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Trajectories of Body Dissatisfaction and Dietary Restriction in Early Adolescent Girls: A Latent Class Growth Analysis

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RUNNING HEAD: Sociocultural predictors in Early Adolescents

**Trajectories of Body Dissatisfaction and Dietary Restriction in Early Adolescent
Girls: A Latent Class Growth Analysis**

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Trajectories of Body Dissatisfaction and Dietary Restriction in Early Adolescent Girls: A Latent Class Growth Analysis

Abstract

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2 We aimed to examine longitudinal patterns of development of body dissatisfaction and
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4 dietary restriction among early adolescent girls. A sample of 259 school girls ($M_{\text{age}} = 12.76$
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6 years, $SD = 0.44$) reported on sociocultural influences, body dissatisfaction and dietary
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8 restriction at baseline, eight, and 14 months. A subsample provided height and weight.
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10 Analyses identified 4 trajectories of body dissatisfaction: low, moderate-increasing,
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12 moderate-decreasing, and high. Three trajectories of dietary restriction emerged: low,
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14 moderate, and high. Baseline and 8-month sociocultural variables and BMI differed between
15
16 the trajectories. A subgroup of girls already displays high levels of body image and eating
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18 concerns by early adolescence. Identifying the timing of the emergence of concerns is
19
20 necessary. Sociocultural variables likely influence these trajectories.
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26 **Keywords:** early adolescent girls, sociocultural, body image, dietary restriction, prospective
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Trajectories of Body Dissatisfaction and Dietary Restriction in Early Adolescent Girls: A
Latent Class Growth Analysis

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Body image and disordered eating are important clinical concerns for early adolescent girls (Ricciardelli & McCabe, 2001). Furthermore, while eating disturbances emerge mainly in late adolescence among girls, recent research has suggested that vulnerable individuals may already present higher levels of body image and eating concerns by early adolescence (Rohde, Stice, & Marti, 2014). To date, however, it is unclear when this high-risk subgroup emerges and how the trajectory of their body dissatisfaction and dietary restriction might differ from that of their peers. In addition, sociocultural models of body image and eating concerns posit that pressure to attain the culturally-promoted thin-ideal leads to increases in body dissatisfaction and dieting through internalization of the thin-ideal and appearance comparison (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Although this theory has received much cross-sectional support, little is known about how these factors are associated with different trajectories of body image and eating concerns over time. The aim of the present study was to contribute to bridging this gap by exploring longitudinal patterns of body dissatisfaction and dietary restriction in early adolescent girls over a 14 month period.

Early adolescence is an important time for the development of body dissatisfaction and associated eating disorder risk factors in girls. Rates of body dissatisfaction already reach 50% by early adolescence (Ricciardelli & McCabe, 2001), and up to 30% of girls aged between 10 and 14 years old report dieting to lose weight (McVey, Tweed, & Blackmore, 2004; Westerberg-Jacobson, Ghaderi, & Edlund, 2012). These rates are concerning as body dissatisfaction and dieting have been put forward as the two most important predictors of eating disorder onset in later adolescence (Stice, Marti, & Durant, 2011). In addition, it has been shown that the predictors of body dissatisfaction vary during adolescence (Paxton, Eisenberg, & Neumark-Sztainer, 2006). To date, however, little is known regarding the

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1 stability or change in the course of body dissatisfaction and dietary restriction in early
2 adolescence, or the typical patterns of evolution in concerns that may exist in this age group.
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4 Thus, the first aim of this study was to identify the latent profiles of the course of body
5 dissatisfaction and dietary restriction in early adolescents over a 14-month period.
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10 Sociocultural theories of the development of body image and eating disturbances
11 recognise that Western society promotes an unrealistically thin body-ideal (Flynn, Park,
12 Morin, & Stana, 2015). Young girls experience constant pressure from sociocultural agents
13 including peers, parents and media to attain this ideal, and experience negative interpersonal
14 feedback such as teasing when they fail to conform to the ultra-slender ideal (Thompson et
15 al., 1999). This appearance-focused environment is hypothesized to lead to the internalization
16 of the thin-ideal, that is, the endorsement of the media ideal as a personal standard to be
17 attained, and also lead to appearance comparison with both media images and peers. Both
18 internalization and appearance comparison are posited to heighten the perception of the gap
19 between one's own body and the thin-ideal, leading to body dissatisfaction and unhealthy
20 weight control behaviors such as dieting, that aim to decrease the gap (Schutz, Paxton, &
21 Wertheim, 2002; Thompson et al., 1999).
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40 The sociocultural theory has received much empirical support from cross-sectional
41 correlation studies and experimental studies that provide evidence for these hypothesized
42 relationships (Cafri, Yamamiya, Brannick, & Thompson, 2005; Durkin, Paxton, & Sorbello,
43 2007; Keery, Van den Berg, & Thompson, 2004; Rodgers, Chabrol, & Paxton, 2011; van den
44 Berg, Thompson, Obremski-Brandon, & Covert, 2002). However, few longitudinal studies
45 have examined how these influences might be associated with increases in body image and
46 eating concerns over time, in particular among early adolescent girls. Specifically, to our
47 knowledge, only one study has explored sociocultural pressure, teasing, internalization, social
48 comparison, and body dissatisfaction as predictors of disordered eating among Chinese
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1 adolescent girls aged between 12 and 19 years old over a 9-month period, providing support
2 for the importance of these factors with the exception of teasing (Jackson & Chen, 2008). In
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4 addition, there have been no prospective investigations of the role of these factors in changes
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6 in body image or dietary restriction. Establishing the usefulness of sociocultural factors in
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8 prospectively predicting different trajectories of body dissatisfaction and dietary restriction in
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10 early adolescent girls is necessary to further our understanding of the development of these
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12 concerns at this critical developmental period, and to provide support for the sociocultural
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14 model and guide prevention development for this age group.
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20 The extant literature that has examined individually the role of sociocultural
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22 influences on changes in body dissatisfaction and dietary restriction over time has provided
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24 initial support for the importance of these factors. Thus, it might also be expected that these
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26 factors would be successful in predicting different developmental trajectories of body image
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28 concerns and dieting. Peer influences and to a lesser degree parental influences, prospectively
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30 predicted body dissatisfaction and dieting in early adolescent girls aged 11 years (Blodgett
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32 Salafia & Gondoli, 2011; Paxton et al., 2006). Among slightly older girls, sociocultural
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34 pressure, parental and peer pressure has sometimes been shown to predict weight concerns
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36 and extreme weight-loss behaviors (Field et al., 2001; Helfert & Warschburger, 2011;
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38 McCabe & Ricciardelli, 2005; Schooler & Trinh, 2011). However, other studies have not
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40 found support for prospective influences of media, peers or parents on body image concerns
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42 or dieting (Clark & Tiggemann, 2008; Field et al., 2001; McCabe & Ricciardelli, 2005).
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45 Regarding weight-related teasing and fat talk in particular, studies are scarce among early
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47 adolescents. However, some evidence exists for teasing as a prospective predictor of body
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49 dissatisfaction and dieting among early adolescent girls (Gardner, Stark, Friedman, &
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51 Jackson, 2000; Wetheim, Koerner & Paxton, 2001). One prospective examination of the effect
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53 of fat talk among pre-adolescent girls did not find any evidence of an association with later
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body dissatisfaction (Clark & Tiggemann, 2008), although this relationship has been documented among older adolescent girls (Arroyo & Harwood, 2012; Jones, 2004).

