

Increases in Emotional Eating During Early Adolescence and Associations With Appearance Teasing by Parents and Peers, Rejection, Victimization, Depression, and Social Anxiety

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Abstract

Emotional eating, defined as eating in response to affect, may increase during early adolescence, a time of heightened emotionality and increased prevalence of emotional disorders. We investigated change in emotional eating, while also testing the influence of social-emotional risk factors. Study participants ($N = 379$, mean age [M_{age}] = 12.0 years; 56% girls) completed measures of emotional eating twice over 1 year and reported on social adversity within peer and parent contexts (i.e., appearance teasing by peers and parents, and peer rejection) and depression and social anxiety symptoms. Relational victimization and peer rejection, measured via classmate-reports, were also examined as correlates of emotional eating. Emotional eating increased, on average, for Grade 6 and 7 students,

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marginally increased in Grade 5 students, and increased in boys and girls. In a multivariate prospective model, appearance teasing by parents and social anxiety symptoms were prospectively associated with a higher level of emotional eating 1 year later.

Keywords

emotional eating, peer relationships, social risk, depression, social anxiety

Emotional eating is typically defined as eating in response to affect, with most theories and measures emphasizing *overeating* in response to *negative* affect (Bruch, 1975, 1997; Ganley, 1989). Emotional eating is often considered a form of disordered eating, given that it has been linked with poorer food choices and preferences, binge eating (Zeeck, Stelzer, Woolfgang Linster, Joos, & Hartmann, 2010), and higher body mass index (BMI) (Konttinen, Männistö, Sarlio-Lähteenkorva, Silventoinen, & Haukkala, 2010; Péneau, Ménard, Méjean, Bellisle, & Hercberg, 2013). By adolescence, overeating in response to emotion is relatively common, particularly among girls (Jääskeläinen et al., 2014), with clear patterns emerging of heightened vulnerability to emotional overeating in some individuals compared with others (Greeno & Wing, 1994). In addition, comparing across studies, emotional eating appears to be more elevated among middle-to-late adolescents (van Strien, Snoek, van der Zwaluw, Carmen, & Engels, 2010a; van Strien, van der Zwaluw, Carmen, & Engels, 2010b) relative to children (Herle, Fildes, Rijdsdijk, Steinsbekk, & Llewellyn, 2018; Steinsbekk, Barker, Llewellyn, Fildes, & Wichstrøm, 2018). Yet, there has been very little prospective research on risk factors, especially those amenable to change, for the development of emotional eating in the early years of adolescence, an age period when increases in emotional eating might occur frequently. Such research is needed to guide the design of interventions that hope to reduce the risk of disordered eating, overweight, and obesity in youth. The aim of this study was to identify the unique risk of social adversity and internalizing symptoms for increasing emotional eating among young adolescents, attending to similarities and differences between boys and girls.

Our focus on social adversity and internalizing symptoms as risks for emotional eating were founded on psychosomatic theory (Bruch, 1975; Ganley, 1989; Kaplan & Kaplan, 1957), affect regulation models (e.g., Hawkins & Clement, 1984; McCarthy, 1990; Telch, 1997), and escape theory (Heatheron & Baumeister, 1991). Psychosomatic theory and affect regulation models propose that emotional eating is the result of inadequate affect

regulation processes, whereby individuals have learned that eating alleviates negative affect (see Spoor, Bekker, van Strien, & van Heck, 2007). Consistent with these notions, escape theory posits that emotional eating is enacted to escape or divert attention away from aversive self-awareness and subsequent negative affect (see Spoor et al., 2007). Thus, common to each of these theories is the use of food to avoid or reduce negative affect, with escape theory also incorporating diversion from negative self-appraisal as a reason for emotional eating. This directly implicates internalizing symptoms, namely depressive and anxiety symptoms, as risk factors for heightened emotional eating, but also suggests that social experiences that spark negative affect may be risks for emotional eating.

There is some evidence to support these theoretical models for understanding disordered eating and weight gain. For example, in support of psychosomatic theory and affect regulation models, several studies have found that an increase in manipulated negative affect is associated with increased eating in normal-weight and obese adult emotional eaters (e.g., Oliver, Wardle, & Gibson, 2000; van Strien & Ouwens, 2003). Furthermore, depression and anxiety symptoms have been concurrently linked with higher emotional eating among adults (e.g., Ostrovsky, Swencionis, Wylie-Rosett, & Isasi, 2013; van Strien, Kontinen, Homberg, Engels, & Winkens, 2016) and adolescents (e.g., Goossens, Braet, Van Vlierberghe, & Mels, 2009; Nguyen-Rodriguez, McClain, & Spruijt-Metz, 2010). We could not locate a previous prospective study of emotional eating and depression and anxiety symptoms in young adolescents; however, one prospective study found that adolescents' depressive symptomology (mean age [M_{age}] = 13.4 years) was positively associated with emotional eating 4 years later, but this association was not significant when controlling for baseline emotional eating and gender (van Strien, Snoek, et al., 2010a).

