this abuse impacts victims' body image and attitudes. They further explained that both types of abuse result in physical damage to the body, and that this very observable damage affects the victim's body attitudes because it impairs their notion of physical limits and promotes objectification of their bodies. This view may weaken the mechanisms used for body protection and maintenance, leading the victims to have less positive attitudes and less body care, as well as greater frequency of danger exposure. This study is in agreement with the suggestions of Ackard and Neumark-Sztainer (2002), who proposed that victimization experiences, because they involve behaviours that violate and cause damage to the body, may make it difficult for victims to integrate a positive body image, especially when the abuse occurs during a developmental stage, with physical and physiological normative changes to their bodies.

That being said, it is necessary to understand how integrating a positive and adaptive body image is actually hampered by victimization in a dating relationship and in what ways these altered perceptions of body image are associated with DE in a Portuguese population of adolescents and young adults.

With this is mind, two studies were conducted. Study 1 aimed at analysing the psychometric properties of the Body Investment Scale. For study 2 the following aims were established:

1. To analyse the frequency of DV behaviours and to compare male vs. female and high school vs. university students regarding disordered eating, body investment and emotion regulation;
2. To analyse the association between DE behaviours and DV (victimization and perpetration), emotion regulation and body investment;
3. To create predictive models for DE, for DV victimization, and for perpetration.

Method

Participants

A total of 526 participants were recruited from clinical (N = 78) and non-clinical (N = 448) settings. Study 1 utilized the total sample collected (clinical and non-clinical) and study 2 utilized the non-clinical sample.

The clinical sample was composed of 76 women and 2 man with an eating disorder, aged between 14 and 31 (M = 22.36; SD = 4.06), and was collected from an Hospital Centre in the north of Portugal.

The non-clinical sample counted with 448 participants, of which 351 are university students, aged between 17 and 26 years (M = 20.69; SD = 2.17), and 97 are high school students, aged between 14 and 18 years (M = 15.45; SD = 1.17). The university sample was recruited from several Portuguese universities, but mostly from University of Minho (79.6%). In the total university sample, 85.1% of participants were female and 14.9% were male. The high school sample was collected in a single school, across six classes from 9th to 12th grade, of which 53.9% were female and 46.1% were male.

Instruments

Socio-demographic questionnaire. An initial assessment was made to collect information regarding participants' age, sex, level of education, and formal education equipment frequented.

Eating Disorder Examination Questionnaire (EDE-Q5). Self-report measure of 28 items that reflects the number of days, in the past four weeks, when behaviours, attitudes, and feelings about eating occurred (eg "How many days in the last 28 days did you feel fat?"). These are rated on a 7-point Likert scale, from 0 (no day) to 6 (every day). The combined items create a global score scale, obtained from averaging four subscales, namely, Restraint, Eating Concern, Weight Concern, and Shape Concern. The original scale presents good psychometric properties (Fairburn and Belgin, 1994). The Portuguese version of the instrument shows good internal consistency, with Cronbach's alpha of .97 (Machado, Martins, Vaz, Conceição, Bastos, & Gonçalves, 2014).

Conflict in Adolescent Dating Relationships Inventory (CADRI). Self-report measure of 28 items aimed at adolescents over the age of 14 who have current or past experience in romantic relationships. This inventory assesses the use of positive and negative strategies for resolving emergent conflicts in intimate relationships, being filled by only one individual regarding their abusive behaviours (eg, "I threatened to hurt him/her.") and abuse suffered (eg "He/ She threatened to hurt me."). In this study, items regarding positive strategies were not utilized. It's composed of five categories that address the various types of violence, namely, severe abuse (sexual and physical abuse), threatening behaviour, relational aggression, verbal and emotional abuse, and abuse through new technologies. It was initially developed and validated by Wolfe, Scott, Reitzel-Jaffe, Wekerle, Grasley, & Straatman (2001) as a way of adapting existing instruments for adult individuals to adolescents, obtaining good internal consistency levels for the combination of subscales ($\alpha > .83$). Saavedra, Machado, Martins, & Vieira (2008) assessed its psychometric properties in a Portuguese population, obtaining a good value of Cronbach's alpha ($\alpha = .90$).

Difficulties in Emotion Regulation Scale (DERS). This self-report scale contains 36 items rated on a 5-point Likert scale, from 1 (almost never) to 5 (almost always), regarding the frequency with which the presented statements apply to the participant. It evaluates clinically relevant difficulties in regulating emotions (eg "When I am upset, I feel weak.") and is composed of six domains: limited access to emotional regulation strategies; non-acceptance of emotional

responses; lack of emotional awareness; difficulties in impulse control; difficulties in acting in accordance with the objectives; and lack of emotional clarity. This scale showed high values of Cronbach's alpha in the original study, α = .93 (Gratz & Roemer, 2004), and for the Portuguese population, α = .93 (Coutinho, Ribeiro, Ferreirinha, & Dias, 2009).