Internalization of media ideals has been found to prospectively predict increases in body dissatisfaction in adolescent girls (Espinoza, Penelo, & Raich, 2010; Jackson & Chen, 2008; Stice & Whitenton, 2002), and pre-adolescent girls (Clark & Tiggemann, 2008). However, the evidence for a relationship with dietary restriction among adolescent girls is lacking (Bearman, Presnell, Martinez, & Stice, 2006; Presnell, Bearman, & Stice, 2004; Wojtowicz & von Ranson, 2012). Prospective explorations of appearance comparison are scarce, although two studies have found that appearance comparison predicted body dissatisfaction among adolescent girls (Jones, 2004; Jackson & Chen, 2008).

One of the important tenets of sociocultural theory is the relationship between body dissatisfaction and increases in dietary restriction. In this model, it is proposed that dieting may be undertaken in response to body dissatisfaction, as the former is perceived to lead to weight loss, which would thus help with attaining the media ideal (Stice, 2001). Consistent with this idea, body dissatisfaction has been found to prospectively predict dietary restriction in adolescent girls (Allen, Byrne, McLean, & Davis, 2008; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006; Wertheim et al., 2001).

While actual body weight is not always taken into account in sociocultural models, it is relevant to several aspects of the theory. First, a direct effect of body weight is that heavier individuals are likely to perceive themselves as more distant from the thin-ideal (Thompson et al., 1999). Second, indirectly, it would be expected that certain interpersonal influences such as parental pressure or peer weight-related teasing might be experienced to a greater extent by heavier individuals who depart most from the media ideal (Haines et al., 2006). Consistent with this theory, body mass index (BMI) has been shown to prospectively predict

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1 increases in body dissatisfaction among adolescent girls (Bearman et al., 2006; Quick,
2 Eisenberg, Bucchianeri, & Neumark-Sztainer, 2013; Stice & Whitenton, 2002; Wojtowicz &
3 von Ranson, 2012), and early adolescent girls (Clark & Tiggemann, 2008). Furthermore,
4 BMI has been shown to prospectively predict an increase in dietary restriction among
5 adolescent girls (Allen et al., 2008; Field et al., 2001). Thus, taken together these findings
6 suggest that sociocultural factors would be successful in predicting developmental trajectories
7 in body dissatisfaction and dieting.
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18 In summary, early adolescence has been suggested to be an important period for the
19 establishment of body dissatisfaction and dietary restraint which are critical risk factors for
20 the development of eating disorders in late adolescence (Stice et al., 2011). In addition, to
21 date there is limited evidence for the role of sociocultural factors in predicting body
22 dissatisfaction and dietary restriction over time, particularly among early adolescent girls.
23 The aim of the present study was, therefore, first, to examine 14-month trajectories of body
24 dissatisfaction and dietary restriction among a sample of early adolescent girls. Second, the
25 aim was to examine baseline and 8-month differences in sociocultural factors between
26 trajectories so as to further our understanding of the role of sociocultural influences in the
27 course of body dissatisfaction and dietary restriction over time. Specifically, we investigated
28 sociocultural pressure, peer weight-related teasing, fat talk, media internalization, appearance
29 comparison, and BMI as predictors of trajectories of body dissatisfaction and dietary
30 restriction.
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Methods

Participants

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55 Data from a sample of 277 grade 7 girls, who were control participants in an
56 intervention study, were included in this study. Participants were recruited from six co-
57 educational and one single-sex school in Melbourne, Australia, to be involved in a body
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1 image intervention trial. In these analyses, baseline, eight months, and 14 months data from
2 the assessment only control group has been used. In total, 259 girls provided written parental
3 consent and complete outcome data across at least two time points and were thus included in
4 the analyses. The mean age of participants at baseline was 12.76 years ($SD = 0.44$). The
5 majority of participants indicated they had been born in Australia or New Zealand (87.3%).
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7 In addition, 4.8% reported being born in South East Asia, 2.6% the Middle-East, and the
8 remaining 5.3% in other countries.
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17 **Measures**

18 **Sociocultural pressures.** Perceived pressure to be thin from family, friends, and the
19 media was assessed using the Perceived Socio-Cultural Pressure Scale (Stice & Bearman,
20 2001). In our study, two of the original 10 items that focused on dating partners were not
21 included as they were thought to be mainly irrelevant for this age group. The items are scored
22 on a 5-point scale ranging from 1 (*none*) to 5 (*a lot*) with higher scores indicating greater
23 perceived pressure. An example item is “I’ve noticed a strong message from my family to
24 have a thin body.” Previous studies have revealed that the scores from this scale demonstrate
25 good reliability among adolescent girls (Stice & Whitenton, 2002). In the present sample $\alpha =$
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66 **Peer weight-related teasing.** The peer teasing subscale from the McKnight Risk
67 Factor Survey (Shisslak et al., 1999) was used to assess peer weight-related teasing. The scale
68 includes 8 items assessing the frequency with which participants have been teased about their
69 weight during the previous year. Items are scored on a 5-point scale ranging from 1 (*never*) to
70 5 (*always*), with higher scores indicating more frequent experiences of teasing. An example
71 item is “How often have you tried to change your weight so you would not be teased by
72 girls/young women (including sisters)?” Previous studies have revealed that the scores from
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this scale demonstrate good reliability among adolescent girls (Shisslak et al., 1999). In the present sample $\alpha = .92$.