The possibility that adversity would be a risk for emotional eating has been examined in some past cross-sectional research with adolescents (Nguyen-Rodriguez, Chou, Unger, & Spruijt-Metz, 2008) and adults (Sims et al., 2008). Yet, we argue that it would be even more relevant to focus on *social or interpersonal adversity*, as it has been theorized that it is experienced as particularly aversive, especially among adolescents, as indicated by the risk posed to various indices of maladjustment including mood disturbance and disordered eating (Auerbach, Bigda-Peyton, Eberhart, Webb, & Ho, 2011; Eisenberg & Neumark-Sztainer, 2008; Vartanian, Smyth, Zawadzki, Heron, & Coleman, 2014). Interestingly, we could locate only four studies that had examined social adversity as a correlate or predictor of adolescent emotional eating, with some studies focused on family relationships and others focused on peer relationships.

First, in a diary study of early adolescents ($M_{\text{age}} = 12.4$ years), daily variations in parental rejection were significantly and positively associated with variations in emotional eating, while peer rejection showed a marginally significant positive association with emotional eating (Vandewalle, Mabbe, Debeuf, Braet, & Moens, 2017a). In two studies of adolescents ($M_{\text{age}} = 13.2$ years and 13.6 years), maternal rejection was associated with more emotional eating assessed by self-reports (Vandewalle, Moens, & Braet, 2014) and by a laboratory paradigm (Vandewalle, Moens, Bosmans, & Braet, 2017b). In a final study that examined teasing about weight specifically, weight-related teasing by parents and by peers was concurrently and positively associated with emotional eating in early adolescents ($M_{\text{age}} = 11.1$ years; Olvera, Dempsey, Gonzalez, & Abrahamson, 2013).

Past research also demonstrates some notable sex effects of relevance to this study. In a sample of adolescents, stress-driven eating was more prevalent in girls compared with boys (Jääskeläinen et al., 2014), and similarly, emotional eating in adults has been found to be higher among women than men (Larsen, van Strien, Eisinga, & Engels, 2006). Accordingly, the final aim of the study was to examine gender differences in adolescent emotional eating. Building further on this, however, are the findings that depression and anxiety are typically more elevated in adolescent girls compared with boys (Bender, Reinholdt-Dunne, Esbjørn, & Pons, 2012; Hankin et al., 2015), yet these emotional symptoms are associated with poorer outcomes (including lower well-being, self-esteem and psychosocial functioning, and more academic problems) in adolescent boys compared with girls (Derdikman-Eiron et al., 2011). Given these findings, we also examined whether gender interacted with any risks posed by social adversity, depression, and social anxiety for subsequent emotional eating.

In summary, despite emerging evidence for social adversity (both with the family and with peers, and both general and specific to weight) and internalizing symptoms as risks for adolescents' emotional eating, it is unclear what type of adversity might be most relevant, whether both social adversity and symptoms have unique effects on emotional eating, and perhaps most importantly, whether adversity and internalizing symptoms are each unique risk factors explaining increases in emotional eating over time. The purpose of this study was to test social adversity and internalizing symptoms as risk factors for an increase in emotional eating. We measured social adversity using both self-report and peer-report to capture a range of indicators of peer and parent teasing, and peer victimization and rejection, and assessed internalizing symptoms as depression and social anxiety. It was expected that teasing about appearance, poorer peer relationships, and emotional vulnerabilities in the forms of depressive and social anxiety symptoms would be associated

with heightened emotional eating, both concurrently and prospectively. We also investigated sex differences and sex moderation, testing whether there were significant interactions of risk factors with sex, on emotional eating. It was expected that girls would report higher levels of emotional eating than boys, but no a priori hypotheses were made regarding sex moderation of risks for emotional eating.

Method

Participants

Participants were 379 (56% female) Australian students in Grade 5 (26%), Grade 6 (32%), or Grade 7 (42%) who participated in the first four waves of a longitudinal study with a 6-month lag between assessments. All students attended one of three participating schools. At Time 1 (T1), participants were 10–13 years of age ($M_{\text{age}} = 12.0$, $SD = 0.90$; with two students of age 9 years and one student of age 14 years at T1), and endorsed White/Caucasian (80%), Asian (15%), Australian first peoples or Pacific Islander (1%), or a range of other sociocultural backgrounds (4%). The average BMI of the students, measured by research assistants at T1, was 18.45 ($SD = 2.94$) with a range from 11.89 to 28.41. Overall, 85% had married parents, whereas 15% of parents were divorced, separated, or widowed. About 49% of parents had some university education, 21% reported no education beyond high school, and the remaining parents (30%) reported some technical or other training beyond high school. The full possible sample included 398 students, but 11 participants were not included because they did not report emotional eating in any wave, and another eight were removed because they did not provide demographic information.