Body Investment Scale (BIS). This measure assesses body-directed experiences, feelings, and attitudes. It consists of a self-report scale composed of 24 items (e.g. "I like to take a shower.") on a 5-point Likert scale, 1 (completely disagree) to 5 (I completely agree). It's divided into four factors: feelings and attitudes toward body image; comfort to touch; body care; and body protection. Higher results represent more positive feelings and attitudes, greater comfort to touch, more care and greater protection. The score is calculated by averaging the six items that make up each of the factors. This instrument was developed and validated with both clinical and community samples, aiming to construct an instrument that evaluated several facets of body image, enabling the study of normative and pathological behaviours (Orbach and Mikulincer, 1998). High values of Cronbach's alpha were obtained for all of the factors (α = .75, α = .85, α = .86, and α = .92, respectively). The psychometric properties of this measure in Portuguese population are yet to be established and will be analysed in study 1.

Procedure

The present investigation was submitted for authorization to the Social Science's Ethics Committee of the University and the Ethics Committee of the *Direção Geral da Educação*.

The clinical sample was recruited through the consult of eating disorders, were a larger project was taking place, and participants were applied the research protocol for the present study.

The instruments to be used with the university students sample were computerized and converted for the application *Google Forms*. Students enrolled in the Psychology course at University of Minho could participate in the investigation through an Accreditation System that will reward academic credits to students who participate in research initiatives from the School of Psychology.

The high school sample was collect in the Secondary School from the north of Portugal, with six classes chosen by the school Director. In a first moment, Informed consents for each student and respective legal guardians were distributed through the selected classes. In a second moment, the main researcher of the present study applied the questionnaire to each student who

presented the informed consent signed by both them and their caregivers. The security and anonymity of the information voluntarily provided by the participants was guaranteed and a brief explanation of what the participants would be doing was provided. In the end, their participation was thanked and the aim of the study was explained.

Data analysis

All statistical analyses were conducted with IBM SPSS 25 for Windows, with exception of a confirmatory factor analysis, which was conducted with IBM SPSS Amos™ 25.

Regarding the first study, principle component factor analysis was conducted on a sample comprised of community and clinical participants to assess the factor structure of the 24 items of the Body Investment Scale. Internal consistency was assessed for both samples.

Confirmatory factor analysis (CFA) was conducted with the clinical sample to assess the factorial structure of BIS, using the maximum likelihood (ML) method for model estimations. Five participants presented missing data and were, therefore, excluded from the sample. Skewness (*Sk*) and kurtosis (*Ku*) were evaluated for all items to assess the assumption of normality. According to Kline's (2005, p.50) criteria of absolute values $Sk > |3|$ and $Ku > |10|$, no severe violations to normal distribution were found.

To assess the model's adjustment, two absolute fit indices were used. Normed chi-square (χ^2/degrees of freedom, *df*), with values between 2-3 indicating a good fit (Arbuckle, 2008, 9.589); and the Root Mean Square Error of Approximation (RMSEA), with 90% confidence interval (upper bound of CI < .10 indicating a good fit), in which values [.05; .08[indicate a good fit (Arbuckle, 2008, p.592). Additionally, relative indices were used to further evaluate the model fit: The Tucker-Lewis Index (TLI), Bollen's Incremental Fit Index (IFI), and Comparative Fit Index (CFI), for which values < .90 indicate a bad fit, values [.90; .95[indicate a good fit, and values > .95 indicate a very good fit (Hu & Bentler, 1999; Hooper, Coughlan, & Mullen, 2008).

The original four-factor model of BIS was tested, which was re-specified to achieve a better model fit. This re-specification allowed the covariance between four pairs of item's residuals, which correlations

In study 2 the assumption of normality was assessed for the focal variables, once more according to Kline's (2005, p. 50) criteria, which were not met by CADRI subscales Victimization and Perpetration. Hence, all analysis conducted with these variables used non-parametric tests.

Differences between high school and university students; and between female and male participants were assessed for DE behaviour and DV experiences. Chi-square tests were used to evaluate differences regarding prevalence and Mann-Whitney U tests for independent variables were used to assess differences between mean ranks of the EDE-Q Subscales and CADRI dimensions.

Subsequently, Pearson's and Spearman's (only for associations with CADRI Victimization and Perpetration total scores) correlation analyses were conducted in the university students sample and in the high school students sample, to assess the associations between all the focal variables.

Finally, multiple linear regression analyses were carried out to identify predictive models for the EDE-Q total score, the CADRI Victimization total score, and the CADRI Perpetration total score, controlling for the effect of age and sex of the participants. In order to fulfil all the assumptions, three participants with outlier values were removed to conduct the analysis with EDE-Q total score, 20 and 26 participants were removed to conduct the analysis with CADRI victimization and perpetration total scores, respectively.