Fat talk. Fat talk was assessed using the Appearance Conversations Scale (Jones, Vigfusdottir, & Lee, 2004). The scale includes 5 items assessing the frequency with which participants engaged in conversations about weight, shape, and appearance with their peers. Items are scored on a 5-point scale ranging from 1 (*never*) to 5 (*very often*), with higher scores indicating more frequent engagement in fat talk. An example item is “My friends and I talk about how our bodies look in our clothes.” Previous studies have revealed that the scores from this scale demonstrate good reliability among adolescent girls (Jones et al., 2004). In the present sample $\alpha = .87$.

Internalization of the media ideal. Internalization of the media ideal was assessed using the Internalization-general subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-3 (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004). The scale includes 9 items assessing the degree to which participants adopt the media standard of thinness as their own. Items are scored on a five-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with higher scores indicating higher levels of internalization. An example item is “I would like my body to look like the models who appear in magazines.” Previous studies have revealed that the scores from this scale demonstrate good reliability among adolescent girls (Heinicke, Paxton, McLean, & Wertheim, 2007). In the present sample $\alpha = .95$.

Appearance comparison. The Physical Appearance Comparison Scale (Thompson, Heinberg, & Tantleff, 1991) was used to assess physical appearance comparison. The scale includes five items assessing the frequency with which participants compare their physical appearance to that of other individuals in social situations. Items are rated on a 5-point scale

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1 ranging from 1 (*never*) to 5 (*always*), with higher scores indicating greater frequency of
2 appearance comparison. An example item is “In social situations, I compare my figure to the
3 figures of other people.” Previous studies have revealed that the scores from this scale
4 demonstrate good reliability among adolescent girls (Schutz et al., 2002). In the present
5 sample $\alpha = .89$.
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12 **Body dissatisfaction.** Body dissatisfaction was assessed with the 12 items of the
13 Weight and Shape Concern subscales of the Eating Disorders Examination-Questionnaire
14 (Fairburn & Beglin, 1994). Each item is rated on a 7-point scale. Five items assess the
15 frequency of thoughts or feelings over the past 28 days, with ratings ranging from 0 (*no days*)
16 to 6 (*every day*), while seven items assess the intensity of these thoughts and feelings with
17 scores ranging from 0 (*not at all*) to 6 (*markedly*). Higher scores indicate greater levels of
18 weight and shape concerns. An example item is “Have you felt fat?” Previous studies have
19 revealed that the scores from this scale demonstrate good reliability among adolescent girls
20 (Mond et al., 2007). In the present sample $\alpha = .94$ at baseline, $\alpha = .95$ at eight months, and α
21 = .95 at 14 months.
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38 **Dietary Restriction.** Dietary restriction was assessed using the Restraint subscale of
39 the Dutch Eating Behaviors Questionnaire (van Strien, Frijters, Bergers, & Defares, 1986).
40 The 10 items assess extent of deliberate weight control and food restriction and are rated on a
41 5-point scale ranging from 1 (*never*) to 5 (*very often*) with higher scores indicating higher
42 levels of dietary restriction. An example item is “How often do you refuse food or drink
43 because you are concerned about your weight?” Previous studies have revealed that the
44 scores from this scale demonstrate good reliability among adolescent girls (Heinicke et al.,
45 2007). In the present sample was $\alpha = .93$ at baseline, $\alpha = .94$ at eight months, and $\alpha = .94$ at
46 14 months.
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Body Mass Index. BMI was calculated from self-reported height and weight. Self-report is considered reliable and valid in adolescent girls despite a tendency to over-estimate height and under-estimate weight (Himes, Hannan, Wall, & Neumark-Sztainer, 2005).

Procedure

The study was approved by the La Trobe University Human Ethics Committee. Students from participating schools were invited to participate in the study, and girls who provided written parental consent were invited to complete a self-report questionnaire. Data collection was conducted in classroom settings, and supervised by the researchers and a class teacher. Participants could choose to not provide information on height and weight. In addition, if they were unsure of these values, they could choose to weigh themselves privately and record their own weight. Scales were available in a secluded area for participants to do this if they wished.

Data Analysis

To address our first aim of identifying trajectories of body dissatisfaction and dietary restraint over the three time points, we used latent class growth analysis (LCGA), a variant of growth mixture modelling (Jung & Wickrama, 2008; Muthén & Muthén, 2000). LCGA seeks to characterize profiles of individuals by constructing common trajectories. We conducted LCGA analyses in which the variance of the growth estimates was fixed to 0. The latent factor model providing the best fit to the data was determined using the Bayesian Information Criteria (BIC), as well as the Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT) which compared the fit of a given model, against that of a model with $k-1$ classes (Jung & Wickrama, 2008). A final consideration was the relative sizes of the generated classes, in which a rule of thumb is that models with a good fit would generate a solution in which no class contained less than 5% of the full sample (Delucchi, Matzger, & Weisner, 2004). Analyses were conducted using MPLUS 7.11 (Muthén & Muthén, 2013). ANOVAs and

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repeated measures tests were conducted using SPSS 21 to compare class levels on body dissatisfaction and dietary restriction and test change over time. In line with our second aim, to explore how baseline characteristics might influence trajectory membership, we conducted Univariate *F*-tests with post-hoc Bonferroni comparisons to test difference between classes in sociocultural variables at Time 1 (baseline) and at Time 2 (8 months), to explore their respective impact on the trajectory from Time 1 to Time 2, and from Time 2 to Time 3.

Results

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Identification of latent profiles

Fit among the two class (BIC = 2444.64), three class (BIC = 2315.15), four class (BIC = 2283.44), and five class (BIC = 2280.14) models for body image was compared. In conjunction with the examination of the results from the LMR-LRT, and the relative sizes of the profiles generated, the four-latent profile model was selected. The four class model was a significantly better fit compared to the three-class model, LMR-LRT = 45.64, $p = 0.018$. However, the five-class model was not a significantly better fit compared to the four class model, LMR-LRT = 18.84, $p = 0.43$.

