

**The prospective associations between bullying experiences, body image shame
and disordered eating in a sample of adolescent girls**

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Highlights

- The prospective effect of bullying on body shame and disordered eating was tested.
- The study was conducted in adolescent girls and involved 3 waves of data collection.
- Bullying had a significant effect on baseline body shame and disordered eating.
- Body image shame and disordered eating symptomatology growth was stable over time.
- Body shame mediated the link between bullying experiences and disordered eating.

1 **The prospective associations between bullying experiences, body image shame and**
2 **disordered eating in adolescent girls**

3

4 **Abstract**

5 **Objective:** The current analysed the prospective effect of bullying on body image shame and
6 disordered eating symptomatology in adolescent girls. **Method:** The study was conducted
7 with 290 adolescent girls, and involved three waves of data collection assessing over time
8 victimization experiences, body image shame and disordered eating symptomatology. At the
9 beginning of the study, the participants average age was 13.73 years ($SD = 0.78$). Latent
10 growth models were used to fit the data to identify the effect of bullying on the outcomes.
11 Path analysis examined the mediator effect of body image shame on the association between
12 bullying and disordered eating. **Results:** Bullying had a significant effect on the initial status
13 of both body image shame and disordered eating. Body image shame and disordered eating
14 growth was stable over time. Body image shame significantly mediated the relationship
15 between bullying and disordered eating symptomatology. **Conclusions:** Findings suggest that
16 programmes aimed at preventing bullying and associated shame could decrease the risk of
17 initially developing body image issues and disordered eating.

18

19 **Keywords:**

20 Bullying; body image shame; disordered eating symptomatology; adolescence; longitudinal

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26 **1. Introduction**

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28 Bullying, including being excluded, ridiculed, name-called or even physically abused
29 is a common experience (Nansel et al., 2001; Smith & Brain, 2000), with its peak occurring
30 in early adolescence (Smith, Madsen, & Moody, 1999). There is consistent evidence that
31 persistent victimization by peers is related to mental health problems in adolescence (Cunha,
32 Matos, Faria, & Zagalo, 2012; Gilbert & Irons, 2009; Hawker & Boulton, 2000; Kaltiala-
33 Heino, Rimpelä, Rantanen, & Rimpelä, 2000; Rubeis & Hollenstein, 2009; Smokowski &
34 Kopasz, 2005) and can have deleterious enduring effects into adulthood (Matos & Pinto-
35 Gouveia, 2010; Pinto-Gouveia & Matos, 2011; Rigby, 2001). Physical appearance is often
36 the cause of peer victimization, which may lead to body image and eating-related problems,
37 especially among adolescent girls (Frisén, Holmqvist, & Orcarsson, 2008; Menzel et al.,
38 2010). Nonetheless, despite the pervasive nature of such victimization experiences in
39 adolescence, not all adolescents who experience these negative interactions develop body
40 image or disordered eating difficulties. Thus, it is important to understand *how* victimization
41 experiences may become associated with body image and eating psychopathology in this
42 critical developmental period.

43

44 *Body image as an indicator of social attractiveness*

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46 Negative body image has received empirical support as a risk factor for disordered eating
47 (Fairburn, Cooper & Shafran, 2003; Stice, Marti, & Durant, 2011). Body image
48 dissatisfaction increases with the onset of adolescence (Bearman, Presnell, Martinez, & Stice,
49 2006; Bucchianeri, Arikian, Hannan, Eisenberg, & Neumark-Sztainer, 2013; Cusumano &
50 Thompson, 2001) and is considered a widespread phenomenon among women (Thompson,

51 Heinberg, Altabe, & Tanleff-Dunn, 1999). Physical maturation associated with the onset of
52 puberty, characterized by the development of curves and by an increased regional deposition
53 of body fat is not always consistent with the socially valued physical appearance. This
54 inconsistency may help explain why many adolescent girls become increasingly dissatisfied
55 with their physical appearance (Ricciardelli, McCabe, Holt, & Finemore, 2003) and may
56 engage in efforts to alter their physical appearance to become closer to the social
57 representation of the ideal female appearance (e.g., thinness Allen & Land, 1999; Gilbert &
58 Irons, 2009).

59 It has been suggested that having traits believed to be valued by others, within a
60 certain social and cultural context, is associated with positive social outcomes (e.g., thinness
61 is often equated with attractiveness, power and success in modern Western societies; Ferreira,
62 Pinto-Gouveia, & Duarte, 2013; Pinto-Gouveia, Ferreira, & Duarte, 2014) and is important
63 for one's sense of safeness and self-worth (Gilbert, 1989, 1997; Kurzban & Leary, 2001).
64 Concerns that one lacks such qualities or has certain traits or attributes that others might
65 disapprove or do not value can be perceived as threatening, which may give rise to
66 perceptions of inferiority and inadequacy. In *extremis* these perceptions characterize the
67 painful emotion of shame.