Results

Study 1

Exploratory factor analysis. A principal component analysis (PCA) was conducted for the 24 items of the Body Investment Scale (BIS), using orthogonal rotation (varimax), in accordance with the analysis of the original scale (Orbach & Mikulincer, 1998). Sampling adequacy for the analysis was proved by the Kaiser-Meyer-Olkin measure, KMO = .87, and by Bartlett's test of sphericity, χ^2 (276) = 5209.17; $p < .001$. All the values of the anti-image correlation matrix diagonals were over .5. Initially, the analysis was conducted with no number of fixed factors, resulting in seven factors with eigenvalues greater than 1 explaining 62.72% of the variance. Cattell's scree plot was ambiguous for it showed points of inflexion that could justify extracting either two or four factors. Taking this into account and considering the previous theoretical evidence for the appropriate structure of this instrument (Orbach & Mikulincer, 1998), data were forced into a four-factor solution, explaining 53.94% of the total variance. Table 1 shows the factor loadings after rotation, as well as the eigenvalues and total explained variance for each factor.

Table 1.

Loadings of the 24 Items of the Body Investment Scale in Rotated Factors.

	Body image	Touch	Care	Protection
5. I am frustrated with my physical appearance. (R)	**.869**	.129	-.066	.043
13. I hate my body. (R)	**.861**	.172	-.011	.103
16. I feel comfortable with my body.	**.847**	.102	.145	-.054
21. I like my appearance in spite of its imperfection.	**.824**	.223	.173	.000
10. I am satisfied with my appearance.	**.818**	.106	.053	-.129
17. I feel anger toward my body. (R)	**.782**	.146	.050	.150
22. Sometimes I purposely injure myself. (R)	**.477**	.179	.143	.289
12. I enjoy taking a bath.	**.330**	.192	.308	.086
6. I enjoy physical contact with other people.	.162	**.755**	.130	-.073
2. I don't like it when people touch me. (R)	.288	**.725**	-.022	.127
20. I like to touch people who are close to me.	.043	**.725**	.148	-.069
11. I feel uncomfortable when people get too close to me physically. (R)	.209	**.724**	-.073	.132
9. I tend to keep a distance from the person with whom I am talking. (R)	.094	**.691**	-.032	.121
23. Being hugged by a person close to me can comfort me.	.095	**.511**	.194	.046
4. I pay attention to my appearance.	-.065	.064	**.698**	-.114
14. In my opinion it is very important to take care of the body.	.085	.050	**.689**	.099
8. I like to pamper my body.	.334	.191	**.609**	-.081
1. I believe that caring for my body will improve my well-being.	-.147	-.001	**.591**	.098
19. I use body care products regularly.	.148	-.040	**.529**	.087
24. I take care of myself whenever I feel a sign of illness.	.180	.243	**.392**	.385

3. It makes me feel good to do something dangerous. (R)	.071	.016	-.011	**.831**
7. I am not afraid to engage in dangerous activities. (R)	-.156	-.058	-.100	**.766**
15. When I am injured. I immediately take care of the wound.	.109	.143	.360	**.503**
18. I look in both directions before crossing the street.	.206	.187	.322	**.420**
Eigenvalues	6.46	2.56	2.09	1.83
Variance explained	20.69%	13.56%	10.91%	8.78%

Note: R = items scored in reversed direction; Factor loadings > .30 were chosen.

When examining the factor loadings, three items loaded on different factors from the original scale. Specifically, the item 12 ("I enjoy taking a bath") and the item 22 ("Sometimes I purposely injure myself") loaded on the Body Image factor rather than, respectively, on the Care and the Protection factors; moreover, the item 24 ("I take care of myself whenever I feel a sign of illness.") loaded on the Care factor (instead of the Protection factor). Regarding the first two items, internal consistency of the Body Image factor was higher when the items were removed (from .90 to .93). Moreover, internal consistency of the Care factor did not change when item 12 was included and item 24 was excluded. As for the Protection factor, internal consistency improved when items 22 and 24 were included here (from .62 to .66). In line with these findings, considering the structure of the original scale and its potential relevance to be used in clinical settings, all three items were clustered in accordance with Orbach and Mikulinger's (1998) factor structure.

Internal consistency. Internal consistency was assessed for the community and clinical samples. For the community sample, we found high Cronbach's alpha coefficients for Factor 1 (Cronbach's α = .91) and Factor 2 (Cronbach's α = .80), and acceptable values for Factor 3 (Cronbach's α = .69) and Factor 4 (Cronbach's α = .62). In the clinical sample, internal consistency was strong for Factor 1 (Cronbach's α = .94) and Factor 2 (Cronbach's α = .81), acceptable for Factor 3 (Cronbach's α = .68), and good for Factor 4 (Cronbach's α = .75).