The four-latent profile model generated a first class ($n = 112$, 43.2%), that was characterized by low levels of body dissatisfaction across the three time points, and labelled “low body dissatisfaction (BD)” (Figure 1). The second class ($n = 80$, 30.9%) included individuals whose body dissatisfaction started out at an intermediate level at Time 1 and then slowly decreased over time. This profile was labelled “moderate-decreasing.” The third class ($n = 43$, 16.6%), similarly displayed moderate levels of body dissatisfaction at Time 1, however, this class revealed a slow increase over time, and was labelled “moderate-

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1 increasing.” The final class ($n = 24$, 9.3%) displayed constant high levels of body
2 dissatisfaction across time, and was named “high body dissatisfaction.”
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5 All four classes differed in Time 1, Time 2, and Time 3 levels of body dissatisfaction
6 ($p < .001$, see Table 1). Repeated measures tests revealed that the low BD group displayed a
7 significant decrease in body dissatisfaction levels across time, Pillai’s trace = .10, $df = 2$, $p =$
8 .005. Similarly, the moderate-decreasing group revealed a significant decrease over time,
9 Pillai’s trace = .80, $df = 2$, $p = .045$. The moderate-increasing group revealed a significant
10 increase in body dissatisfaction over time, Pillai’s trace = .19, $df = 2$, $p = .027$. The high BD
11 group revealed no change over time, $p = .645$.
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23 **Comparison of predictor levels across classes at Time 1 and Time 2**

24 Findings from the univariate F-test comparing Time 1 levels of the sociocultural predictors
25 revealed significant differences between the four Body Dissatisfaction trajectories on the
26 combined predictors, Pillai’s trace = .933, $df = 5$, $p < .001$ (Table 2). Follow up tests revealed
27 significant differences between classes for all variables. Specifically, post-hoc Bonferroni
28 comparisons, comparing each class to the three others, revealed that teasing and
29 internalization of media ideals differed significantly across all the classes, with increasing
30 values for classes one through four (ps ranging from $< .001$ to .041). Regarding sociocultural
31 pressure and appearance comparison, the low BD class was significantly lower ($p < .001$)
32 than the three other classes, and the high BD class was significantly higher than the other
33 three classes ($p < .001$), however the two moderate classes did not differ from each other ($p =$
34 0.08 and $p = 1.00$ for sociocultural pressure and appearance comparison respectively).
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54 Finally, for fat talk, the low BD and moderate-decreasing classes did not significantly differ
55 from each other ($p = .959$), however the low BD class was significantly lower than the
56 moderate-increasing and the high BD class ($p < .001$). The moderate-increasing and high BD
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did not significantly differ ($p = .46$), however the high BD class was significantly high than the low and moderate-decreasing classes ($p < .001$). A separate ANOVA was run to compare BMI across classes among the subgroup who had provided height and weight. Findings revealed that the low BD class had a significantly lower BMI than the moderate-decreasing class ($p = .035$) and the moderate-increasing and high BD classes ($p < .001$). The moderate-decreasing class, also had a significantly lower BMI than the moderate-increasing class ($p = .027$), and the high BD class ($p < .001$). However, no significant differences ($p = .122$) in BMI emerged between the moderate-increasing class and the high BD class.

The univariate F-test comparing Time 2 levels of the sociocultural predictors revealed significant differences between the four Body Dissatisfaction trajectories on the combined predictors, Pillai's trace = .937, $df = 5$, $p < .001$ (Table 2). Follow-up tests revealed significant differences between classes for all variables. Specifically, post-hoc Bonferroni comparisons revealed that sociocultural pressure levels were significantly different across all classes (ps ranging from $< .001$ to $.021$), with increasing levels in classes 1 through 4. For internalization of media ideals and appearance comparison, the low BD class was significantly lower than the other three classes ($p < .001$ and ps from $.004$ to $< .001$ for internalization and appearance comparison respectively), and the high BD class was significantly higher than the other three classes ($p < .001$ and ps ranging from $.015$ to $< .001$ respectively). However, no differences in internalization of media ideals and appearance comparison were found between the two moderate classes ($p = .795$ and $p = .116$, respectively). For teasing, the low BD class was significantly lower than the three other classes (ps ranging from $.005$ to $< .001$), and the moderate-decreasing class was significantly lower than the moderate-increasing and the high BD classes ($p < .001$). However, these latter two classes did not differ from each other ($p = .076$). For fat talk, the low BD class was significantly lower than the other three (ps ranging from $< .001$ to $.022$): however, the three

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1 other classes did not differ from each other (ps ranging from .094 to 1.00). Findings regarding
2 BMI revealed that the low BD class did not differ in BMI from the moderate-decreasing
3 class ($p = .067$), although it had a significantly lower BMI than the moderate-increasing and
4 high BD classes ($p < .001$). However, the moderate-increasing class and the high BD class did
5 not differ from each other ($p = 1.00$).
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12 In sum, while differences between each of the classes were only found for some
13 sociocultural variables, for the majority there were significant differences between two or
14 three of the classes with the low BD and moderate-decreasing class, tending to reveal lower
15 levels of risk factors than the moderate-increasing and high BD class. This pattern emerged at
16 both time points.
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26 Trajectories of dietary restriction

27 Identification of latent profiles

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29 For dietary restriction, the fit was compared among the two class (BIC = 1875.22),
30 three class (BIC = 1811.36), and four class (BIC = 1804.92) solutions. In conjunction with
31 the examination of the results from the LMR-LRT, and the relative sizes of the profiles
32 generated, the three-latent profile model was selected. The three class model was a somewhat
33 better fit compared to the two-class model, LMR-LRT = 78.98, $p = 0.08$. In addition, the
34 four-class model was not a significantly better fit compared to the four class model, LMR-
35 LRT = 21.79, $p = 0.39$.
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51 The three-latent profile model generated a first class ($n = 128, 49.4\%$), that was
52 characterized by low levels of dietary restriction across the three time points, and labelled
53 “low dietary restriction” (Figure 2). The second class ($n = 88, 34.0\%$) included individuals
54 whose dietary restriction was moderate but stable across time, labelled “moderate dietary
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restriction.” A third group ($n = 43$, 16.6%), displayed high and slowly increasing levels of dietary restriction, and was labelled “high dietary restriction.”