To consider representative of the students included in this study, we describe here publicly available school and regional demographic information. It is important to note that questions regarding birth country and language spoken at home are often asked in Australia instead of the questions about race/ethnicity asked of students in our study. The schools from which the students were drawn report that their student population (all grades) is approximately 52% boys, with 1% Australian first peoples or Pacific Islander, and about 20% speaking a language other than English at home. The schools report that 10% of students are in the lowest income quartile, 61% are in the middle two income quartiles, and 29% are in the highest income quartile.

A demographic survey in the region where the study was conducted reports that 64% of adults were born in Australia, 1.7% endorsed Australian

first peoples or Pacific Islander, 17% of adults had a university degree (18% Year-12 high school maximum, 12% Year-10 high school maximum, with 53% reporting some education beyond high school), and 45% were married. Overall, it appears that our study participants may have slightly more girls than in the school population, but was representative otherwise. In comparison to the region, the students in this study seemed to have had parents who were more educated, which was likely also reflected in the distribution of income levels in the schools. Students had a higher proportion of married parents than in the adult population in the region, but this would likely be the result of including only adults who have children.

Procedure

This study was drawn from the first four waves of an ongoing longitudinal study on adolescent socioemotional functioning. Emotional eating was only measured in the first four waves. Study approval from the Griffith University Human Research Ethics Committee was obtained and local schools were contacted. The first three consenting schools were permitted to participate. All students were eligible to participate, and students took consent forms home to their parents for completion and returned them to the school. Some parents (16%) declined participation, and 42% of students failed to return forms and could not participate. Participant assent was obtained for both survey completion and height and weight measurements. Participants completed paper-and-pencil surveys in one of their classrooms, and to ensure confidentiality, researchers monitored participants, ensured empty seats separated all children, and ID codes were used instead of names. Across the study and for convenience, schools sometimes selected to merge groups of students from multiple classrooms into single rooms for data collection. Height and weight measurements were taken after survey completion in an adjoining private space, one student at a time. The portions of the questionnaire included in this study were completed in approximately 30 min.

To reduce the time burden on schools and participants involved in this research, abbreviated measures were employed and a planned missingness design was used (Little, Jorgensen, Lang, & Moore, 2014). A small set of measures was administered to only 50% of participants at any single time of measurement. In this study, emotional eating items were administered to 50% of the sample at each time. Thus, emotional eating was collected at Time 1 (T1) and 1 year later at Time 3 (T3) for about 50% of participants and at Time 2 (T2) and Time 4 (T4) for the other 50%. T1 data collection began in the third month of the school year (April), with data then collected

every 6 months. We merged T1 and T2 data and we merged T3 and T4 data to create two waves of measurement to yield scores on emotional eating for each participant and refer to the merged data from Times 1 and 2 as Wave 1 (W1), and the merged data from Times 3 and 4 as Wave 2 (W2). For all other measures, we averaged T1 and T2 scores together to create scores for W1 to use as predictors of emotional eating. We control for the timing of first collection of emotional eating (either T1 or T2) in all analyses and refer to this variable as *cohort*.

Regarding representative of the students, the three schools from which students were drawn report that 10% of their student population is in the lowest quartile of Australian income, 60% are in the middle two quartiles, and 30% are in the highest quartile.

W1 and W2 Measures

Emotional eating. Five items from the emotional eating subscale of the Dutch Eating Behavior Questionnaire (DEBQ; van Strien, Frijters, Bergers, & Defares, 1986) were used to assess emotional eating. The DEBQ has previously been successfully used with adolescents (e.g., Calzo, Austin, & Micali, 2018; Wardle et al., 1992). All items focused on eating or wanting to eat under the condition of emotional discomfort. An example item is “Do you have a desire to eat when you are bored?” (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, and 5 = *very often*). Total scores were formed by averaging all items, and Cronbach’s α was .85 at W1 and .87 at W2.

W1 Self-Report Measures

Peer appearance teasing. Three items derived from the Weight Teasing Subscale of the Perceptions of Teasing Scale (POTS; J. K. Thompson, Cattarin, Fowler, & Fisher, 1995) were used to assess appearance teasing from peers. This measure has been used previously in adolescents (Webb, Zimmer-Gembeck, & Donovan, 2014). An example item is “Do people your age (your PEERS) make fun of you because of your weight or looks?” Participants rated the frequency of teasing from their peers (1 = *never* and 5 = *very often*), and items were averaged to form the total appearance teasing by peers score. Cronbach’s α was .84.

Parent appearance teasing. One item modified from the Weight Teasing Subscale of the POTS (K. A. Thompson et al., 1995) was used to measure appearance teasing by parents. The item was “Do your parents tease you about your weight and looks?” (1 = *never* and 5 = *always*).

