

1 **Appearance Esteem Trajectory According to Three Different Sources of Support Among Adolescents Over a**
2 **School Year**

3
4 **Abstract**

5 Although social support has been linked to body satisfaction, there has been little research on the effect of differential
6 sources of support on the trajectory of appearance esteem over time. To address this gap, this study explored changes
7 in adolescents' appearance esteem to perceived social support over one year. Data were collected from 339 Canadian
8 adolescents (54.57% females) in Grade 7 ($M_{age} = 12.05$) and Grade 10 ($M_{age} = 15.14$). Multilevel growth modeling
9 revealed that perceived social support from fathers was not associated with appearance esteem, whereas mothers'
10 support had the strongest effect on appearance esteem, consistently over time. Friends' support was also related to an
11 increase in the appearance esteem trajectory, but only for older students. Overall, this prospective study provides a
12 better understanding of the unique contribution of three different sources of social support during adolescence for
13 preventing negative appearance esteem, beyond the effects of other related variables.

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15 **Key words:** adolescence; body esteem; body image; peer support; parental support; multilevel growth modeling
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Introduction

21 Body image is particularly important during the critical period of adolescence (Bucchianeri et al., 2013), in
22 which concerns about the body tend to increase while lifestyles and physical and psychosocial health are developing
23 (Littleton & Ollendick, 2003). Among adolescents, low levels of body image can lead to various negative
24 psychological outcomes (Duchesne et al., 2017), problematic weight-related behaviors, and maladaptive appearance
25 management behaviors (López-Guimerà et al., 2013). As these consequences can last in the long term, focusing on
26 protective factors of negative body image is crucial (Cash, 2012). Among those factors, concerns about appearance
27 among adolescents have been the object of increased public interests in recent years (Ricciardelli & Yager, 2016).
28 However, few studies have focused specifically on appearance esteem, an important sub-construct of body image that
29 refers to general feelings about appearance (Mendelson et al., 2001). It is well known that social interactions are
30 important protective factors for body image among adolescents (Ata et al., 2007). However, little is known about the
31 respective influence of various sources of support on appearance esteem and its trajectory. Given that interpersonal
32 relationships are critical for helping adolescents cope with psychological distress occurring during this developmental
33 period (Camara et al., 2014), this prospective study extends previous research by assessing the differential impact of
34 three important sources of perceived social support on the trajectory of adolescents' appearance esteem over a 12-
35 month period using a robust statistical approach.

Appearance Esteem

37 Whereas body image is defined as individuals' beliefs, thoughts, feelings, attitudes, and behaviors toward the
38 body (Pruzinsky & Cash, 2002), appearance esteem is an important part of the multidimensional and complex
39 construct of body image and refers to general feelings about appearance (Mendelson et al., 2001). During adolescence,
40 concerns about appearance become very important because of the numerous physical and psychological changes
41 occurring (Mendelson et al., 2001). Adolescents may be subject to considerable pressure about their appearance from
42 their family, their peers, and the media (Hardit & Hannum, 2012) and they may also be particularly afraid of being
43 criticized or evaluated negatively by others (Beesdo et al., 2007). In fact, in a qualitative study where adolescents were
44 asked to report factors related to the development of body dissatisfaction, many emphasized appearance teasing,
45 appearance pressure, appearance-related conversations, and appearance comparison (Gattario & Frisé, 2019). As
46 appearance esteem is associated with identity development (Wängqvist & Frisé, 2013), it seems paramount to explore
47 its protective factors to help promote better adjustment and mental health during this critical period of life.

48 Whereas it is known that appearance esteem is lower among girls (Mendelson et al., 2001), the few studies
49 focusing specifically on the appearance esteem trajectory have shown that it tends to exhibit a negative transition with
50 age, from childhood to adolescence for both genders, with a greater decrease among girls and those with a higher body
51 mass index (BMI; Frisé et al., 2015), and then to stabilize in adulthood (Nelson et al., 2018). This finding is consistent
52 with those on body dissatisfaction where predictors from adolescence to middle adulthood would be gender, age, BMI,
53 and other variables, such as depression, self-esteem, parental communication and caring, peer dieting, and weight-
54 based teasing (Wang et al., 2019).