All three classes differed in Time 1, Time 2, and Time 3 levels of dietary restriction (see Table 3; $p < .001$). Repeated measures tests revealed that the low dietary restraint group displayed a significant decrease in levels across time, Pillai’s trace = .098, $df = 2$, $p = .003$. In contrast, the high dietary restriction group revealed a significant increase over time, Pillai’s trace = .209, $df = 2$, $p = .015$. However, the moderate dietary restriction group revealed no change over time, $p = .170$.

Comparison of predictor levels across classes at Time 1 and Time 2

Findings from the univariate F-test comparing Time 1 levels of the sociocultural predictors revealed significant differences between the three Dietary restriction trajectories on the combined predictors, Pillai’s trace = .99, $df = 6$, $p < .001$. Follow-up tests revealed significant differences between classes for all variables. Specifically, post-hoc Bonferroni comparisons revealed that teasing, internalization of media ideals, sociocultural pressure, and body dissatisfaction differed significantly across all the classes, with increasing values from class one through class three (see Table 2; ps ranging from $<.001$ to $.048$). Appearance comparison, and fat talk were significantly lower for the low compared to the moderate dietary restraint class ($p < .001$): however, no differences were found between the moderate and high dietary restriction classes ($p = .164$ and $p = 1.00$ for appearance comparison and fat talk respectively). A separate ANOVA was run to compare BMI across classes among the subgroup who had provided height and weight. Finding revealed that the low class reported a significantly lower BMI than the moderate class ($p < .001$): however, no differences emerged in terms of BMI between the moderate and high class ($p = .062$).

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The univariate F-test comparing Time 2 levels of the sociocultural predictors revealed significant differences between the 3 three dietary restriction trajectories on the combined predictors, Pillai's trace = .919, $df = 6$, $p < .001$. Follow-up tests revealed significant differences between classes for all variables. Specifically, post-hoc Bonferroni comparisons revealed that sociocultural pressure, teasing, and body dissatisfaction levels were significantly different across all classes with increasing levels across classes 1 through 3. For internalization of media ideals, appearance comparison, and fat talk the low class reported significantly lower levels compared to the moderate dietary restriction class (ps ranging from $< .001$ to $< .002$). However, no differences were found between the moderate and high class ($p = .589$, $p = .122$, and $p = .266$ for internalization of media ideals, appearance comparison, and fat talk, respectively). Regarding BMI, findings revealed that the low dietary restraint class reported a significantly lower BMI than the moderate dietary restraint class ($p < .001$). However no differences emerged in terms of BMI between the moderate and high classes ($p = .099$).

To summarize, the three classes differed in levels of many of the sociocultural risk factors with a patten emerging in which the low dietary restriction class displayed lower levels of risk factors compared to the moderate dietary restriction class, which in turn displayed lower levels compared to the high dietary restriction class. These patterns were similar across both time points.

Discussion

The aim of the present study was to investigate longitudinal patterns of development of body dissatisfaction and dietary restriction in early adolescent girls over a 14 month period, and the role of sociocultural influences in shaping these patterns. Overall, our findings suggest that high or low risk status in terms of body dissatisfaction and dietary restriction is already established and somewhat stable by 13 years old, with a subgroup already displaying

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consistently high levels of concerns. Furthermore, sociocultural factors are able to distinguish between trajectories and seem to play a role in the maintenance of high levels of concerns.

Our findings revealed that the course of body dissatisfaction and dietary restraint over time was relatively stable at the class level, particularly so for dietary restraint, such that individuals presenting with high levels at the first assessment point maintained these levels over the course of the 14 months, and those with initially low levels increased little. These findings are consistent with other reports that the overall mean in body dissatisfaction increases only slightly among female adolescents and might increase more in early adulthood (Rohde et al., 2014). Similarly over early adolescence, dieting has been found to decrease slightly when considering group trends before increasing in later adolescence (Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011; Rohde et al., 2014). The patterns of body dissatisfaction in the current study suggest that body dissatisfaction may develop prior to early adolescence in girls. This suggestion is consistent with findings among children which have demonstrated the presence of body dissatisfaction among 8 year old girls (Ricciardelli & McCabe, 2001). Further work aiming to identify the period and risk factors leading to the development of the high body dissatisfaction trajectory among this subgroup of girls is warranted. Furthermore, interventions that aim to prevent or decrease body dissatisfaction would likely have a high impact when targeting early or preadolescents (Ross, Paxton, & Rodgers, 2013).

Regarding body dissatisfaction, the low BD class and the moderate-decreasing class both described low risk decreasing trajectories of body image concerns. The moderate-increasing trajectory described an upward course of body image concerns, while the high BD class included individuals with consistently high levels of body dissatisfaction. Notably, these levels were higher than the suggested cut off of 4 for clinically significant levels of body dissatisfaction using the eating disorder examination questionnaire (Carter, Stewart, &

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Fairburn, 2001). While only a small proportion of girls were included in this high consistent class (9.27%) this remains an important finding with a view to targeted prevention.

Sociocultural pressure, internalization of media ideals, and appearance comparison distinguished the high level trajectory from the moderate-increasing one at both time points, suggesting that these sociocultural variables might be associated with the maintenance of high levels of body dissatisfaction. Previous work examining the prospective relationships between sociocultural pressures and body dissatisfaction has been divergent (e.g., Clark & Tiggemann, 2008; Field et al., 2001; Helfert & Warschburger, 2011). The present findings suggest that this might stem from the fact that while sociocultural pressures are associated with present levels of concerns, and thus their maintenance, they may not exert a distal effect or predict changes over time. Similarly, the association between media internalization and body dissatisfaction has been previously described in early adolescent girls (Clark & Tiggemann, 2008), and frequently reveals moderate to strong associations with body dissatisfaction cross-sectionally in pre-adolescents with effect sizes of $r = .50$ to $r = .60$ (Clark & Tiggemann, 2008; Ross et al., 2013). Furthermore, it has been shown that, like body dissatisfaction, media internalization shows only a slight increase during the adolescent period (Rohde et al., 2014). Taken together, these findings provide some support for the idea that the internalization of media ideals may act as a maintenance factor in this age group.