Confirmatory factor analysis. A confirmatory factor analysis (CFA) was conducted to confirm the original factorial structure of BIS in a clinical sample of patients diagnosed with Eating Disorders (N = 73). Initially, the four-factor solution showed a poor fit to the data (Table 2),

similarly to Marco's et al. (2017) study. In order to improve model fit, modification indexes were examined and the covariance between four pairs of item's residuals was allowed: namely between items 3 and 7; items 9 and 10; items 3 and 24; and items 22 and 24. These correlations might be due to similar meaning of the items in each pair. The final re-specified model showed an improved fit, IFI = .926, TLI = .912, CFI = .923 and RMSEA = .061.

Table 2.

Model Fit Statistics for Confirmatory Factor Analysis of the BIS.

Model	χ^2 *(df)*	χ^2 */df*	IFI	TLI	CFI	RMSEA
Original four-factor model	369.27*** (246)	1.501	.857	.834	.852	.083
Re-specified four-factor model	305.80** (242)	1.264	.926	.912	.923	.061

Note: $n = 73$; χ^2 = chi-square; df = degrees of freedom; Re-specification = correlation between errors of items 9 and 11; items 3 and 7; items 3 and 24; and items 22 and 24; IFI = incremental fit index; TLI = Tucker-Lewis index; CFI = Comparative fit index; RMSEA = Root mean square error of approximation.

**$p < .01$; ***$p < .001$

Study 2

Frequency of Disordered Eating and Dating Violence. Table 3 displays mean scores for the EDE-Q subscales by level of education and sex of the participants. Regarding the diagnostic items, the most frequent behaviour were episodes of binge eating, with 30.9% of girls and 19.1% of boys in high school, and 41.3% of female and 22.6% male participants of the university sample reporting at least one occurrence in the past 28 days. Excessive exercise was reported at least once in past month by 16.4% of girls and 16.7% of boys in high school, and by 17.1% of female and 9.4% of male university students. Purging behaviour and misuse of laxatives was very low across all ages and sex of the participants (all below 4%).

A large amount of participants reported at least one occurrence of DV victimization (82.4%) and perpetration (85.9%), with the most reported type of violence being emotional/ verbal abuse (80.3% reported suffering and 82.1% reported inflicting), followed by abuse through new technologies (30.2% of victimization and 31.1% of perpetration), physical and/or sexual victimization (19.8%) and perpetration (18.2%), threatening behaviour (11.7% reported suffering and 13.3% reported inflicting), and relational aggression (10% and 2.6%). Almost 80% ($n = 242$) of the participants reported both victimization and perpetration experiences.

Group differences between level of education and sex of the participants in disordered eating and dating violence. Results from the four EDE-Q Subscales in high school students differed significantly from those in university students, with the latter presenting higher scores of DE (Table 2). Regarding sex differences overall, female students reported higher scores (M = .97, SE = .86) than male students (M = .58, SE = .75) in the high school, $t(93) = -2.28$, $p = .025$; and in the university (Female: M = 1.50, SE = .1.26; Male: M = .75, SE = .60), $t(144) = -6.73$, $p < .001$, settings.

Binge eating episodes were significantly more prevalent in university students, $\chi^2 = 5.33$, $p = .021$, $\varphi = .109$, and in female students within this setting, $\chi^2 = 6.06$, $p = .014$, $\varphi = .132$. There were no significant sex differences among high school students. There were no other significant differences regarding disordered eating behaviours between female and male participants; and between high school and university students.

Table 3.

Mean Values for the EDE-Q Subscales Regarding the Past 28 days, Represented by Level of Education and Sex of the Participants.

Disordered eating	High School		University		Statistics
	Female	Male	Female	Male	
Total, N = 448	(n = 55), M (SD)	(n = 42), M (SD)	(n = 298), M (SD)	(n = 53), M (SD)	t-Test t(df)
EDE-Q Total score	.97 (.86)	.58 (.75)	1.50 (1.26)	.75 (.60)	$t(214) = -5.34^{\cdots}$
EDE-Q Subscales					
Restraint	.73 (.90)	.44 (.57)	1.30 (1.31)	.91 (.98)	$t(251) = -6.17^{\cdots}$
Eating Concern	.39 (.62)	.28 (.62)	.72 (1.11)	.22 (.41)	$t(267) = -3.57^{\cdots}$
Weight Concern	1.41 (1.35)	.86 (1.13)	1.96 (1.64)	.94 (1.03)	$t(188) = -3.98^{\cdots}$
Shape Concern	1.35 (1.17)	.77 (1.17)	2.01 (1.57)	.94 (.76)	$t(184) = -4.97^{\cdots}$

$^{\cdots}p < .001$

As seen in Table 4, DV Perpetration is significantly more prevalent in university students, specifically concerning emotional/verbal abuse, $\chi^2 = 5.36$, $p = .021$, $\varphi = .132$.There were no significant differences between education level regarding Victimization. However, a higher number of high school students reported relational aggression Victimization, $\chi^2 = 6.65$ $p = .010$,