Peer-reported relational victimization. Five items drawn from the Children's Social Behavior Scale (Crick & Grotpeter, 1995) were used to assess peer-reported relational victimization. Students nominated up to three classmates who best fit five behavioral descriptors reflecting victimization (e.g., "Who in your grade is ignored on purpose?," "Who is made fun of by others in your grade," and "Who do students often say mean things about behind their back?"). Nominations were received from 97.7% of participants and all received nominations were utilized. All classmates could be nominated, regardless of participation. Nominations received by each participating student for each item were summed and then standardized within classrooms to adjust for unequal class sizes. These standardized scores for items were then averaged to form a total relational victimization score for each participant. Cronbach's α was .88.

Perceived peer rejection. Participants completed one item: "How much do you feel that other kids in your school like you?" (1 = *not at all* and 5 = *very much*). This item was reversed to represent perceived peer rejection.

Peer-reported rejection. Each participant rated how much he or she liked each of their classmates (1 = *not at all* and 5 = *very much*). Classmates' responses were averaged to form a peer-reported acceptance score for each participant. This item was reversed to represent perceived peer rejection.

Depressive symptoms. The complete 13-item Mood and Feelings Questionnaire (Angold & Costello, 1987) was developed for children and used to measure symptoms of depression. Participants indicated on a 5-point scale the extent to which items were true over the previous 2 weeks (1 = *not true* and 5 = *very true*). An example item is "I felt miserable or unhappy." Averaging all items formed the total score and Cronbach's α was .92.

Social anxiety symptoms. The complete 18-item Social Anxiety Scale for Children—Revised (La Greca & Stone, 1993) was used to assess symptoms of social anxiety. An example item is "I worry about doing something new in front of others." Participants indicated on a 5-point scale how much they felt each statement was true for them (1 = *not true* and 5 = *very true*). Averaging all items formed the total score and Cronbach's α was .92.

BMI. After completing the first survey, height and weight were measured for each participant (in private) by trained researchers at each school. A laser distance measuring device was used to measure students' height in centimeters, and a Seca digital scale was used to measure students' weight in

kilograms. Each measurement was taken twice, with the average of the two measurements used to calculate BMI as weight (kg)/height (m²). Raw BMI scores were converted to age- and sex-specific BMI percentiles (see <https://www.cdc.gov/healthyweight/bmi/calculator.html>); the raw BMI and the BMI percentile were correlated at $r = .92$.

Overview of the Data Analyses

Less than 5% of the data were missing for the 379 students included in analyses, and Little's Missing Completely At Random (MCAR) test indicated that the data were missing completely at random ($\chi^2 = 117.93$, $df = 118$, $p = .485$). As such, multiple imputation was employed to replace missing data and we imputed 20 complete datasets. Mean scores (M), standard deviations (SD), and correlations between all variables were then calculated and pooled values across the 20 datasets are reported. A paired samples t test between W1 and W2 emotional eating was conducted for the total sample and for subgroups by grade and gender. Independent groups t tests were used to compare boys and girls on all measures.

Given that some measures were nested with classroom, we first used multi-level modeling to estimate the variance explained by classroom. The intraclass correlation coefficient (ICC) was .014. Given that .014 is below the .05 criterion for using multilevel modeling to account for higher level factors, we used standard multiple regression as our primary analysis method (Heck, Thomas, & Tabata, 2014).¹ Thus, we fit a regression model to test whether social adversity risk factors (self-reported and peer-reported peer acceptance, peer-reported relational victimization, self-reported appearance teasing by peers and parents), depression and social anxiety symptoms, and covariates were prospectively associated with emotional eating at W2, controlling for emotional eating at W1. The covariates included participant sex, Grade levels (5, 6, or 7), BMI percentile, and cohort (a dummy variable indicating when participants first completed the measure of emotional eating; 0 = T1, 1 = T2). All social adversity risk factors, depression and social anxiety symptoms, and covariates (grade, sex, BMI percentile, and cohort) were entered into the models simultaneously. We also examined whether associations of social adversity risk and depression and social anxiety symptoms with emotional eating differed according to gender.

Results

Mean Scores, Standard Deviations, and Correlations

Mean scores (M), standard deviations (SD), and correlations between variables are presented in Table 1. When mean levels of all variables were compared

between girls and boys (also shown in Table 1), girls reported significantly more emotional eating, were rated as less rejected by peers, and reported significantly higher levels of depression and social anxiety symptoms relative to boys.

Emotional eating at W1 was associated with all social adversity measures except those that were reported by peers (peer rejection and relational victimization). Emotional eating at W2 was associated with more teasing by peers and parents about appearance. Both W1 and W2 emotional eating were associated with more depression and social anxiety symptoms. Regarding the covariates, grade was positively associated with self-report of rejection, peer teasing about appearance, and depressive and social anxiety symptoms. Those with a higher BMI percentile reported more appearance teasing by peers and parents, as well as more depressive symptoms. Participant cohort had a small association with social anxiety symptoms.