55 Given that many individual and environmental factors can influence body dissatisfaction, it may be difficult to
56 specifically identify the role of each variable on its trajectory, as suggested in findings from a longitudinal study
57 (Wang et al., 2019). That study revealed several differences in the evolution of body dissatisfaction over time even if,
58 overall, it remained relatively stable from middle adolescence to adulthood. Their findings suggested that self-image
59 and thus body satisfaction develop at an early age, hence the importance of ensuring positive appearance esteem in
60 adolescence to prevent problems in the short and long term. However, no known studies have focused on the protective
61 factors that specifically influence the trajectory of appearance esteem.

62 **Social Interactions and Social Support**

63 The important role of the social environment in appearance concerns has inspired many sociocultural models,
64 such as the Bowlby attachment model (Bowlby, 1978) and the tripartite influence model of body image and eating
65 disturbance (Thompson et al., 1999). The theoretical model used for this study was the acceptance model (Avalos &
66 Tylka, 2006), according to which a person's body appreciation is strongly influenced by the appreciation that loved
67 ones have of their own body and by the social support that they provide. This association has repercussions from
68 adolescence to adulthood (Gattario & Frisé, 2019). One way to explore social influences in research is to investigate
69 social support. Feeling accepted and appreciated by others would make people more confident and give them more
70 positive feelings about themselves and their body (Stice & Whitenton, 2002).

71 Within adolescents' social groups, parents are important to consider in relation to body image. For example,
72 some aspects of parenting, such as attachment style and perceived parental care and control, are associated with body
73 esteem, self-esteem, and eating behaviors among young adult males and females (Sira & White, 2010). Furthermore,
74 in a 15-year study including 1,455 participants, it was found that environmental factors, such as parental caring and
75 communication, can be important predictors of body dissatisfaction from adolescence to adulthood (Wang et al.,

76 2019). Besides verbal communication and active encouragement, even indirect behaviors, such as mothers exhibiting
77 body image concerns, have been found to impact the appearance esteem of offspring (Handford et al., 2018). Parent-
78 adolescent relationships are thus important for the maintenance of a healthy body image and can be conceptualized as
79 a protective factor. However, whereas the mother-child relationship has been examined in many studies and a maternal
80 influence has been consistently found, little is known about the distinct role of fathers. This gap has been highlighted
81 in previous research (Sira & White, 2010), suggesting the need for more investigation of the respective contribution
82 of every dimension of family functioning. Moreover, research is needed to include additional information in the
83 acceptance model about whether and how support from others plays a role in increasing appearance esteem.

84 In adolescence, the social environment consists primarily of interactions with school peers, such as classmates
85 and friends (Brown et al., 2008), who play a significant role in appearance esteem among girls and boys. Adolescents
86 are more frequently confronted with peers' appearance cultures and with an integrated focus on appearance, beauty,
87 and thinness (Jones et al., 2004), which are associated with body image concerns and negative behaviors (Carey et al.,
88 2013). Thus, given that relationships with peers substantially influence body appreciation and that friends are very
89 present in adolescents' lives, it is important to gain a deeper understanding of the role of support received more
90 specifically from friends (Kenny et al., 2017).

91 The respective influence of peers and of friends on appearance esteem in adolescence varies. The results of a
92 meta-analysis of 25 studies conducted between 1995 and 2010 among adolescents and young adults revealed a stronger
93 relationship between body dissatisfaction and the influence of peers than of family (Quiles Marcos et al., 2013).
94 However, this meta-analysis grouped studies pertaining to parental and peer/friend support, and few focused on both
95 types at the same time. Nonetheless, the greater importance of friends could be explained by the notion that
96 adolescence is the developmental period in which emancipation from parents occurs alongside individualization,
97 leading the person to become a full-fledged autonomous adult (De Goede et al., 2009). In preadolescence, boys and
98 girls spend more time socializing with family than in later adolescence, when they tend to spend more social time with
99 same-sex peers (Graber et al., 1999). In early adolescence, boys and girls both perceive more support from their mother
100 and their father than in late adolescence (De Goede et al., 2009). Thus, regarding body image, it may be expected that,
101 in later adolescence, parental influence on appearance esteem would be less strong than peer influence. However,
102 previous studies have produced conflicting results. For example, among young university students, body esteem would
103 be greater for students who felt loved by, in order of importance, their mother, another family member, their friends,