φ = -1.47, as well as higher frequency of occurrence of those behaviours, U = 6.332, z = -2.57, p = .010, in comparison to university students. There were no significant sex differences, overall. Nevertheless, among university students, the number of male participants reporting DV Perpetration through relational aggression was significantly higher, χ^2 = 5.78, p = .16, φ = -.152, as was the mean frequency with which those aggressions occurred during the relationship, U = 3 770.0, z = -2.37, p = .018, in comparison to female participants. Furthermore, female university students showed higher prevalence, χ^2 = 12.56, p < .001, φ = .224, and mean frequency of occurrence, U = 3 003.5, z = -2.52, p = .012, of DV perpetration through emotional/verbal abuse.

Table 4.

DV Prevalence and Frequency of Violent Behaviour Occurrence, Represented by Level of Education and Sex of the Participants.

Dating Violence	High School		University		Statistics	
	Female (n = 55),	Male (n = 42),	Female (n = 298),	Male (n = 53),		
Total, N = 311	n (%)	n (%)	n (%)	n (%)	χ^2	φ
Victimization	25 (78.1)	18 (78.3)	179 (84.4)	29 (76.3)	.83	.052
Perpetration	24 (77.4)	17 (73.9)	192 (90.6)	29 (76.3)	5.45·	.133
	M (SD)	M (SD)	M (SD)	M (SD)	U Test	
Victimization	4.81 (6.24)	7.86 (12.27)	4.77 (5.32)	4.32 (3.95)	308.5	
Perpetration	3.87 (4.41)	6.67 (11.38)	4.97 (4.78)	3.55 (3.37)	327.5	

·p < .05;

Group differences between level of education and sex of the participants in emotion regulation and body investment. Emotion regulation difficulties in high school students differ significantly from university students in the Awareness, t(146)= 4.31, p < .001, Impulse, t(151)= 2.68, p = .008, and Goals, t(158)= 3.53, p = .001, subscales. These results suggest that high school students have lower emotional awareness, lower impulse control, and higher difficulty in acting with accordance to their goals. Regarding body investment, university students presented significantly higher scores in the Care, t(148)= -2.10, p = .038, and Protection, t(140)= -4.71, p < .001, factors (Table 6). Among high school students, male

participants presented higher score in the Impulse subscale, $t(78) = 2.48$, $p = .015$. Moreover, female participants reported significantly higher mean scores for Body Care, $t(73) = -3.04$, $p = .003$, and Body Protection, $t(87) = -3.62$, $p < .001$, in comparison to their male counterparts. Within university students, female students showed significantly higher difficulty with emotion regulation overall, $t(83) = -2.14$, $p = .036$, higher difficulty in accepting emotional responses, $t(347) = -2.43$, $p = .016$, less positive body-related feelings and attitudes, $t(347) = 4.27$, $p < .001$, and higher levels of body protection, $t(71) = -3.89$, $p < .001$.

Associations between the focal variables. Pearson's and Spearman's correlation coefficients between the main variables for the high school and university samples are displayed in Tables 7 and 8, respectively. Regarding the first set of students, DE behaviour positively correlated with emotion dysregulation. This means that participants with greater DE also present greater difficulties in regulating their emotions. DE is also strongly associated with being female. Moreover, higher mean score of DE were significantly associated with a poor body image and less comfort to physical touch. No significant correlation was found between DE and DV victimization or perpetration.

Table 5.

Pearson's and Spearman's Correlation Coefficients Between Age, Sex, DE, DV, Emotion Regulation and Body Investment for the High School Sample.

	1	2	3	4	5
Sex [a]	–				
Disordered eating [a]	.230*	–			
Victimization [b]	-.139	.220	–		
Perpetration [b]	-.070	-.235	.867***	–	
Emotion Regulation [a]	-.192	.296**	.345*	.259	–
Body Image [a]	-.134	-.637***	-.175	-.006	-.430***
Touch [a]	.109	-.226*	-.005	-.148	-.222*
Care [a]	.309**	.134	.094	.222	-.275**
Protection [a]	.350***	-.167	-.259	-.084	-.302**

* p < .05; ** p < .01; *** p < .001; [a] Pearson's Correlation; [b] Spearman's Correlation

Among the university students, DE was also strongly associated to being female; it appeared positively correlated with both DV victimization and perpetration; with emotion regulation difficulties; and was negatively correlated with a positive body image, as well as with comfort to physical touch. Furthermore, victimization and perpetration were positively correlated with emotion dysregulation; and negatively correlated with a positive body image. Additionally, violence victimization was significantly negatively correlated with body protection. This suggests that participants who experience violence in a romantic relationship present more difficulties in emotion regulation, as well as a poor body image, and less mechanisms of body protection.