68

69 *Body image shame*

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71 Shame is a complex self-focused social emotion that involves evaluations that the self
72 is inferior or flawed, negatively viewed by others, criticized or judged, and thus vulnerable to
73 social exclusion, rejection or even attacks (Gilbert, 1998; Lewis, 2003; Tangney & Dearing,
74 2002; Tracy & Robins, 2004). Several studies have demonstrated that shame can have

75 negative effects on psychological adjustment (e.g., Kim, Thibodeau, & Jorgensen, 2011;
76 Matos & Pinto-Gouveia, 2010).

77 One's body image is a domain of self in the context of self and others' evaluation.
78 One's body image can stimulate either a positive image of the self through being valued,
79 included and accepted by others or be perceived as a source of ostracism, devaluation or
80 rejection by one's social context. Body image shame has been conceptualized as involving
81 negative self-evaluations that one is seen as an unattractive, undesirable social agent because
82 of one's physical appearance (Gilbert, 1998, 2002). Body image shame has been linked to a
83 range of psychopathologies, especially eating disorders (Bessenoff & Snow, 2006;
84 Castonguay, Brunet, Ferguson, & Sabiston, 2012; Duarte, Pinto-Gouveia, Ferreira, & Batista,
85 2015; Duarte, Pinto-Gouveia, & Rodrigues, 2015; McKinley, 1998). It has been suggested
86 that disordered eating behaviours may operate as a proximal maladaptive mechanism of
87 attempted coping with the distressing affective experience of shame (Ferreira et al., 2013).
88 Ultimately, however this attempt at coping may lead to a further sense of being devalued,
89 flawed and be associated with poor psychological adjustment (Pinto-Gouveia et al., 2014).

90

91 *Peer bullying as a shame-eliciting experience in adolescence*

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93 Adolescence is characterized by key psychosocial transformations that make the
94 adolescent particularly sensitive to social messages and signals that indicate what is attractive
95 and acceptable to the social group (Gilbert & Irons, 2009; Irons & Gilbert, 2005; Wolfe &
96 Mash, 2006). During this critical period there is a tendency to rely less on attachment figures
97 (e.g., parents) and more on the peer group as a source of support and as a reference to
98 estimate one's self-worth (Allen & Land, 1999). At this developmental phase, there is
99 increases in concerns with self-presentation, self-evaluation of attributes or characteristics

100 that are socially valued, and also increased fears of rejection, disapproval, or potential attacks
101 by the peer group (Gilbert & Irons, 2009).

102 Peer bullying can therefore be a potentially shame provoking experience. Bullying is
103 often focused in physical appearance, especially among adolescent girls (Frisén, Holmqvist,
104 & Orcarsson, 2008; Menzel et al., 2010). Nonetheless, there is cross-sectional and
105 retrospective evidence to suggest that even when the victimization is not specifically focused
106 on the domain of physical appearance, the experience of victimization itself may become
107 associated with perceptions of unattractiveness and inferiority and also with eating
108 psychopathology (Kaltiala-Heino, Rissanen, Rimpela, & Rantanen, 1999; Matos, Ferreira,
109 Duarte, & Pinto-Gouveia, 2014; Striegel-Moore, Dohm, Pike, Wilfley, & Fairburn, 2002). A
110 recent cross-sectional study of a large sample of adolescent girls suggested that the
111 association between peer bullying experiences and disordered eating was influenced by the
112 extent to which these experiences were associated with body image shame and self-criticism
113 (Duarte, Pinto-Gouveia, & Rodrigues, 2015). Associations in this study highlighted possible
114 pathways (shame and self-criticism) by which bullying experiences may influence eating
115 psychopathology in adolescence. This suggests that susceptibility to shame and self-criticism
116 may interact with the environmental trigger of peer victimisation to promote eating
117 disordered symptomology.

118 Longitudinal studies have investigated the directional nature of the relationship
119 between victimization experiences within the peer group context and changes in subsequent
120 body image and eating difficulties (Engström & Norring, 2002). These studies suggest that (i)
121 early peer victimization is prospectively related to increased appearance monitoring and body
122 image shame in adolescent girls in comparison to adolescent boys (Lunde, Frisén, & Hwang,
123 2006); (ii) adolescents who experienced bullying were at increased risk for eating
124 psychopathology symptoms (Copeland et al., 2015; Mamun, O'Callaghan, Williams, &

125 Najman, 2013). Nonetheless, no study to date has investigated the prospective associations
126 between victimization experiences and disordered eating symptoms, mediated by body image
127 shame. It should be emphasised that victimization experiences are a pervasive phenomenon
128 in adolescence (Nansel et al., 2001) but their impact on adolescents' mental health is not
129 ubiquitous. Thus, it is important to understand the mechanisms through which victimization
130 experiences may become associated with body image and eating psychopathology. As in
131 adolescence concerns about whether one is stimulating positive affect and a positive image of
132 oneself in others increase, it is plausible that negative interpersonal experiences (e.g.,
133 criticism, rejection, or attacks) become associated with shame feelings (Gilbert & Irons,
134 2009). Disordered eating symptoms and attempts to change the body may then become a
135 means to cope with shame and to be accepted by others, and avoid such social threats
136 (Duarte, Pinto-Gouveia, Ferreira, & Batista, 2015; Duarte, Pinto-Gouveia, & Rodrigues,
137 2015; Ferreira et al., 2013; Pinto-Gouveia et al., 2014).