132 trajectory over time, an important construct of body image for adolescents that has been less studied. This article
133 sought to address this gap in the literature by focusing on the role of three sources of social support in appearance
134 esteem among Grade 7 and Grade 10 students over a one-year period. It also extended previous research by clarifying
135 the fathers' contribution to their offspring's body image. The results could help improve preventative programs based
136 on positive body image and protective factors. The current study had two main objectives. The first was to investigate
137 the relationship between social support from the mother, father, and friends and appearance esteem. In line with the
138 acceptance model (Avalos & Tylka, 2006) and with prior research (Quiles Marcos et al., 2013), it was expected that
139 social support from the mother, father, and friends would be related to the participants' appearance esteem for both
140 grades. More specifically, it was hypothesized that mothers' influence would be stronger than that of fathers, and that
141 relationships between social support and appearance esteem would be stronger among older adolescents when social
142 support was derived from friends rather than from parents, while the opposite pattern was expected among younger
143 adolescents. The second objective was to explore the contribution of demographics on the progression of appearance
144 esteem over one year. Based on previous work on the effect of age (Frisén et al., 2015) and of gender (Mendelson et
145 al., 2001) and it was hypothesized that appearance esteem would be higher among Grade 7 students (early adolescence)
146 than among Grade 10 students (middle adolescence) and that there would be a gender-based effect, in which females
147 were expected to report lower appearance esteem than males.

148 **Methods**

149 **Participants**

150 Data used in this study were selected from a project, involving 740 respondents, in which the Healthy Mind,
151 Healthy Body (HMHB) program was evaluated. For that project, participants came from two high schools of similar
152 socioeconomic backgrounds and were randomly assigned either to the experimental condition consisting of health-
153 related interventions or to the control group. To achieve the aim of the current study, only the subsample of students
154 from the control group (who did not receive any intervention and who had no contact with the experimental group;
155 N = 427) was selected. To ensure complete anonymity of the participants' answers and to match their questionnaires
156 at each follow-up (from T1 to T3), students answered the same questions about their identity at each wave, so they
157 did not have to remember their code (the two first letters of their first name, their birthdate, etc.), generating an eight-
158 character identification code (Yurek et al., 2008). All students who were present during each of the data-collection
159 visits and who consented to participate in the study were included in the current sample. Participants in Grade 7 were

160 required to submit a parental consent letter to complete the survey, but this was not required for those in Grade 10,
161 because Quebecers can provide informed consent at 14 years of age. Overall, the research sample was composed of
162 339 students at baseline. The phenomenon of attrition is almost inevitable in longitudinal studies, and the current data
163 are no exception. At T2, 260 participants were still enrolled in the study and completed the survey, a loss of 23%, and
164 at T3, 240 completed it, a loss of 30%. The logistic regression showed that dropout variation was not related to any of
165 the variables included in the current study. These findings indicate that the missingness was random.

166 Approximately half of the participants at baseline ($N = 167$, 49.3%) were Grade 7 students in early adolescence
167 ($M_{age} = 12.05$ years, $SD = 0.24$) and the other half ($N = 172$, 50.7%) were Grade 10 students in middle adolescence
168 ($M_{age} = 15.14$ years, $SD = 0.36$). There were 154 males (45.4%) and 185 females (54.6%). As for their ethnicity, 95.3%
169 were Caucasian, 3.8% were from First Nations, 5.6% were from Western Europe, 2.1% were from North
170 Africa/Middle East, and 5.9% indicated another ethnic/racial background. A quarter (25.1%) of the participants
171 reported experiencing food insecurity (e.g., their families could not afford to eat balanced meals), an indicator of low
172 socioeconomic status (Daveluy et al., 2001). Baseline sociodemographic data of the study population are shown in
173 Table 1.