Table 6.

Pearson's and Spearman's Correlation Coefficients Between Age, Sex, DE, DV, Emotion Regulation and Body Investment for the University Sample.

	1	2	3	4	5
Sex [a]	–				
Disordered eating [a]	.220**	–			
Victimization [b]	.004	.167**	–		
Perpetration [b]	.118	.257***	.825***	–	
Emotion Regulation [a]	.096	.488***	.266***	.281***	–
Body Image [a]	-.223***	-.723***	-.174**	-.207**	-.606***
Touch [a]	-.062	-.211***	-.039	-.103	-.357***
Care [a]	.077	-.039	-.093	-.063	-.229***
Protection [a]	.202***	-.054	-.203**	-.111	-.252***

* p < .05; ** p < .01; *** p < .001; [a]Pearson's Correlation; [b]Spearman's Correlation

Predictiors of disordered eating. Three multiple linear regression analysis were conducted using the forced entry method to predict eating behaviour, victimization and perpetration variance in the present sample (Tables 7, 8 and 9). Regarding DE, results indicated that the model explained 54% of the variance, R^2 = .61, Z(12,285) = 36.82, p < .001. Additionally, the analysis revealed that higher age of the participants, presence of DV victimization and perpetration, difficulties accepting emotional responses and a poor body image were significant predictors of variance for this dependent variable.

Table 7.

Multiple Linear Regression for the Prediction of Disordered Eating.

	B	SEB	β
Step 1			
Constant	-.462	.464	
Age	.061	.023	.151**
Sex	.545	.160	.194**
Step 2			
Constant	2.497	.634	
Age	.061	.016	.151***
Sex	-.012	.112	-.004
Victimization	-.043	.011	-.231***
Perpetration	.052	.012	.247***
Strategies	-.001	.011	-.009
Nonacceptance	.022	.010	.125*
Awareness	-.010	.012	-.040
Impulse	.022	.012	.103
Goals	-.008	.011	-.036
Clarity	-.006	.013	-.023
Body Image	-.792	.059	-.673***
Touch	.067	.064	.044

* $p < .05$; ** $p < .01$; *** $p < .001$

Predictors of DV victimization and perpetration. Significant predictive models were found for both variables – $R^2 = .76$, $Z(11,264) = 76.31$, $p < .001$; $R^2 = .80$, $Z(10,259) = 100.30$, $p < .001$ – explaining 75.2% and 79.1% of its variance, respectively. In either analysis, these variables were the most significant predictor for each other, while also being predicted by age (only for perpetration) and sex of the participants. More specifically, being older and a women strongly predicts acts of violence perpetration and, in turn, being a man regardless of age predicts experiences of victimization in a romantic relationship. Finally, decreased body protection appeared as a significant predictor for greater DV victimization.

Table 8.

Multiple Linear Regression for the Prediction of Dating Violence Victimization.

	B	SEB	β
Step 1			
Constant	4.731	1.622	
Age	-.009	.079	-.007
Sex	-.851	.546	-.094
Step 2			
Constant	4.122	1.468	
Age	-.053	.043	-.041
Sex	-.828	.302	-.092**
Perpetration	.712	.028	.865***
Disordered eating	-.227	.161	-.068
Strategies	.032	.027	.063
Nonacceptance	-.025	.027	-.041
Impulse	-.023	.033	-.033
Goals	-.018	.030	-.025
Clarity	.062	.032	.072
Body Image	.053	.196	.013
Protection	-.472	.220	-.074*

* p < .05; ** p < .01; *** p < .001

Table 9.

Multiple Linear Regression for the Prediction of Dating Violence Perpetration.

	B	SEB	β
Step 1			
Constant	2.888	1.510	
Age	.033	.074	.028
Sex	.447	.513	.053
Step 2			
Constant	-3.180	1.117	
Age	.104	.036	.087**

Sex	.689	.248	.082**
Perpetration	.714	.024	.867***
Disordered eating	.052	.137	.016
Strategies	.030	.024	.064
Nonacceptance	.016	.023	.029
Impulse	.014	.029	.020
Goals	.006	.026	.008
Clarity	-.015	.027	-.019
Body Image	.197	.166	.052

* p < .05; ** p < .01; *** p < .001

Discussion

DE behaviour associated with adverse experiences such as abusive relationships has been fairly researched in the past (Ackard & Neumark-Sztainer, 2002; Barter & Stanley, 2016; Cha et al., 2016; Mills et al., 2014; Trottier & MacDonald, 2017), however, to our knowledge, this study is the first to investigate it in a Portuguese population and to specifically research a predictive model for both DE and DV, accounting for several dimensions of emotion regulation and body investment. Moreover, very few studies consider the importance of analysing experiences of perpetration (Mumford, Liu, & Taylor, 2019) and, therefore, the present research contributes to existing knowledge of this problematic.