138

139 *This study*

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141 The current study prospectively examined the longitudinal relationship between
142 victimization experiences, body image shame and disordered eating symptomology. We
143 examined individual differences in the longitudinal trajectories of these outcomes over three
144 years in a sample of 290 adolescent girls using latent growth curve models. Taken together
145 theoretical and empirical contributions (Gilbert, 2002; Duarte, Pinto-Gouveia, & Rodrigues,
146 2015; Gilbert & Irons, 2005; Ferreira et al., 2014), we hypothesized that (i) victimization
147 experiences would be predictive of earlier levels of body image shame, (ii) that body image
148 shame would in turn predict later developmental trajectories in disordered eating

149 symptomatology and (iii) that body image shame mediated the longitudinal effect of bullying
150 experiences on disordered eating symptomatology.

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153 **2. Method**

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155 **2.1. Participants**

156 This study is part of a wider project examining the effect of interaction experiences on
157 self-evaluation, emotion regulation, body image and eating-related difficulties in
158 adolescence. The sample of this study comprised adolescent girls and was collected in private
159 (1) and public schools (13) of the central region of Portugal, over three years. Participation
160 rate in each school ranged from 44% to 100%. Participants attended schools located in urban
161 (38.67%), semi-urban (46.15%) and rural (15.8%) areas; 99.18% of the participants were
162 Caucasian. Equidistant measurement was assured at every 12 months. A total of 481
163 adolescent girls ($M_{Age} = 13.73$, $SD = 0.78$), completed the assessment at year 1 when
164 attending the 8th and 9th grades; 395 participants ($M_{Age} = 14.50$, $SD = 0.75$) completed the
165 assessment at year 2; and 290 ($M_{Age} = 15.63$, $SD = 0.68$) completed the assessment at year 3.
166 The attrition rate (17.88% at year 2 and 26.58% at year 3) was primarily due to students
167 transferring out of the schools in the study catchment during the 9th grade transition from
168 middle to secondary school. Thus 191 students were lost to follow-up. No differences were
169 found between the participants that completed the study and those who did not regarding the
170 study variables at the start of the study ($t_{(479)BMI} = 0.29$, $p = .774$; $t_{(479)Bullying} = 1.16$, $p = .249$;
171 $t_{(479)BodyShame} = 0.40$, $p = .690$; $t_{(479)DisorderedEating} = 0.19$, $p = .985$).

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174 **2.2. Measures**

175 *Body Mass Index.* Participants' BMI was calculated by dividing self-reported weight (in
176 Kg) by self-reported height squared (in m).

177 *Peers Relations Questionnaire* (PRQ; Rigby & Slee, 1993) is a 20-item self-report
178 measure that includes a subscale (Victim - 5 items) used to assess victimization experiences
179 inflicted by peers. Items are rated on a 4-point scale (ranging from 1 = *never* to 4 = *very*
180 *often*). The scale presents good psychometric properties in the original study (Rigby & Slee,
181 1993) and in the Portuguese validation study (Silva & Pinheiro, 2010). In this study, the
182 subscale Victim (e.g., "I get called names by others"; "I get picked on by others") was used to
183 assess bullying experiences, which presented a Cronbach's alpha of .84 in the Portuguese
184 validation study (Silva & Pinheiro, 2010).

185 *Body Image Shame Scale – Adolescents Version* (BISS-A; Duarte & Pinto-Gouveia,
186 2014; Duarte, Pinto-Gouveia, Ferreira, & Batista, 2015) is a 9-item scale that assesses body
187 image shame, including perceptions that others negatively evaluate and criticize the self
188 because of one's body image, and body image-focused negative self-evaluations (e.g., "My
189 physical appearance makes me feel inferior in relation to others"; "I feel uncomfortable in
190 social situations because I feel that people may criticize me because of my body shape").
191 Participants are asked to rate the items using a 5-point scale (ranging from 0 = *never* to 4 =
192 *almost always*). The original scale (Duarte, Pinto-Gouveia, Ferreira, & Batista, 2015) and the
193 adapted version for adolescents (Duarte & Pinto-Gouveia, 2014) present good psychometric
194 properties.