Change in Emotional Eating

The average level of emotional eating increased significantly from W1 ($M = 2.01$, $SD = .86$) to W2 ($M = 2.24$, $SD = .96$), paired $t = -4.38$, $p < .001$, $d = .24$. Emotional eating increased for those who first participated in Grade 6 ($M_{\text{age}} = 11.8$ years; W1 $M = 1.90$, W2 $M = 2.18$; paired $t = -3.16$, $p = .002$, $d = .30$) and Grade 7 ($M_{\text{age}} = 12.8$ years; W1 $M = 2.13$, W2 $M = 2.35$; $t = -2.80$, $p = .005$, $d = .23$), but the increase in emotional eating for Grade 5 students was only marginally significant ($M_{\text{age}} = 10.9$ years; W1 $M = 1.94$, W2 $M = 2.12$; $t = -1.67$, $p = .095$, $d = .19$). Significant increases in emotional eating were found for boys and girls (boys W1 $M = 1.84$, W2 $M = 2.06$; $t = -3.15$, $p = .001$, $d = .25$; girls W1 $M = 2.15$, W2 $M = 2.38$; $t = -3.09$, $p = .002$, $d = .22$). Thus, increases in emotional eating were found for most subgroups, but the effect sizes were generally small to moderate (Cohen, 1969).

Unique Associations of Adversity and Symptoms with Change in Emotional Eating

The result of regressing W2 emotional eating on W1 social adversity measures and depression and social anxiety symptoms, covariates, and W1 emotional eating was significant, $R^2 = .27$, $F(12, 365) = 111.45$, $p < .001$ (see Table 2). Appearance teasing by parents ($\beta = .13$, $p = .025$) and social anxiety symptoms ($\beta = .17$, $p = .004$) were uniquely and positively associated with more reported emotional eating at W2, relative to emotional eating at W1.

Table 1. Correlations Between Emotional Eating, Social Adversity, Internalizing Symptoms and Covariates, Descriptive Statistics, and t-tests (With Effect Sizes) Comparing Mean Levels in Boys ($n = 171$) With Girls ($n = 207$) (total $N = 378$).

Variables	1	2	3	4	5	6	7	8	9	10	11
1. W1 emotional eating	—										
2. W2 emotional eating	.47**	—									
3. Self-reported peer rejection	.24**	.09	—								
4. Peer-reported rejection	.06	.05	.29**	—							
5. Peer-reported relative victimization	-.01	.05	.29**	.52**	—						
6. Self-reported peer appearance-related teasing	.33**	.22**	.36**	.18**	.22**	—					
7. Self-reported parent appearance-related teasing	.22**	.27**	.27**	.04	.05	.37**	—				
8. Depression symptoms	.40**	.25**	.42**	.24**	.23**	.47**	.39**	—			
9. Social anxiety symptoms	.34**	.35**	.32**	.13*	.17**	.43**	.36**	.47**	—		
10. Grade	.10	.10	.13*	-.09	.00	.10*	.07	.13**	.11*	—	
11. BMI (percentile)	.03	.09	.03	.08	.03	.16**	.25**	.11*	.09	.09	—
12. Cohort	.01	.07	.02	-.05	.05	-.02	-.04	-.02	.11*	-.07	-.03
Mean	2.01	2.24	2.50	2.82	-0.06	1.41	1.50	1.71	2.22	—	49.59
SD	0.86	0.96	0.87	0.56	0.87	0.46	0.85	0.74	0.84	—	29.50
Boys mean	1.84	2.06	2.46	2.96	-0.05	1.39	1.41	1.58	2.01	—	48.83
Boys SD	0.77	0.90	0.87	0.54	0.89	0.46	0.80	0.64	0.72	—	31.75
Girls mean	2.15	2.38	2.53	2.71	-0.08	1.42	1.58	1.81	2.40	—	50.22
Girls SD	0.91	0.99	0.86	0.54	0.87	0.46	0.89	0.80	0.89	—	27.59
Sex compare, $t(1, 376)$	-3.48**	-3.10**	-0.78	4.47**	0.33	-0.75	-1.90	-3.07**	-4.58**	—	-0.54
Effect size, d	.37	.34	.08	.46	.03	.07	.20	.32	.48	—	.05

Note. All variables are W1 unless indicated with W2. Cohort coded as 0 = emotional eating first assessed at Time 1, 1 = emotional eating first assessed at Time 2. Sex coded 1 = boy, 2 = girl. BMI = body mass index.
* $p < .05$. ** $p < .01$.

Table 2. Results of Regressing W2 Emotional Eating on All Measures ($N = 378$).