In what concerns the Body Investment Scale, data from this study provides important preliminary information regarding its psychometric properties in clinical and non-clinical samples. Internal consistency in the non-clinical sample was low for the Care and Protection factors, similarly to results from a Brazilian community sample of high school students (Gouveia, Santos, Gouveia, Santos, & Pronk, 2008). In the clinical sample of the present study, internal consistency was low only for the Care factor. However, item 1 ("I believe that caring for my body will improve my well-being.") did not load in any of the factors, since most participants strongly agreed with this statement, hence demonstrating that it does not effectively evaluate body investment in a clinical setting of eating disorders. Were item 1 to be removed, internal consistency of the Care factor would improve to an acceptable value (> .70) (Nunnally & Bernstein, 1994). A study analysing the psychometric properties of this instrument in a Spanish clinical sample of women with an eating disorder reported similar internal consistency values (Marco et al., 2017). Taking into consideration these psychometric studies and results from Orbach and Mikulinger's original

study (1998), which found significantly fewer body investment in the suicidal inpatients, it can be put forward that this instrument appears to be a better fit to measure body investment in a clinical sample.

Our findings showed extremely high prevalence of DV victimization (82.4%) and perpetration (85.9%), which is not in accordance with majority of previous studies (Ackard & Neumark-Sztainer, 2002; Neves et al., 2018; Cha et al., 2016; Machado, Caridade, & Martins, 2010). To understand this result, a closer look should be should taken at the instrument utilized to measure DV. The CADRI goes beyond assessing overt abusive behaviours such as physical or sexual aggression, and measures subtle acts of abuse as well (e.g. speaking in an hostile manner) (Wolfe et al., 2001). These more subtle behaviours are mostly considered emotional or verbal abuse, which showed higher prevalence rates (approximately 80%), in comparison to the other types of abuse (all lower than 32%). Accounting for these subtle abusive behaviours could explain the unusually high rates of DV prevalence found in this sample. Moreover, two other studies have used this inventory and arrived at similar prevalence rates regarding perpetration (94%) (Fernández-González, Wekerle, & Goldstein, 2012) and rates of emotional/verbal abuse victimization and perpetration (95% and 96%, respectively) (McClure & Parmenter, 2017). Not only was violence very prevalent, but was also for the most part bidirectional. This is because the greater part of participants in abusive relationships reported being simultaneously victim and aggressor.

University students reported higher rates of overall abuse, and of emotional/verbal abuse, towards their partners. This is not a novel finding, furthering findings from Machado and colleagues (2010), who reported a very similar pattern of results. These authors suggested that a higher level of education and, consequently, greater awareness about social issues such as abusive relationships, leads to increased willingness to recognise one's violent acts. Alternatively, as explained by Wolf and collaborators (2001), adolescent romantic relationships are characteristically experimental regarding positive and negative strategies for conflict resolution. Hence high school aged participants might not be experienced enough to identify abusive behaviours that university students recognise as negative to resolve conflicts with a partner.

There has been a long lasting discussion in past literature regarding possible sex differences in DV, with some studies referring to female participants being more victimized (Cha et al., 2016; Zweig et al., 2013); and others reporting no sex differences (Machado et al., 2010; Mumford et al., 2019; Smith et al., 2018). In the present research, overall rates of dating

violence did not differ between male and female participants. Nevertheless, when the several types of abuse were assessed individually, among university students results showed that male participants tended to present higher rates of relational aggression perpetration. It is possible that this variance occurred as a result of the instrument used to measure DV, since relational aggression was reported to vary by grade of the participants (Wolfe et al., 2001). Female participants presented higher rates of emotional/verbal abuse perpetration. This finding has been reported in past studies (Machado et al., 2010; Perles, Martín, & Canto, 2016) and must be interpreted with careful consideration for the social and cultural beliefs regarding abuse perpetrated by men and women. It may be that women are more prone to recognize their own abusive behaviours towards a partner (Machado et al., 2010), but also that they report with greater ease abusive acts that are generally considered less severe when perpetrated by women (Perles, Martín, & Canto, 2016).

As expected, female participants presented greater DE than their male counterparts across all ages. This is no surprise since eating behaviour psychopathology is significantly more present in girls and women (American Psychiatric Association, 2013; Yu et al., 2018). Furthermore, university students showed significant higher scores than high school students. This is a very interesting finding when interpreted through a developmental point of view. Transition from high school to university is a stressful life event, found to be associated with increased psychological distress (Fisher, Hood, 1987). Moreover, Marquis, Talbot, Sabourin, & Riopel (2017) described several factors inherent to the life of university students that could contribute to increased DE: an overloaded schedule can result in the consumption of quick meals; living in residential halls with limited cooking facilities may lead to restricted meal options; the stress from exam periods associated with loss of control regarding students' diets; and lack of financial resources to acquire food. This might help explain the increased dysfunctional eating among university students.