195 *Eating Disorder Examination Questionnaire* (EDE-Q; Fairburn & Beglin, 1994)
196 includes 36 items assessing disordered eating behaviours and attitudes (e.g., "Have you been
197 deliberately trying to limit the amount of food you eat to influence your shape or weight
198 (whether or not you have succeeded)?" ; "Have you had a definite fear of losing control over

199 eating?"; Has your shape influenced how you think about (judge) yourself as a person?") over
200 the past 28 days (score ranges between 0 and 6). The EDE-Q presented good psychometric
201 properties in the original (Fairburn & Beglin, 1994) and in its Portuguese version (Machado
202 et al., 2014). The global score of the questionnaire was used the current study.

203

204 **2.3. Procedure**

205 The required local authorities and ethics committees (General Direction of Innovation
206 and Curricular Development; Portuguese Data Protection Authority) approved the study. The
207 boards of schools of the central region of Portugal that comprised 'school clusters' (i.e.,
208 schools where students complete their primary and secondary education) were contacted to
209 take part in the study. All contacted schools ($N = 14$) approved the study, and invited the
210 respective female students (attending 8th and 9th grades) to participate. Participants and their
211 parents/legal tutors provided their written informed consent to voluntarily participation at the
212 three yearly assessment points. Each school subsequently scheduled the day and a class
213 period for the questionnaires completion. The teacher in charge introduced the researchers to
214 the students who provided the written informed consent and left the classroom. The
215 researchers gave standardized instructions to all participants, emphasised that their
216 participation was voluntary and that all data collected would be confidential, anonymised and
217 used only for research purposes. The self-report questionnaires took approximately 45
218 minutes to complete. The questionnaires were administered during the nominated class
219 period in groups that comprised 5 to 36 participants; this variability was due to the number of
220 participants in each class, in each respective school, that consented to take part in the study.

221

222 **2.4. Analytic strategy**

223 Descriptive statistics and correlation analyses were calculated using SPSS (v.21 SPSS;
224 Armonk, NY: IBM Corp.). Differences between participants with significant levels of eating
225 psychopathology (determined using the EDE-Q cut-off score ≥ 4 ; Carter, Stewart, &
226 Fairburn, 2001) at both T2 and T3 and the remaining participants, on bullying experiences (at
227 both T1 and T2), were calculated through Student t-tests.

228 Longitudinal relationships between the study variables were analysed through Latent
229 Growth Curve Modelling. This technique incorporates initial levels of study variables
230 (intercept mean), the inter-variability in these levels (intercept variance), the average rate at
231 which individuals change (slope mean), and the inter-individual variability in that rate (slope
232 variance (Selig & Preacher, 2009). Unconditioned latent growth curve models were
233 calculated to examine the growth of bullying experiences, body image shame and disordered
234 eating. To examine the effect of bullying experiences on the longitudinal relationships
235 between body image shame and eating psychopathology a conditioned latent growth curve
236 model was tested using baseline assessment (year 1) of self-reported bullying experiences
237 (independent variable). To assess the change (slope) in the outcome variables (body image
238 shame and eating psychopathology) from baseline we used the observations from year 1, 2
239 and 3.

240 BMI at baseline was controlled for in the models as a covariate to account for its effect
241 on outcomes.

242 Analyses were conducted using the Maximum Likelihood estimation method. The
243 plausibility of the examined models was assessed using the following model fit indices: the
244 Chi-square (χ^2), which indicates a very good model fit when nonsignificant; the Comparative
245 Fit Index (CFI) and the Tucker Lewis Index (TLI), with higher levels (above .95) indicating
246 very good fit; the Root Mean Square Error of Approximation (RMSEA), with 90%

247 confidence intervals, with values below .08 indicating reasonably good fit (Kline, 2005;
248 Tabachnick & Fidell, 2013).

249

250

251 **3. Results**

252

253 **3.1. Descriptives and correlations**

254 Preliminary analyses indicated no extreme outliers, no severe violation normality and
255 no evidence of multicollinearity (Kline, 2005).

256 Means and standard deviations of the study variables (reported in Table 1) were
257 similar to those obtained in previous studies with community samples (Duarte, Pinto-
258 Gouveia, & Rodrigues, 2015; Luce, Crowther, & Pole, 2008; Rigby & Slee, 1993).
259 Participants' mean BMI was within the normal weight range and the BMI distribution was
260 similar to prior studies (De Onis et al., 2007). Considering a cut-off score of ≥ 4.0 on the
261 EDE-Q score to indicate clinical significance, 3.8% of the sample in year 1, 4.8% in year 2
262 and 4.8% in year 3, scored in the clinical significant range (Carter, et al., 2001). Student t-test
263 results indicated that participants who presented scores above the EDE-Q ≥ 4.0 cut-off score
264 at T2 presented significantly higher scores of bullying experiences ($M = 9.00$, $SD = 3.09$) at
265 the T1, in comparison to the remaining participants ($M = 6.43$, $SD = 2.06$; $t_{(288)} = 3.19$, $p =$
266 $.006$). Moreover, participants who scored above the EDE-Q ≥ 4.0 cut-off score at T3,
267 reported significantly higher scores of bullying experiences ($M = 9.00$, $SD = 3.09$) at T2, in
268 comparison to participants who scored below the cut-off score ($M = 6.43$, $SD = 2.06$; $t_{(288)} =$
269 3.19 , $p = .006$).