Regarding appearance comparison, as previously stated, empirical examinations are scarce: however, transdiagnostic models of eating pathology have suggested that appearance comparisons might contribute to maintenance of symptomatology (Fairburn, 2008). The present findings provide some preliminary support for that view. Further investigations of the role of sociocultural pressure, internalization of media ideals and appearance comparison in the maintenance of body dissatisfaction are warranted.

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Levels of teasing were also significantly different between the moderate-decreasing and the moderate-increasing trajectories of body dissatisfaction at both time points, suggesting that levels of teasing may be predictive of changes in body dissatisfaction over time. Weight-related teasing has also emerged as an important prospective predictor of disordered eating and decreased emotional health in adolescents (Eisenberg, Neumark-Sztainer, & Wall, 2006; Haines et al., 2006). Limiting weight-based teasing in settings such as schools is thus clearly an important issue. Interestingly, while BMI was only available for a subsample of participants, it also varied significantly between the moderate-decreasing and moderate-increasing groups, but not between the moderate increasing and high BD group. This pattern emerged at both time points, suggesting that it might also play an important role in the course of body dissatisfaction. Given the emphasis on slenderness in social representations of the female ideal (Thompson et al., 1999), it is unsurprising that BMI should play such a role. However, it is also to be expected that girls might gain weight around this age, therefore the role of BMI in increasing body dissatisfaction is concerning.

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Regarding dietary restriction, three trajectories were described, a low and decreasing pattern, a moderate stable pattern, and a high increasing pattern. Sociocultural pressure, teasing, and body dissatisfaction varied between the three trajectories at both time points, and distinguished the high increasing trajectory from the moderate stable one. The finding for sociocultural pressure is similar to that regarding its role in the maintenance of body dissatisfaction and suggests that the sociocultural environment might have a more immediate, rather than distal, effect on disordered eating. Similarly, body dissatisfaction emerged as being related to present levels of dietary restraint. In contrast, appearance comparison, fat talk, and BMI levels did not differ between the moderate stable pattern and the higher increasing one at both time points, suggesting these factors may perhaps not predict increases in dietary restriction. The effects of appearance comparison on dietary restraint may be

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1 mediated by body dissatisfaction, as supported by cross-sectional research (Rodgers, Chabrol,
2 & Paxton, 2011) which might explain this finding. The fact that BMI did not vary
3 significantly between these two patterns, in contrast to body dissatisfaction, provides further
4 evidence for the fact that it is the subjective experience of one's body shape and weight that
5 is more closely related to dietary restraint (Paxton, Eisenberg, & Neumark-Sztainer, 2006).
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12 The present findings have both theoretical and practical implications. In relation to
13 theory, findings provide further evidence for the fact that a subgroup of high-risk individuals
14 already display clinically significant levels of body image and eating concerns by early
15 adolescence, and are somewhat stable at this period (Colautti et al., 2011). Thus, the
16 emergence of these problems must predate early adolescence. Further identification of the