174 **Procedure**

175 There were three waves of data collection. Time 1 took place at the start of the school year (T1: October 2016),
176 Time 2 at the end of the school year (T2: May 2017), and Time 3 at the beginning of the next school year (T3: October
177 2017). Parents and students received a letter describing the study. They answered a custom-designed questionnaire
178 with different scales at baseline (T1) and at the 8- and 12-month follow-ups (T2 and T3). The questionnaire was
179 administered in computer rooms during regular class hours. This study received the institutional review board's (IRB)
180 approval (blinded for review).

181 **Measures**

182 **Appearance esteem.** The Body-Esteem-Appearance subscale of the Body-Esteem Scale (Mendelson et al.,
183 2001) was used. It consists of 10 Likert-scale items assessing general feelings about appearance. Participants were
184 instructed to report how much they generally appreciated their body (e.g., "I like what I see when I look in the mirror")
185 by giving a score from 0 (never) to 4 (always), where a higher score indicated positive appearance esteem.
186 Standardized Cronbach's alpha values in the sample were 0.933 at T1, 0.932 at T2, and 0.934 at T3.

187 **Perceived parental support.** Parental support was measured at T1 through the Parental Emotional Support
188 Questionnaire (Deschesnes et al., 1997) based on previous questionnaires (Schaefer, 1965; Siegelman, 1965; Parker
189 et al., 1979). The adolescents were required to complete one questionnaire concerning their mother and another one
190 concerning their father (it was the same questionnaire apart from the instruction: Answer the following questions while
191 thinking of your father/while thinking of your mother). Support was assessed according to a four-item Likert-type
192 scale ranging from 0 (never) to 5 (often), for example: Is he affectionate with you (e.g., takes you in her arms, smiles
193 at you, kisses you or talks to you kindly). The scores were added together for a maximum total of 15. Higher scores
194 indicated greater social support. In cases where the students had little or no contact with one or both biological parents,
195 they completed a questionnaire referring to the female and male adults whom they considered to play these roles
196 (stepparent, adoptive parent, grandparent, etc.). The adolescents were not asked who the person was; however, a
197 sociodemographic question on family composition provided the information needed to make this determination.
198 According to this question, 85.1% of the participants in the sample lived with their biological father and mother, 10.0%
199 with their mother and her partner, 2.5% with their father and his partner, and 2.4% in other situations (guardian, foster
200 family). Standardized Cronbach's alpha values for maternal and paternal support in the current study were 0.739 and
201 0.788, respectively, and the correlation between those two variables was 0.519 ($p = 0.000$).

202 **Perceived friends' support.** Friends' support was measured at T1 using four items of the Multidimensional
203 Scale of Perceived Social Support (Zimet et al., 1988) on a 7-point Likert-type scale ranging from strongly disagree
204 (0) to strongly agree (6). Examples of these items are "I can count on my friends when things go wrong" and "I can
205 talk about my problems with my friends." Higher scores indicated greater support from friends. The standardized
206 Cronbach's alpha was 0.876 in the current sample.

207 **Perceived current figure.** Perceived current figure was evaluated with the Figure Rating Scale (Collins, 1991),
208 generally used to determine participants' desire to change their figure by calculating the gap between the perceived
209 and ideal figures. Participants were instructed to assess which figures were closest to their own from a selection of
210 seven silhouettes, ranging from smallest to largest. In accordance with the aim of the present study, the analyses
211 included the perceived figure responses only as a measure of perceived body size in replacement of BMI, as the two
212 are strongly correlated (Gardner & Brown, 2010). BMI was calculated in this study but could not be included because
213 of the high level of missing data (35.54%) for either weight or height. Because the correlation between the BMI and

214 perceived figure was significant ($r = 0.580, p < 0.001$) among the respondents, perceived figure was deemed
215 appropriate for use as a control variable.

216 **Weight-related teasing.** The degree and source of the weight-related negative comments received by the
217 participants were assessed at baseline using an adapted version of the nine items questionnaire (Bellerose, 2002).
218 Participants answered the question, “Do the following people (e.g., mother, father, boyfriend/girlfriend, siblings,
219 friends, extended family, sport teacher or coach, ex-boyfriend/ex-girlfriend, or other) ever make negative comments
220 about your weight?” A score (from 0 to 9) indicating the number of sources of negative comments received at some
221 point in their lives was calculated. In the present sample, 47.5% of respondents reported having previously received
222 negative comments about their weight, and 1.5% had received negative comments from between six and nine different
223 sources ($M_{Sources\ of\ teasing} = 1.16, SD = 1.62$).