270 There were moderate positive correlations between bullying experiences and both
271 body image shame and disordered eating symptomology in year 1, 2 and 3 (Table 1). There

272 were strong positive correlations between body image shame and disordered eating
273 symptomology at the three assessment points. BMI was not significantly associated with
274 bullying experiences, but revealed small-to-moderate positive associations with body image
275 shame and disordered eating symptomology.

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Insert Table 1 here

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3.2. Unconditional latent growth curve modelling

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Three unconditional latent growth models were first conducted for bullying experiences, body image shame and eating psychopathology. Plausibility estimates for bullying experiences revealed a very good model fit ($\chi^2_{(1)} = .007, p = .935$; CFI = 1.00; TLI = 1.00; RMSEA = .00 [.00, .00], $p = .989$). The means for the intercept and slope factors were estimated to be 6.56 ($p < .001$) and -.15 ($p = .003$). Moreover, there were significant variance estimates for both the intercept (3.69, $p < .001$) and slope (.46, $p = .006$), indicating that there was substantial individual variability around both the mean starting point and the mean rate of change over time. Also, there was a significant correlation between the intercept and slope factors ($-.35; p = .019$). These results indicated that although the pattern for the sample as a whole suggested that scores on this variable declined over time, this rate of decline was less steep for individuals with high levels of bullying at baseline.

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For body image shame the model also showed a very good model fit ($\chi^2_{(1)} = 2.20, p = .138$; CFI = 1.00; TLI = .99; RMSEA = .06 [.00, .18], $p = .273$). The mean of the intercept was .84 ($p < .001$), while the mean slope was nonsignificant ($-.02; p = .437$). There were significant variance estimates for the intercept (.79, $p < .001$) and for the slope (.14, $p < .001$), suggesting significant individual variability for the mean starting point and progression

296 over time. The correlation between the intercept and slope factors was significant ($-.42, p <$
297 $.001$) indicating less steep increases of body image shame.

298 The unconditioned model for disordered eating symptomology revealed a very good
299 model fit ($\chi^2_{(1)} = .181, p = .670$; CFI = 1.00; TLI = 1.00; RMSEA = .00 [.00, .12], $p = .765$).
300 The mean of the intercept was significant ($1.35, p < .001$), there was a nonsignificant mean
301 estimate for the slope ($-.04; p = .105$). Variance estimates were significant for the intercept
302 ($1.39, p < .001$) and for the slope ($.16, p < .001$), indicating that for disordered eating
303 symptomology the growth is not homogeneous between individuals. The correlation between
304 the intercept and slope factors was $-.18 (p < .033)$, indicating less steep increases over time.

305

306 **3.3. Conditional latent growth curve modelling**

307 A conditional latent growth model was conducted to analyse the relationships
308 between body image shame and disordered eating symptomology and whether bullying
309 experiences were associated with those relationships (Figure 1). The model revealed a very
310 good fit ($\chi^2_{(10)} = 18.163, p = .111$; CFI = 1.00; TLI = .99; RMSEA = .04 [.00, .08], $p = .589$).
311 Bullying experiences had a significant effect on the initial levels of both body image shame
312 ($\beta = .42, p < .001$) and disordered eating symptomology ($\beta = .47, p < .001$), but it did not
313 significantly impact the slope of these variables ($\beta = .09, p = .148$; and $\beta = .06, p = .314$,
314 respectively). The correlation between body image shame and disordered eating
315 symptomology intercept factors was $.66$, and the correlation between the two variables slope
316 factors was $.59$, indicating that the initial status of body image shame was similar to the
317 initial status of disordered eating symptomology and that the change over time of these
318 variables was also similar. Initial levels of body image shame had a significant effect of $-.22$
319 ($p < .001$) on the growth of disordered eating symptomology over time, and the initial levels
320 of disordered eating symptomology also had a significant effect on the growth of body image

321 shame over time ($\beta = -.14, p = .021$), which indicates that higher initial levels of body image
322 shame and disordered eating symptomatology are associated with less steep growth (i.e.,
323 smaller magnitude of change) of the other construct. Results also revealed a significant
324 indirect effect of bullying experiences on the slope factors of disordered eating
325 symptomatology ($-.09$; CI = $-.02, -.01$; $p < .001$) and body image shame ($-.07$; CI $-.02, -.001$; p
326 = $.032$) and, mediated by the intercept factors of body image shame and disordered eating
327 symptomatology, respectively. The tested relationships were preserved after controlling for the
328 effect of BMI at baseline ($\chi^2_{(16)} = 45.34, p < .000$; CFI = $.98$; TLI = $.97$; RMSEA = $.08$ [$.05,$
329 $.11$], $p = .038$).