17 factors leading to this increase as well its timing is critical. In addition, our findings provide
18 further longitudinal support for sociocultural theories of the development and maintenance of
19 body image and eating concerns. Specifically, our findings support the role of sociocultural
20 pressure and teasing as predictors of increases in body dissatisfaction and dietary restriction
21 (Cafri et al., 2005, Thompson et al., 1999). Furthermore, they provide further evidence for the
22 role of media internalization, and importantly, for appearance comparison as a critical
23 variable in body dissatisfaction among early adolescent girls.
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43 Regarding clinical implications, our findings provide further evidence of the
44 usefulness of targeting early adolescent females in prevention interventions (Rohde et al.,
45 2014). While this group has been identified as an important target for prevention, existing
46 resources are rare (Bird, Halliwell, Diedrichs, & Harcourt, 2013; Ross et al., 2013), and much
47 of the larger scale dissemination work has occurred in later adolescence or college aged
48 participants (Marchand, Stice, Rohde, & Becker, 2011). In addition to targeting this younger
49 age group, our findings suggest that targeting sociocultural pressure and appearance
50 comparison is an important component of interventions that aim to decrease body
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1 dissatisfaction, and indeed programs addressing appearance comparison have been shown to
2 be successful (Gollings & Paxton, 2006; Heinicke et al., 2007; Paxton, McLean, Gollings,
3 Faulkner, & Wertheim, 2007; Richardson & Paxton, 2010). Given the role of sociocultural
4 influences, points in time when sociocultural groups change and early adolescents enter new
5 environments might represent important junctures. Finally, our findings suggest that targeting
6 teasing is also likely to be an important aspect of preventing increases in body image and
7 eating concerns in early adolescent girls.
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18 Our study has a number of limitations. First, as previously mentioned, the provision of
19 height and weight information was optional in our study due to the sensitivity of this
20 information, which limited our examination of BMI as a predictor. Second, the sample size
21 was somewhat small (although comparable to other studies) which may have limited our
22 capacity to identify longitudinal patterns, and detect significant effects. In addition, it would
23 have been interesting to explore sociocultural pressures from different sources separately so
24 as to identify the differential effects of media, parental, and peer influences in this age group.
25 Finally, a methodological limitation may also lie in the fact that our data are taken from the
26 assessment-only control group of an intervention trial, and students who were invited to
27 participate in the study were aware that they had been assigned to the control group, which
28 may have biased the sample.
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45 In conclusion, our study addresses the gap in the literature regarding prospective
46 studies of the course of body dissatisfaction and dietary restriction in early adolescents, and
47 our findings provide support for sociocultural theories of the development of body image and
48 eating concerns, and suggest that interventions developed for early female adolescents would
49 be helpful and appropriate. Future work should focus on examining the course of these
50 concerns among even younger groups, and developing successful interventions for young
51 girls.
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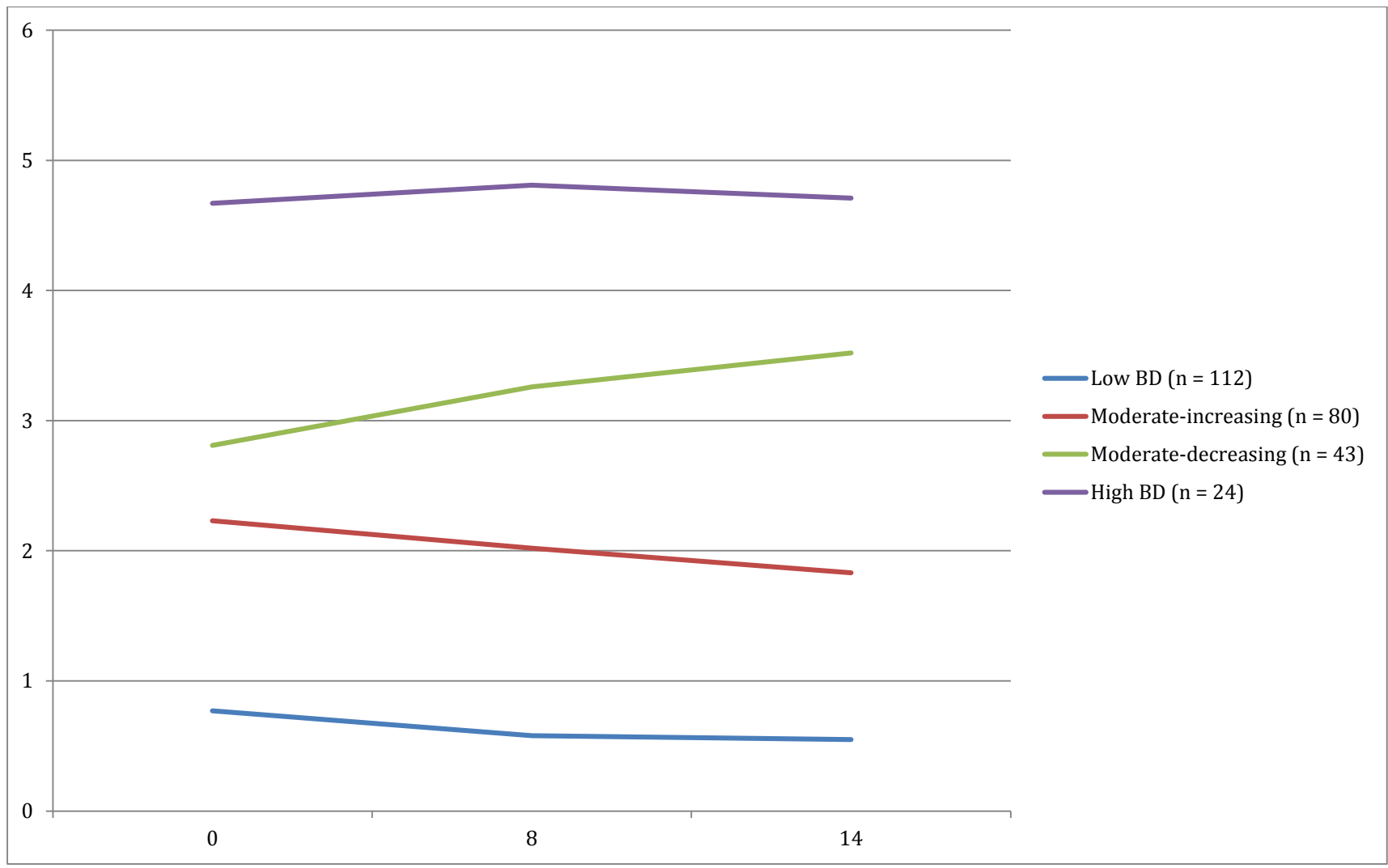
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Trajectories of Body Image