224 **Sociodemographic characteristics.** Participants were asked to provide sociodemographic information
225 including gender, grade level, ethnicity, and food insecurity.

226 **Statistical Analyses**

227 Before the main analysis was conducted, demographics and descriptive statistics were computed. Longitudinal
228 multilevel growth modeling (Grimm et al., 2017) was then conducted to investigate the association between social
229 support and the appearance esteem trajectory. This type of analysis has been proven to allow the examination of
230 individual differences in within-person variations and co-variations over time (Hoffman, 2007). Given the three
231 measurement waves (Burchinal et al., 2006) and the small amount of missing data (Enders, 2011), the sample size
232 provided sufficient statistical power to detect slope differences between groups even for small effect sizes (Coertjens
233 et al., 2017). Moreover, according to previous work (Arend & Schäfer 2019), the power estimation of this two-level
234 model study is considering as sufficient. First, the mean trajectory of appearance esteem across the three time points
235 was modeled (to determine if it increased, decreased, or remained the same over time). Second, the effects of predictors
236 measured at T1 on appearance esteem were examined. Gender, students’ grade level, current perceived figure, and
237 negative weight-related comments were included as control variables in the current model. Food insecurity was not
238 significant and thus not included in the final model for the sake of parsimony. A widely used software program for
239 studying data with hierarchical or nested structures, SAS (version 9.4), was used (Bell et al., 2013).

240 The three social support variables were centered-reduced, which made their coefficients comparable. Full
241 maximum likelihood (FIML) was used to handle missing data and to estimate parameters (Johnson & Young, 2011).

242 It is comparable to multiple imputation and is considered to produce stable, more efficient, and less biased estimates
243 of the parameters of interest (Johnson & Young, 2011).

244 Singer and Willett's (2003) multiple-step procedure, described below, was used to test hypotheses. First, an
245 unconditional model was computed (with no predictors). Second, a series of nested multilevel models was fitted. The
246 effect of each predictor, added sequentially, was tested on the intercept (baseline) and on the rate of change (time).
247 Then, alternate models including the interactions between the variables, or with time, were tested. To select the best
248 final model, fit indices, such as the Akaike information criterion (AIC), the Bayesian information criterion (BIC), and
249 the log-likelihood (deviance) statistics, were used (Grimm et al., 2017). Lower values indicated a better representation
250 of the data by the model (Singer & Willet, 2003). The difference in deviance between the unconditional model and
251 the final conditional model, which is a measure of goodness of fit, was $\Delta \chi^2 = 235.1$, $\Delta dl = 23$, $p < 0.001$. This justified
252 the decision to retain this model to represent the rate of change in appearance esteem. Finally, the examination of
253 conditional residues indicated no major violation of the postulates of normality and homoscedasticity.

254 Results

255 Descriptive Statistics

256 Descriptive statistics and correlations among the variables are presented in Table 1. All the correlations
257 appeared to be in the hypothesized directions.

258 *INSERT TABLE 1 ABOUT HERE.*

259 Appearance Esteem and its Trajectory

260 **Appearance esteem trajectory.** Results of the unconditional growth model revealed that the intraclass
261 correlation was 0.77, justifying the use of conditional multilevel analyses. This finding indicated that students'
262 appearance esteem score variance was attributable mostly to differences between, rather than within, participants over
263 the 12-month period.