W1 independent variables	B	SE (B)	β	95% CI B	
				Lower	Upper
Emotional eating	0.42	0.06	.38***	0.30	0.54
Self-reported peer rejection	-0.11	0.06	-.10	-0.23	0.01
Peer-reported rejection	0.12	0.10	.07	-0.08	0.32
Peer-reported victimization	0.03	0.07	.03	-0.11	0.17
Self-reported peer teasing	-0.03	0.13	-.01	-0.27	0.22
Self-reported parent teasing	0.15	0.06	.13*	0.02	0.27
Depression symptoms	-0.03	0.08	-.02	-0.19	0.13
Social anxiety symptoms	0.19	0.07	.17**	0.06	0.32
BMI percentile	0.00	0.00	.02	0.00	0.00
Grade	0.07	0.06	.06	-0.05	0.18
Sex	0.14	0.10	.07	-0.06	0.33
Cohort	0.12	0.09	.06	-0.06	0.29

Note. Final $F(12, 365) = 11.45$, $R^2 = .27$ ***. Sex coded 1 = boy, 2 = girl. Cohort coded as 1 = emotional eating first assessed at Time 1, 2 = emotional eating first assessed at Time 2. BMI = body mass index.

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

Sex as a Moderator

Interactions of sex with social adversity and symptoms (depression and social anxiety) were entered into the regression model shown in Table 2, to test whether the associations of social adversity and symptoms with emotional eating at W2 were different in girls compared with boys. No significant interactions were found (p ranged from .241 to .901).

Discussion

Emotional eating has a low incidence in childhood and, although more research is needed, past research has reported no significant change, on average, across the ages of 6–10 years (Steinsbekk et al., 2018). Yet, by middle-to-late adolescence, study findings seem to indicate that the average level of emotional eating is higher than in childhood (van Strien, Snoek, et al., 2010a; van Strien, van der Zwaluw, et al., 2010b). This suggested to us that emotional eating may increase during early adolescence. As such, the purpose of this prospective study was to examine emotional eating during the transitional period of early adolescence, expecting that an increase in eating or a desire to eat when emotionally distressed or bored would occur during this time of life.

In addition, founded in multiple theories linking social problems and distress with emotional eating, we investigated whether appearance-related teasing by parents or peers and poorer peer relationships (more rejection and victimization), as well as emotional vulnerabilities in the forms of depressive and social anxiety symptoms, were concurrent or prospective correlates of heightened emotional eating. We also examined whether the social and emotional risk factors for emotional eating differed between boys and girls.

Most generally, as expected, we found that emotional eating increased a modest but significant amount, on average, across the 1-year period of this study, with the increase statistically significant in students who were in Grades 6 and 7 at the first assessment, but no significant change in emotional eating in Grade 5 students. We also found that both girls and boys increased in emotional eating over time. As such, it may be that Grade 6 (i.e., around the age of 12 years) may be an important time when emotional eating begins to rise, on average, and that both boys and girls show this general increase. This raises the possibility that early adolescence may be a period of heightened risk for emotional eating, just as has been found for other emotion-related problems (Auerbach et al., 2011; Eisenberg & Neumark-Sztainer, 2008; Vartanian et al., 2014; Zimmer-Gembeck & Skinner, 2016).

In support of escape theory (Heatherton & Baumeister, 1991) and affect regulation theory applied to emotional eating (e.g., Polivy & Herman, 1993), bivariate correlations that were found here indicate that adolescents reporting more emotional eating felt more teased by parents and peers about appearance and reported more elevated symptoms of depression and social anxiety. Also, emotional eating was higher among adolescents who felt less liked by their peers. These concurrent associations are suggestive of a pattern of social adversity, emotional problems, and emotional eating in some young adolescents. It is perhaps more noteworthy, however, that the findings from our multivariate prospective model, considering all measures of adversity and symptoms plus covariates, identified two prospective risk factors for emotional eating 1 year later. These risks were a higher level of self-reported appearance teasing by parents and more symptoms of social anxiety. These factors were uniquely associated with more emotional eating 1 year later, even after controlling for baseline emotional eating, age, gender, BMI, and cohort. Furthermore, no interactions of social or emotional risk factors with sex (boy, girl) on emotional eating were significant in the prospective model.

These findings generally confirm but also extend previous research that has found parental rejection, rather than peer rejection, to be uniquely and positively associated with concurrent emotional eating (Vandewalle, Moens, Bosmans, & Braet, 2017b) and daily variations in emotional eating (Vandewalle, Mabbe, Debeuf, Braet, & Moens, 2017a), whereas weight

teasing by parents and peers has been found to be positively associated with concurrent emotional eating (Olvera et al., 2013). Our findings of the prominence of parent teasing about appearance in our prospective model accord with previous findings from these data showing parental appearance teasing as predictive of adolescents' increasing levels of appearance sensitivity and anxiety over time (Webb et al., 2017; Zimmer-Gembeck, Webb, Farrell, & Waters, 2018). Although peer relations seem relevant to concurrent levels of emotional eating, it appears that the parent–adolescent relationship is influential when the aim is to identify which young adolescents are at the greatest risk for *a future higher level of* problems. Furthermore, supportive and positive parent–adolescent relationships have been described as providing protection against potentially negative peer influences, compensating for an absence of peer relationships, and influencing the nature of peer interactions (Laursen & Collins, 2009; Steinberg & Morris, 2001). As such, it is also possible that parents do not only influence changes in emotional eating during early adolescence, but will continue to shape it, even when other relationships, such as with friends or partners, are also important.