DE and DV were associated among university students, but not within high school students. Although past research points to similar results regarding high school students (Ackard, Eisenberg, & Neumark-Sztainer, 2007), most literature on the subject reports a significant positive association between these two variables in younger participants (Ackard & Neumark-Sztainer, 2002; Barter & Stanley, 2016; Cha et al., 2016). This lack of association was unexpected and it might be due to low reporting of dysfunctional eating among the high school

students. These results must be carefully interpreted and future research should be conducted to further analyse DE and DV in high school students in a Portuguese sample.

Current findings that a poor body image was the most significant predictor for the variance of DE are entirely in accordance with theoretical models of eating disorders (Fairburn et al., 2003; Murphy et al., 2010). These generally emphasize the centrality, in the maintenance of the psychopathology, of over evaluating one's body weight and shape and trying to exert control over a body image and weight that are not satisfactory. Additionally, the result that DV victimization and perpetration are the following most significant predictors of DE behaviour considerably furthers past research about the association between DE and DV, establishing abusive experiences in a romantic relationship as an important factor to account for when assessing or trying to understand involvement in DE behaviours among university aged students. To better clarify this relation, predictive models for both victimization and perpetration were analysed, concluding that DE did not constitute as a predictor for the variance in DV. These results might be pointing to DV as factor in the maintenance of already existing DE behaviours, as previously hypothesised in this investigation. A dimension of emotion dyresgulation designated as nonacceptance of emotion responses was also identified as a significant predictor. Participants with higher scores in this dimension tend to show negative secondary emotional responses to their negative emotions. Once again, this finding is in accordance with the theoretical models of eating disorders' psychopathology, specifically Fairburn's Transdiagnostic Maintenance Model (Fairburn et al., 2003; Murphy et al., 2010). This model states that there are common mechanisms maintaining the main eating disorders (i.e. bulimia nervosa, anorexia nervosa, and atypical eating disorders) and that these mechanisms might not all be present in every situation, but rather help characterize the variety of forms in which the psychopathology of eating disorders can manifest itself. Two of the mechanisms described are interpersonal difficulties and mood intolerance (i.e. an inability to appropriately cope with emotional states).

Overall, the predictive model described here is largely in accordance with the Transdiagnostic Maintenance Model, with a poor body image as the main predictor reflecting eating disorders' core psychopathology; DV victimization and perpetration possibly constituting severe interpersonal difficulties manifested in a romantic relationship; and the nonacceptance of emotional responses reflecting the mood intolerance found in patients with eating disorders.

Despite the referred contributions, a few limitations must be pointed out. Firstly, self-report measures were used to evaluate sensitive issues such as abusive relationships. Secondly,

the sample was not representative of the country's high school and university population, as it was collected exclusively in the north.

Although this research considerably furthered the field of knowledge regarding the association between DE and DV, future studies should aim to analyse in which direction this association occurs. On top of that, future research should investigate a possible mediating model with difficulty in accepting emotional responses and negative body-related attitudes/feelings as mediators.

In conclusion, this study reports significant evidence regarding the importance of considering subtle forms of abuse that might constitute as precursors for future, more severe forms of aggression. It also furthers past discussions about sex differences regarding prevalence of DV. Most notably, this research considerably contributes to the research focusing on disordered eating associated with dating violence and it provides important evidence for the possible contribution of difficulty in accepting emotional responses and a poor body image in maintaining DE. Ultimately, these findings are only preliminary, but nonetheless important for the discussion that DE behaviour could be maintained by several factors and that there seems to be an especially important contribution made by past and present abusive dating experiences.

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Appendixes

Appendix A – Submission to the University of Minho Ethics Commission

Processo CE.CSH 099/2018 - Comportamentos relacionais e alimentares em jovens Portugueses

<conselhoetica.csh@reitoria.uminho.pt>
Assunto: Processo CE.CSH 099/2018 - Comportamentos relacionais e alimentares em jovens Portugueses

Prof. Sónia Gonçalves,

Confirmo a receção do seu email e comunico a referência atribuída ao processo: CE.CSH 099/2018. Solicito que a mesma se mantenha na troca de mensagens que considerar pertinente com o Conselho de Ética, no campo assunto.

Cordiais cumprimentos
Isabel Monteiro

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Appendix B – Submission to *Direção Geral de Educação*

Monotorização de Inquéritos em Meio Escolar: Registo de entidade.

M mime-noreply@gepe.min-edu.pt
qui, 03/01/2019 10:20
Joana Rita Oliveira Fernandes

Exmo(a)s. Sr(a)s.

O registo da entidade "Joana Rita Oliveira Fernandes" efectuado no sistema de Monitorização de Inquéritos em Meio Escolar (http://mime.gepe.min-edu.pt) foi aprovado.