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331 Insert Figure 1 here

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334 4. Discussion

335 The current study examined the longitudinal trajectories of self-reported victimization
336 experiences, body image shame and disordered eating symptomatology in a sample of
337 adolescent girls over a 3-year period. Results of the correlation analyses were in agreement
338 with previous findings that victimization experiences are associated with body image
339 difficulties and disordered eating symptomatology (Engström & Norring, 2002; Kaltiala-
340 Heino et al., 2000; Lunde et al., 2006) and that body image-focused perceptions of inferiority
341 and inadequacy are linked to symptoms of disordered eating, both cross-sectionally and
342 longitudinally. This raised hypothetical questions about the prospective relationships between
343 the study variables and whether the association between victimization experiences and
344 disordered eating symptomatology was mediated by body image shame. Moreover, results
345 indicated that participants who presented clinically significant levels of eating

346 psychopathology at the second and third assessment moments, reported going through
347 bullying experiences in the previous years more frequently than the remaining participants.

348 A series of unconditional latent growth curve models explored the patterns of change
349 in victimization experiences, body image shame and disordered eating symptomology, as
350 well as the individual variability in both the starting point and the change in these variables.
351 Regarding peer victimization experiences, the significant decrease in the mean of
352 victimization experiences from the first assessment (year 1) to the last assessment (year 3), is
353 consistent with the peer victimization literature, which notes that the peak in peer
354 victimization occurs in early adolescence (Smith et al., 1999). In regard to body image shame
355 and disordered eating symptoms, prior evidence has demonstrated significant increases in
356 disordered eating symptoms from late childhood to young adulthood (Slane, Klump, McGue,
357 & Iacono, 2014). This change in overall levels of body image shame and disordered eating
358 symptomology was not evident in the 3-year time window of the current study. But, when
359 looking at the potential heterogeneity within the sample, results suggested that there was
360 significant individual variability in the starting point and in the longitudinal change of body
361 image shame and disordered eating symptomology over time. Given this variability in the
362 growth trajectories of body image shame and disordered eating symptomatology we then
363 examined whether the addition of bullying experiences to an explanatory model would
364 contribute to better understand this variance and the relationship between these constructs.

365 Therefore, we modelled this observed variability in a conditioned latent growth model
366 to explore the predictive effect of victimization experiences on body image shame and
367 disordered eating symptomology and how these two phenomena could interact over time.
368 According to our first hypothesis, adolescents who reported going through more frequent
369 victimization experiences presented both higher initial levels of body image shame and
370 disordered eating symptomology. Previous studies have found that victimization experiences

371 are associated with indicators of poorer mental health in adolescence (e.g., Cunha et al.,
372 2012; Gilbert & Irons, 2009; Hawker & Boulton, 2000; Irons & Gilbert, 2005; Kaltiala-Heino
373 et al., 2000), including difficulties related to body image and disordered eating symptoms
374 (e.g., Copeland et al., 2015; Duarte, Pinto-Gouveia, & Rodrigues, 2015; Kaltiala-Heino et al.,
375 1999; Menzel et al., 2010). The current study extended these findings by highlighting the
376 potential effect of victimization as a trigger of negative self-evaluations and disordered eating
377 symptomology.

378 Moreover, results supported our second hypothesis that body image shame was
379 significantly associated with later disordered eating symptomatology, with higher initial
380 levels of body image shame being associated with less steep growth trajectories in disordered
381 eating symptomology. The effect of disordered eating symptomology on body image shame
382 was smaller but revealed the same trend. These findings suggest that the initial status of body
383 image shame and, to a lesser extent, disordered eating symptomatology, may be predictive of
384 later changes in the other construct, but that changes in these outcomes are small, i.e., tend to
385 be stable over time.

386 Also, results suggested that victimization experiences have a significant indirect effect
387 on later disordered eating symptomatology via body image shame. Victimization experiences
388 also had a significant effect on body image shame via disordered eating, but the effect was
389 smaller. These associations remained significant when controlling for the effect of BMI.
390 These results indicated that even though the reported frequency of victimization experiences
391 decreased over time, when they seem to be at their peak these experiences may impact
392 adolescents' levels of body image shame and indirectly affect disordered eating
393 symptomology. The engagement in disordered eating, in turn, may increase the focus on
394 body image and reinforce shame feelings (Fairburn et al., 2003; Goss & Allan, 2009). The
395 data from this study may suggest that once these relationships are established, they appear

396 relatively stable fuelling a potential cycle of shame feelings about the self-focused on the
397 body, which activate the engagement in maladaptive attitudes towards body image and eating
398 behaviour. These relationships appear to present stability even when accounting for the effect
399 of BMI. This may suggest that it is not the actual physical characteristics (e.g., body
400 weight/size) that may have an impact on self-evaluations based on physical appearance and
401 on the engagement in disordered eating, but that it is the subjective evaluation that one's body
402 may cause others to view the self negatively or reject/attack the self that may be important in
403 these associations (Duarte, Pinto-Gouveia, Ferreira & Batista, 2015; Duarte, Pinto-Gouveia
404 & Rodrigues, 2015; Gilbert, 2002).