It is important to note that our findings differed depending on whether social adversity was self- or peer-reported. In particular, it was self-reported and not peer-reported social adversity that was associated with emotional eating in the correlations. These findings highlight the importance of adolescent *perceptions* of their social interactions in relation to emotional eating risk and could to some extent reflect biased social processing given significant correlations of all indices of social adversity with depression and social anxiety at baseline.

A number of previous studies have reported that symptoms of depression and anxiety are concurrently associated with elevated emotional eating during adolescence (e.g., Goossens et al., 2009; Nguyen-Rodriguez et al., 2010), but, to our knowledge, only depression had been tested as a prospective correlate of change in emotional eating with evidence suggesting no significant association (van Strien, Snoek et al., 2010a). Here, we examined depression and social anxiety as prospective risk factors, finding that elevated symptoms of social anxiety (but not depression) posed a unique risk for later emotional eating. Such a finding is consistent with previous research on eating disorders, with social phobia showing high comorbidity with eating disorders (Hinrichsen, Wright, Waller, & Meyer, 2003) and symptoms of social anxiety as predictive of the severity of various eating disorder symptomologies in both clinical and nonclinical populations of adult women (Hinrichsen et al., 2003; McLean, Miller, & Hope, 2007). Moreover, the concurrent association between social anxiety and disordered eating in a community sample of adult women was found to be fully explained by the maladaptive emotion

regulation strategy of emotional suppression, which refers to inhibiting the outer expression (but not internal experience) of negative emotions (McLean et al., 2007). In the future, we encourage investigations of emotion regulation in adolescence, such as emotional suppression and a lack of access to coping strategies, as correlates of emotional eating and social anxiety; emotion regulation might be a confounder explaining both emotional eating and social anxiety (Goldstein, Tan, & Chow, 2017; Lavell, Webb, Zimmer-Gembeck, & Farrell, 2018; Masters, Zimmer-Gembeck, & Farrell, 2019; Zimmer-Gembeck & Skinner, 2016).

The final aim of this study was to examine whether any risks posed by social adversity, depression, and social anxiety for subsequent emotional eating was elevated among girls compared with boys. We found that girls reported significantly higher emotional eating at both W1 and W2, but gender did not moderate associations of social risk and emotional vulnerability factors with subsequent emotional eating. Our finding that girls compared with boys reported significantly higher levels of emotional eating is consistent with past evidence of girls reporting more elevated stress-related eating than boys (16 years of age; Jääskeläinen et al., 2014).

Our method was strengthened by the use of both self- and peer-reported indices of social adversity, which enriches our understanding of the role of participant subjectivity. However, a limitation of this study was that the sample reflected a convenience sample of schools of which comprised predominantly White Australian and Asian Australian students. However, this sociocultural background seemed to reflect the region where the study was conducted. Yet, students came from more educated and slightly higher income families relative to the Australian region from which they were drawn. As such, the findings may not be fully representative of, or generalizable to, a more diverse sample of adolescents. A second study limitation was the use of abbreviated and some single-item measures. These were utilized to reduce the time burden on participants and schools. This may have impacted the quality (e.g., the reliability or validity) of the measures. Nevertheless, the present findings highlight a number of interesting avenues for future research. First, longitudinal assessment of the stability and change in emotional eating across a longer period of time (such as from late childhood to late adolescence) would confirm and extend the existing but fragmented evidence to provide a clearer understanding of the development of emotional eating (and also its impact on later physical and mental health) during this critical period. In addition, in light of the growing empirical foundation in support of affect regulation theories of emotional eating, a more nuanced assessment of mediational pathways (or mechanism) linking social adversity and distress to emotional eating, such as via maladaptive coping or emotion regulation, is an

indicated research direction into the future. Promisingly, research relating to this line of questioning is emerging (e.g., Goldstein et al., 2017; Young & Limbers, 2017), but much more is needed, particularly employing a prospective study design.