Figure 1: Trajectories of body image



Trajectories of Body Image

Figure 2: Trajectories of dietary restriction

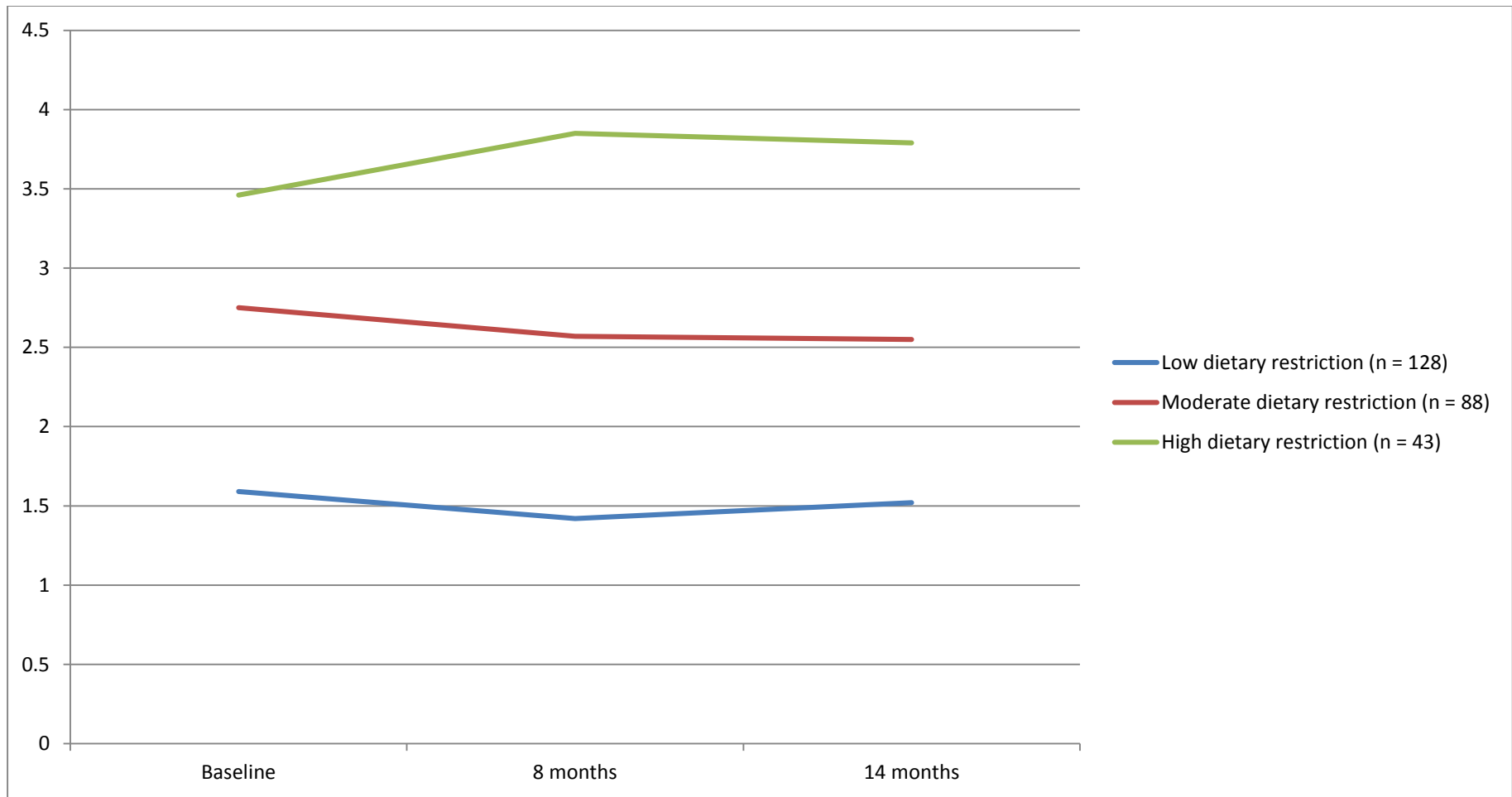


Table 1:

Means for Body Dissatisfaction and Dietary Restriction Classes across Time

	Body dissatisfaction means (SD)				Dietary restriction means (SD)		
	Low BD	Moderate-decreasing	Moderate-increasing	High BD	Low dietary restriction	Moderate dietary restriction	High dietary restriction
Time 1	0.77 (0.68) ^a	2.23 (1.06) ^b	2.81 (1.04) ^c	4.67 (1.06) ^d	1.59 (0.54) ^a	2.75 (0.78) ^b	3.46 (0.79) ^c
Time 2	0.58 (0.47) ^a	2.02 (0.83) ^b	3.26 (0.75) ^c	4.81 (0.52) ^d	1.42 (0.39) ^a	2.57 (0.59) ^b	3.85 (0.54) ^c
Time 3	0.55 (.47) ^a	1.83 (0.67) ^b	3.52 (0.63) ^c	4.71 (0.71) ^d	1.52 (0.52) ^a	2.55 (0.56) ^b	3.79 (0.56) ^c

Note: identical letters indicate consecutive values that were not significantly different

Trajectories of Body Image

Table 2:

Comparison of means for sociocultural variables at Time 1 and Time 2 between Body Image classes

	Time 1				Time 2			
	Mean (SD)				Mean (SD)			
	Low BD	Moderate- decreasing	Moderate- increasing	High BD	Low BD	Moderate- decreasing	Moderate- increasing	High BD
Sociocultural pressure	1.25 (0.39) ^a	1.60 (0.59) ^b	1.89 (0.81) ^b	2.69 (0.97) ^c	1.23 (0.37) ^a	1.63 (0.61) ^b	1.97 (0.74) ^c	2.78 (1.07) ^d
Teasing	1.63 (2.19) ^a	1.73 (0.78) ^b	2.11 (0.83) ^c	3.10 (1.13) ^d	1.32 (0.45) ^a	1.69 (0.64) ^b	2.33 (0.99) ^c	2.82 (1.37) ^c
Internalization of media ideals	15.91 (7.01) ^a	22.81 (8.41) ^b	22.79 (8.66) ^c	29.09 (10.48) ^d	15.31 (6.91) ^a	20.97 (8.58) ^b	23.22 (7.85) ^b	31.53 (7.02) ^c
Appearance comparison	10.07 (3.94) ^a	13.32 (4.14) ^b	13.81 (3.96) ^b	19.59 (3.36) ^c	10.59 (4.05) ^a	12.95 (5.06) ^b	15.05 (4.59) ^b	18.91 (5.15) ^c
Fat talk	1.86 (0.81) ^a	2.03 (0.86) ^a	2.43 (0.81) ^b	2.83 (0.94) ^b	1.76 (0.83) ^a	2.16 (0.99) ^b	2.39 (0.81) ^b	2.99 (1.11) ^b
BMI (193)	18.28 (2.61) ^a	19.80 (2.96) ^b	21.78 (4.04) ^c	24.03 (4.51) ^c	18.76 (2.63) ^a	20.27 (3.00) ^a	23.05 (4.62) ^b	24.24 (4.69) ^b

Note: identical letters indicate consecutive values that were not significantly different

Trajectories of Body Image

Table 3:

Comparison of Sociocultural variables at Time 1 and Time 1 between Dietary Restriction classes

	Time 1			Time 2		
	Low dietary restriction	Moderate dietary restriction	High dietary restriction	Low dietary restriction	Moderate dietary restriction	High idietary restriction
Sociocultural pressure	1.31 (0.48) ^a	1.63 (0.64) ^b	2.33 (0.96) ^c	1.31 (0.46) ^a	1.69 (0.68) ^b	2.32 (0.96) ^c
Teasing	1.37 (0.56) ^a	1.90 (0.89) ^b	2.45 (1.09) ^c	1.44 (0.62) ^a	1.84 (0.89) ^b	2.63 (1.09) ^c
Internalization of media ideals	17.05 (7.84) ^a	22.31 (8.77) ^b	26.17 (9.33) ^c	16.42 (7.47) ^a	23.37 (9.47) ^b	24.44 (80.37) ^b
Appearance comparison	10.90 (4.47) ^a	13.59 (4.40) ^b	15.24 (4.78) ^b	11.10 (4.66) ^a	13.76 (5.14) ^b	15.68 (4.96) ^b
Fat talk	1.80 (0.78) ^a	2.32 (0.87) ^b	2.47 (0.96) ^b	1.81 (0.94) ^a	2.28 (0.94) ^b	2.58 (0.89) ^b
Body dissatisfaction	1.06 (0.95) ^a	2.38 (1.34) ^b	3.40 (1.42) ^c	0.94 (0.97) ^a	2.36 (1.30) ^b	3.50 (1.26) ^c
BMI (n = 193)	18.32 (2.50) ^a	20.75 (3.43) ^b	22.37 (4.67) ^b	18.88 (.2.59) ^a	21.35 (3.69) ^b	22.97 (5.00) ^b

Note: identical letters indicate consecutive values that were not significantly different

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