264 **Predicting appearance esteem at baseline.** The parameter estimates for each of the predictors in the final
265 model are listed in Table 2. In order of importance, mothers' and friends' support had unique and significant effects
266 on the appearance esteem subscale at baseline ($\beta = 0.194$, $p = 0.015$ and $\beta = 0.141$, $p = 0.024$, respectively), while
267 fathers' support appeared to be non-significant ($\beta = 0.119$, $p = 0.142$). This meant that higher levels of social support
268 from the mother and friends were associated with higher levels of appearance esteem at T1. Because the estimate for
269 social support from mothers was higher than for social support from friends ($\beta = 0.194$ and $\beta = 0.141$), these results

270 also suggested that the effect of social support from the mother was more important than that of social support from
271 friends. These effects were significant above and beyond the effect of the control variables, which were also all related
272 to appearance esteem. However, the appearance esteem association with social support from the father was not
273 significant. As for the control variables, gender and grade were associated with more positive appearance esteem ($\beta =$
274 0.658 and $\beta = -0.383$, respectively, $p < 0.001$), in the sense that being a boy and being in Grade 7 was associated with
275 better appearance esteem. Moreover, lower appearance esteem was associated with larger self-perceived figure ($\beta = -$
276 0.137 , $p < 0.001$,) and a higher number of sources of negative weight-related comments ($\beta = -0.070$, $p < 0.05$).

277 *INSERT TABLE 2 ABOUT HERE.*

278 **Predicting appearance esteem rate of change over one year.** The results also revealed interactions with time,
279 indicating that some predictors had an effect on the appearance esteem trajectory that differed over time. First, the
280 results indicated a significant general decline in the appearance esteem trajectory over time ($\beta = -0.017$, $p = 0.013$).
281 Second, an interaction was detected between time and grade levels, which revealed that appearance esteem declined
282 only for Grade 7 students ($\beta = 0.017$, $p = 0.016$). Finally, no significant association was found between mother or
283 father support and change over time in reported appearance esteem, which meant that the effect of mother support and
284 the non-effect of father support on baseline levels of appearance esteem stayed the same at all time points. Nonetheless,
285 the triple interaction was observed between grade levels, social support from friends, and time. Figures 1 and 2 provide
286 a graphical illustration of this interaction for Grade 7 students compared with Grade 10 students receiving high levels
287 (Figure 1) and low levels (Figure 2) of social support from friends. Overall, these results indicate that the grade level
288 modulated the effect of social support from friends on the appearance esteem trajectory. These findings suggest that,
289 among Grade 7 students, even though there was a positive effect of social support from friends on appearance esteem
290 at baseline, it had no effect on the declining appearance esteem trajectory over time. Among Grade 10 students, in
291 addition to its positive effect on appearance esteem at baseline, social support from friends also had a positive effect
292 on the appearance esteem trajectory. This means that receiving a higher level of social support from friends prevented
293 a decline in the appearance esteem trajectory over time. Graphically, even if older students' appearance esteem
294 increased when they had higher levels of social support from friends, their levels of appearance esteem remained
295 below those of younger students over time.

296 *INSERT FIGURES 1 AND 2 HERE.*

297 Finally, there were no time interactions with gender, perceived figure, or weight-related teasing, suggesting
298 that their effect on appearance esteem remained the same over time. Taken together, these results indicate that the
299 appearance esteem trajectory changed for both boys and girls as well as for participants with different perceived
300 shapes, regardless of the number of negative comments received.

301 **Sensitivity Analyses**

302 Because the data used for this study were from a single-source and self-administered questionnaire, common
303 method variance was possible and therefore examined. Although common method variance is more likely to emerge
304 in simple models (Chang et al., 2010) and therefore less likely in the current study given the complex model used, the
305 Harman's one-factor test was also conducted. The results showed no indication of common method variance. Finally,
306 a multiple regression was conducted with the three social support measures using the Durbin–Watson statistic. This
307 test is used as a diagnostic check for bias resulting from autocorrelation in the data when the residuals are not
308 independent from each other and not linearly auto-correlated (Cohen et al., 2013). The results indicated that the
309 Durbin-Watson statistic was in the recommended range, that is, between 1.5 and 2.5 (Durbin & Watson, 1971).