405 Results supported our third hypothesis and extended results obtained in prior cross-
406 sectional research, suggesting that negative peer interactions, such as bullying experiences
407 may become associated with shame feelings related to perceptions that one's body image
408 may create self-perceptions of inadequacy and inferiority in the eyes of others (Duarte, Pinto-
409 Gouveia, Ferreira, & Batista, 2015; Duarte, Pinto-Gouveia, & Rodrigues, 2015; Gilbert &
410 Irons, 2009). These results contribute to research that empirically supports the theoretical
411 suggestion that shame can play a role in the development and maintenance of the disordered
412 eating continuum (Duarte, Pinto-Gouveia, & Rodrigues, 2015; Gilbert, 2002; Goss & Allan,
413 2009; Pinto-Gouveia et al., 2014). In this conceptual model, cognitive and behavioural
414 symptoms of eating psychopathology possibly serve as a defensive albeit maladaptive
415 function of attempting to mould the self to fit into socially prescribed patterns (e.g., thinness;
416 Gilbert, 2002; Gilbert & Thompson, 2002; McKinley, 1998). Nonetheless, the engagement in
417 disordered eating may increase the focus on body image and the importance of this
418 dimension for self-evaluation (Fairburn et al., 2003). Perceptions of failing on reaching such
419 patterns may then be associated with greater shame (Gilbert, 2002; Goss & Allan, 2009),

420 which may contribute to the development or maintenance of body image and disordered
421 eating problems in this life period.

422 The current study highlights therefore potential links between bullying, body image
423 shame and tendencies towards disordered eating patterns and suggests that prevention of
424 bullying early in adolescence may be beneficial for subsequent self-evaluation and eating
425 behaviour patterns. The current study has possible implications for the development of
426 etiological models and possible preventive strategies regarding body image problems and
427 eating psychopathology. Strengths include the longitudinal design and the focus on a critical
428 developmental time period and population to assess the study variables. Nonetheless, there
429 are important limitations that need to be considered. Firstly, these results should be replicated
430 in a larger sample as the sample size of this study may have influenced the strength of the
431 associations detected. Secondly, the study time-window of 3 years may have limited the
432 detection of changes over larger time periods. Future research with extended assessments
433 (i.e., beginning at an earlier age and extending the study to young adulthood) is important to
434 confirm the suggestions derived from the current data. Thirdly, the parsimonious models
435 examined in the current study were incomplete as they excluded other emotional, cognitive,
436 social and physiological variables that have been implicated in the development and
437 maintenance of body image difficulties and eating psychopathology (Slane et al., 2014; Stice
438 et al., 2011). Future studies should attempt to consider how these variables interact to
439 influence the development of body image and eating-related problems in adolescents. Finally,
440 the current study focused solely on girls. Additional research that explores gender differences
441 and cause-effect relationships between victimisation experiences, body image shame and
442 emotional and behavioural indicators of degree of psychological adjustment are required.

443

444 **4.1. Conclusions**

445 The current study suggests that (i) victimization experiences predict initial levels of
446 body image shame and disordered eating symptoms, (ii) body image shame predicts
447 disordered eating symptoms (the opposite is also true but the effect is smaller) and (iii) the
448 prospective effect of bullying experiences on disordered eating symptoms is not direct, but
449 indirect, mediated by body image shame. These results have implications for prevention
450 strategies that may ameliorate the development of eating psychopathology during the critical
451 developmental stage of adolescence.

452

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Table 1.

Means (*M*), Standard Deviation (*SD*), Cronbach's alpha estimates (α), and product-moment Pearson correlation coefficients between the three assessment moments (Time 1, 2 and 3) of the study variables ($N = 290$). Partial correlations controlling for the effect of BMI presented in subscript.

	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6	7	8	9	10	12
1. Bullying_T1	6.56	2.20	.79	1										
2. Bullying_T2	6.41	2.22	.78	.67***	1									
3. Bullying_T3	6.26	1.96	.75	.65***	.75***	1								
4. BISS_T1	.83	.91	.93	.39***	.29***	.28***	1							
5. BISS_T2	.86	.94	.93	.40***	.33***	.30***	.77***	1						
6. BISS_T3	.80	.93	.93	.40***	.33***	.38***	.61***	.76***	1					
7. EDE_T1	1.35	1.23	.95	.44***	.28***	.29***	.68***	.60***	.54***	1				
8. EDE_T2	1.33	1.28	.96	.43***	.34***	.31***	.60***	.70***	.67***	.84***	1			
9. EDE_T3	1.29	1.26	.96	.41***	.32***	.35***	.56***	.65***	.71***	.79***	.91**	1		
10. BML_T1	20.48	3.29	-	.03	-.01	-.01	.32***	.19**	.18**	.37***	.34**	.28***	1	
11. BML_T2	20.81	3.03	-	-.01	-.05	-.03	.25***	.21***	.23***	.36***	.34**	.31***	.81***	1
12. BML_T3	20.89	2.90	-	.04	-.03	-.04	.20***	.19**	.16**	.29**	.30**	.30***	.66***	.78***

Note: *** $p < .001$; ** $p < .010$.