An additional suggestion for future research is to investigate the potentially overlapping and cumulative influence of affect regulation and sociocultural influence theories for emotional eating during adolescence. In particular, while there is now mounting evidence of the role of social adversity and generalized distress in predicting emotional eating (Nguyen-Rodriguez et al., 2010; van Strien et al., 2010a; Vandewalle et al., 2014; Vandewalle, Mabbe, et al., 2017a; Vandewalle, Moens, et al., 2017b), there is also evidence that sociocultural pressures to conform to increasingly strict appearance ideals are linked with emotional eating (Lai et al., 2013; K. A. Thompson et al., 2017). The literature is complicated by some constructs reflecting both social adversity and sociocultural pressures to be lean (e.g., appearance or weight teasing; Olvera et al., 2013), as was the case in this study. Simultaneous and comprehensive investigation of both domains of risk (i.e., generalized stress and distress as well as appearance-focused pressures and concerns) in relation to child and adolescent emotional eating over time would enable progress in understanding the key risk factors for the development of emotional eating, and therefore, potential mechanisms for prevention and intervention.

The findings of this study also suggest studies, applications, and interventions that may, either directly or indirectly, reduce emotional eating. In particular, first, it would be very useful to test how known effective school-wide bullying intervention programs (see Gaffney, Farrington, & Ttofi, 2019 for a review) might impact on appearance teasing, associated weight and appearance concerns of adolescents, and emotional and other disordered eating. It is possible that current programs are not only improving some of the modifiable risk factors found here, such as peer rejection, victimization, and symptoms of depression and social anxiety, but they also could be having beneficial effects on appearance concerns and eating problems. These effects may be occurring because bullying and victimization (physical, verbal, and relational forms) very often focus on weight, shape, or appearance that all covary with other aspects of peer status (Puhl, Neumark-Sztainer, Austin, Luedicke, & King, 2014; Zimmer-Gembeck & Webb, 2017), so reducing bullying and emotional problems may simultaneously reduce weight-related or appearance-related bias and stigma, appearance-related teasing, and body image concerns.

There is substantial covariation between bullying, victimization, a range of mental and physical health problems, and eating and weight concerns

(Copeland et al., 2015; Hong, Espelage, & Rose, 2019; Wolke, Copeland, Angold, & Costello, 2013). General bullying intervention program evaluations (e.g., interventions that focus on reducing all forms of bullying and aggression, rather than focusing on weight stigma and/or eating disorders, more specifically) tend not to measure weight or appearance-related teasing and eating behaviors as outcomes of their intervention efforts. This could be a missed opportunity for identifying useful ways to reduce emotional eating and other eating disorders, at the same time as improving peer relationships and school environments. This may be an especially useful way forward, given that some programs specifically focused on body image, weight, eating, and eating disorders have been found to paradoxically increase symptoms and problems (O’dea, 2000; see O’dea & Abraham, 2000 for an effective program focused on self-esteem).

Second, raising awareness of the ways that family teasing about appearance and mental health symptoms, especially social anxiety, might feature in emotional eating problems could be another way forward for reducing increases in emotional eating among young adolescents. One approach could be to assist parents to reduce conversation focused on weight or appearance and instead engage in positive talk that focuses on healthful eating. One study found that parent conversations with their adolescents focused on weight/size covaried with greater disordered eating, but talk about healthy eating was associated with fewer adolescent-disordered eating behaviors (Berge et al., 2013). It might also be productive for parents and others to be aware that emotional eating and social anxiety may co-occur, and attend to the signs of eating problems when young people are showing signs of excess social anxiety, such as extreme fears and avoidance of any form of social evaluation, very elevated wariness when meeting new people or withdrawal from social events that should be rewarding and enjoyable.

In conclusion, we found here that emotional eating increased, on average, for boys and girls in this study, with the increase statistically significant (but still small to moderate in size) for those of age about 12 years or older. Although the increase was modest in size, it does suggest that the early years of adolescence may be a risky time period for escalation of emotional eating similar to what has been found for other emotional and eating disorders (Auerbach et al., 2011; Eisenberg & Neumark-Sztainer, 2008; Vartanian et al., 2014; Zimmer-Gembeck & Skinner, 2016). In terms of social and emotional risk factors, adolescents who reported more emotional eating concurrently felt more rejected and victimized by their peers, felt more teased about their appearance by both parents and peers, and were higher in symptoms of depression and social anxiety, although their peers did not report that they were more rejected and victimized relative to others. When prospective

levels of emotional eating were the focus, it was adolescents who perceived more appearance teasing by parents and who reported more social anxiety symptoms that had more elevated emotional eating 1 year later. These results highlight the need for further prospective research spanning childhood to adolescence to more clearly illustrate the development of emotional eating, and identify whether these risks are specific to early adolescence or generalize to other periods. Most generally, continued investigation of social risk is suggested, with an expanded emphasis on elucidating the specific intrapersonal and food-related mechanisms through which social and emotional risk is translated into emotional eating.

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Note

1. We also fit the same model with classroom as a Level 2 variable in multilevel modeling. The results were essentially the same as those reported here from standard linear regression. Parameters (B) changed at most by .01 and the conclusions about significant associations with emotional eating were unchanged.

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