310 **Discussion**

311 Although predictors of body dissatisfaction among adolescents have been examined in several studies, for
312 example, psychological factors (Duchesne et al., 2017) or social influences (Quiles Marcos et al., 2013), less is known
313 about the evolution of appearance esteem and its association with social support from significant sources and with
314 other factors. The present study addressed these gaps by examining the impact of three sources of social support
315 (mother, father, and friends) on the trajectory of adolescents' appearance esteem over a 12-month period above and
316 beyond the effect of personal factors (gender, age, perceived figure, weight-related teasing). The data collection
317 included three waves, making it possible to perform a robust linear analysis of the appearance esteem trajectory. The
318 results confirmed most of the hypotheses regarding the positive effects of social support above and beyond the effects
319 of weight-related comments, perceived current figure, and gender. This work contributes to the application of the
320 tripartite model of influence on adolescents' body image and may help to elucidate social and individual factors that
321 can improve adolescents' well-being and mental health.

322 **Appearance Esteem and Social Support**

323 The findings indicated that only two of the three sources of social support were associated with the appearance
324 esteem trajectory, that is, mother and friends, but not father, which is consistent with previous studies on body

325 satisfaction, for example, among college students (Merianos et al., 2012) or adolescents with disordered eating
326 behaviors (Back, 2011). These findings support the notion that perceived emotional and behavioral support from
327 significant sources is a protective factor for own body appreciation (Stice & Whitenton, 2002), and as early as possible
328 in youth's lives, as suggested in studies among high school students (Duru et al., 2019) or children exposed to multiple
329 risks (Thomann Mitchell, 2014).

330 Social support from fathers was also expected to be associated (although less strongly) with appearance esteem
331 over time; however, this was not the case. One explanation that should be tested in future study may be because fathers
332 make fewer comments than mothers about their child's weight (Berge et al., 2016). These differences between mother-
333 child and father-child relationships regarding body image may also be explained by the difference in attachment with
334 parents (Szalai et al., 2017) and in type of influence, where children would be more influenced by modeling than by
335 other types of influence (Quiles Marcos et al., 2013).

336 Moreover, social support from the mother appeared to be more important than that from friends at the initial
337 measurement time, as found in among college students (Merianos et al., 2012) and in a previous longitudinal study
338 reporting that deficits in parental social support, but not in peers' social support, predicted growth in body
339 dissatisfaction for both boys and girls (Bearman et al., 2006). Nonetheless, for Grade 10 students, the impact of friends'
340 support on appearance esteem appeared to change over time. Indeed, friends' support prevented a decline in the
341 appearance esteem trajectory during the school year for Grade 10 students, supporting the notion that friends can be
342 an important source of influence on adolescents' appearance esteem (Carey et al., 2013). This finding may support
343 the notion that this transition occurs in the period of middle to late adolescence, not from early to middle adolescence
344 (De Goede et al., 2009). Further studies should be conducted to better identify this transition.

345 Participants reporting high levels of social support from friends also reported high levels of social support from
346 parents. This is consistent with a previous study who proposed that relationship skills would likely be generalized
347 from parent-child relationships to friendships during adolescence (Schneider et al., 2001). These results may be
348 explained by adolescents' need for support and reassurance in a positive and secure family environment, despite their
349 need to gain more physical, social, and psychological independence. Thus, even if adolescents spend less time overall
350 with their family during adolescence, the time that they do spend with their mothers and fathers is important for their
351 development and entertainment (Coleman, 2011). These findings together support the hypothesis that social support
352 is related to appearance esteem over time, suggesting that social support plays a key role in appearance esteem during

adolescence. Even though the study was not intended to examine the mechanism underlying the link between potential mediators and appearance esteem, those findings may be explained by the fact that social support contributes to a more positive self-esteem and self-image, which, in turn, may positively influence how adolescents feel about their appearance, as previously suggested (Sira & White, 2010).

Appearance Esteem Trajectory

Another goal of the current study was to investigate the appearance esteem trajectory over one school year. The analyses revealed that, over time, appearance esteem decreased only among participants in Grade 7. This finding suggests that entry into adolescence may have unfavorable effects on appearance esteem, which is consistent with findings on the negative impact of puberty on body image (Ackard & Peterson, 2001; Tremblay & Lariviere, 2009). Appearance esteem also decreased in Grade 10 participants who reported low social support from friends, which suggests a protective role of friends at this age (Kirsch et al., 2016).