Bullying = Victimization subscale of the Peer Relationships Questionnaire; BISS = Body Image Shame Scale; EDE = Eating Disorder Examination Questionnaire; T1 = Time 1; T2 = Time 2; T3 = Time 3.

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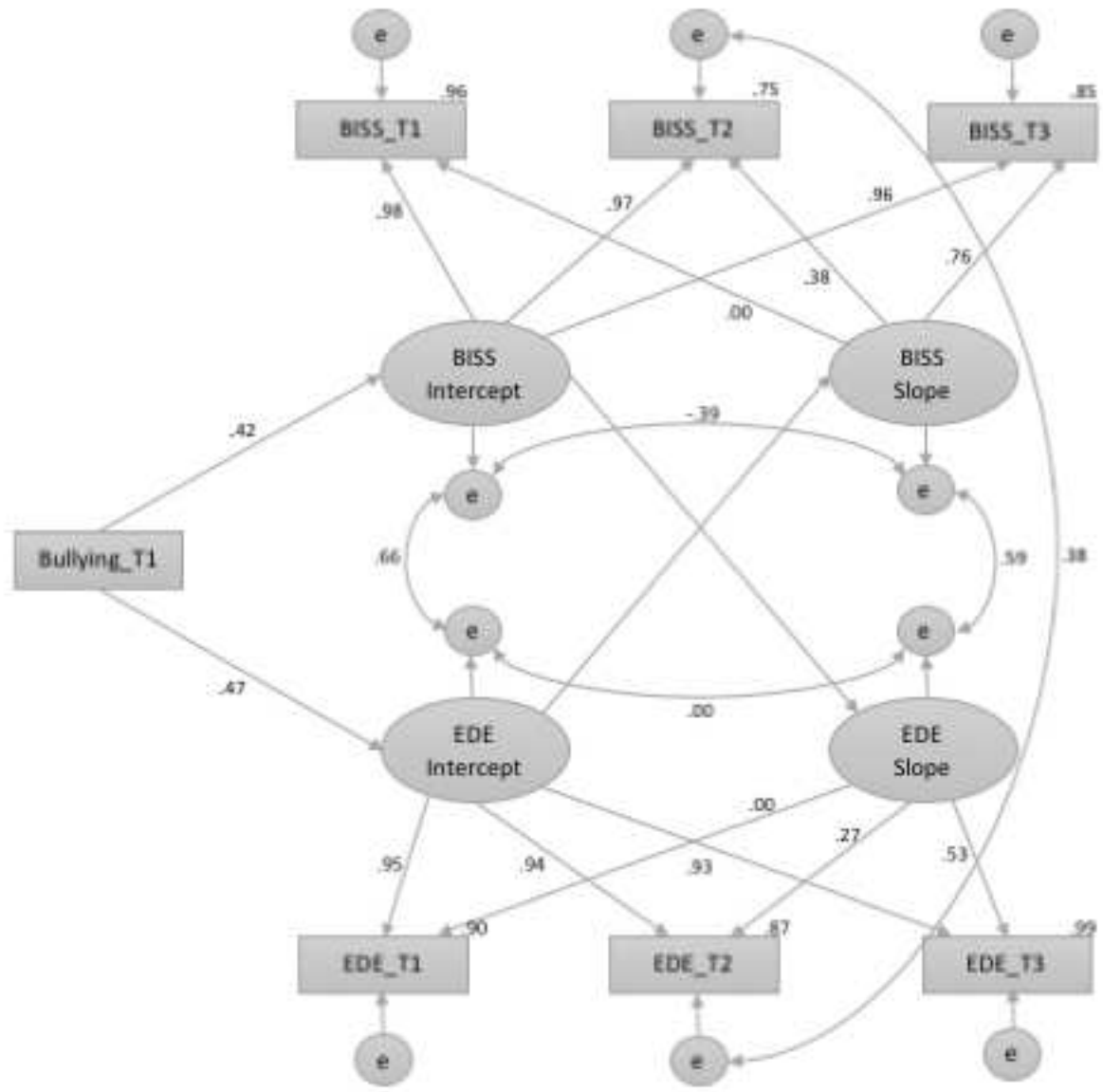
640

641

642 **Figure 1.** Standardized parameter estimates of the multivariate conditional latent growth
643 model between body image shame and disordered eating symptomatology regressed on
644 victimization experiences ($N = 290$).

645

Figure(s)
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