Regarding associations with other control variables, as hypothesized, female adolescents reported being less satisfied with their appearance than male adolescents, and this difference remained over the one-year study period. This finding is consistent with those from a previous one-year study (Abbott et al., 2012) as well as from a previous 10-year study (Bucchianeri et al., 2013). Moreover, a previous 11-year longitudinal study indicated that appearance esteem declined during the transition to adulthood for people of both genders, but that this trend was more pronounced among girls (Frisén et al., 2015). In another study where appearance esteem was compared among young people between the ages of 15 and 20, the results revealed that boys had higher appearance esteem than girls, but that the gap decreased with age (Nanu et al., 2013). In the current study, while the period was only 12 months, no significant interaction was found between time and gender, supporting the notion that people continue to be dissatisfied in the same manner, independently of gender, as proposed in a previous study (Juli, 2017).

Consistent with the third hypothesis, adolescents' appearance esteem was found to be significantly related to every control variable at baseline, and these effects remained the same over time, except for grade level. A larger perceived figure was associated with poorer appearance esteem. As expected, considering that perceived figure is a proxy variable for BMI, these findings are consistent with a previous study also indicating that higher BMI is linked with poorer appearance esteem (Bucchianeri et al., 2013). In addition, weight-related teasing, as expected, was negatively associated with appearance esteem, which supports the importance of the influence of significant others' values on body image (Ata et al., 2007). This finding is also consistent with previous suggestions that this type of

381 comment in adolescence is associated with objectified body consciousness and eating disorders over time (Olvera et
382 al., 2016).

383 As the use of multilevel growth modeling analysis is relatively recent in the field, there are few studies available
384 for comparison. However, it is important to consider that other social factors may also influence appearance esteem.
385 For example, a previous study showed that individual adolescents' characteristics, such as gender, BMI, and general
386 self-esteem, moderated the prediction associations between weight-related comments and social comparison, and body
387 dissatisfaction over time (Cantin & Stan, 2010). Moreover, personal factors, such as anxiety, comparison tendencies,
388 and internalization of social ideals, can moderate parental influence (Rodgers & Chabrol, 2009).

389 **Study Strengths and Limitations**

390 Nevertheless, this study had some limitations that should be considered. Although the sample size was
391 sufficient to test the hypotheses of this study (Coertjens et al., 2017), it was not large enough to provide statistical
392 power to test other moderation hypotheses. For example, a previous study found that gender did not moderate the
393 relationship between social support from family and from peers and body dissatisfaction (Kirsch et al., 2016). Even if
394 a previous study suggested that body satisfaction of offspring is more influenced by parents of the same sex as them
395 (Kluck, 2010), having a larger sample would have allowed parent-adolescent differential gender analyses (i.e., mother-
396 daughter, mother-son, father-daughter, and father-son) to be conducted. Another limitation is that the current data
397 were based on self-reports provided by a single source (the students themselves), creating the possibility of common
398 method variance. In addition, the social support questions precluded knowing exactly to whom the adolescents were
399 referring. However, given that a large majority still lived with their two parents, it was supposed that it was their
400 mother or father. Future research should collect data from multiple respondents (mother, father, and friends) regarding
401 the social support they perceived to be offering. Finally, it may be helpful to examine negative behaviors of
402 adolescents' social groups in future studies, considering that appearance esteem and eating concerns are reported to
403 be negatively influenced by having social support from parents, friends, or significant others who regularly make
404 negative comments about their body or follow diets (Quiles Marcos et al., 2013).

405 Beyond these measurement issues and sample biases, an important strength of this research is the longitudinal
406 design used, combined with a robust and appropriate statistical technique, multilevel growth modeling (Hedeker,
407 2004), which overcome the limitations of other statistical methods (Burchinal et al., 2006). Overall, current knowledge
408 suggests that this is the first longitudinal study where a multivariable model was used to predict the trajectory of

437 higher number of sources were associated with poorer appearance esteem. Thus, the findings revealed that perceiving
 438 high levels of social support from significant sources can be a protective factor for appearance esteem in adolescence
 439 and may thus be key in adolescents' adjustment and mental health. Further studies should also be conducted to better
 440 understand the fathers' role in this equation.

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