Internalising symptoms and body dissatisfaction: untangling temporal precedence using cross-lagged models in two cohorts

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Background: Cross-sectional studies demonstrate that body dissatisfaction and internalising symptoms are correlated and are both overrepresented in girls compared to boys. However, it is not clear whether body dissatisfaction typically precedes internalising symptoms or vice versa. Existing literature provides theoretical and empirical support for both possibilities, but is limited in two ways: (a) no study has simultaneously tested the two temporal hypotheses within the same model, and (b) the studies focus almost exclusively on early adolescents resulting in little being known about development from preadolescence and across puberty. **Methods:** This study used data from 5485 primary school students (49.1% girls, aged 8–9 years at baseline) and 5981 secondary school students (53.9% girls, aged 11–12 years at baseline). Self-reports of internalising symptoms and body dissatisfaction were collected over three consecutive years at 1-year intervals. Cross-lagged models were estimated in the two cohorts, for boys and girls separately, to examine the temporal associations between these two domains across the three measurement points. **Results:** In the younger cohort, internalising symptoms predicted body dissatisfaction 1-year later for both boys and girls, whereas there was no evidence for the reverse being true. In the older cohort, internalising symptoms predicted later body dissatisfaction for boys. However, in girls, body dissatisfaction predicted later internalising symptoms. **Conclusions:** In preadolescents, internalising symptoms drive later body dissatisfaction regardless of gender, suggesting body dissatisfaction is a specific manifestation of a tendency towards negative affect. From age 11, girls develop a distinct risk profile whereby body dissatisfaction drives later internalising symptoms. Preventative interventions in this field would benefit from adopting a developmentally sensitive approach that takes into account gender differences in risk pathways. **Keywords:** Internalising, body image, eating disorders, psychopathology, adolescence, childhood.

Introduction

Body dissatisfaction and internalising symptoms are distinct but related phenomena with high prevalence in adolescence: about a third of adolescents report being dissatisfied with their appearance (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006) and internalising disorders are the most prevalent mental health difficulties in this age group (Green, McGinnity, Meltzer, Ford, & Goodman, 2005; Murray et al., 2012). Both have negative long-term outcomes, making these difficulties important targets for interventions (e.g. Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004; Testa & Steinberg, 2010).

Cross-sectional studies demonstrate that body dissatisfaction and internalising symptoms are correlated (Bearman & Stice, 2008; Neumark-Sztainer et al., 2006; Ohring, Graber, & Brooks-Gunn, 2002), and both are overrepresented in girls, compared to boys (Cyranowski, Frank, Young, & Shear, 2000; Neumark-Sztainer et al., 2002). However, the trajectories underlying these concurrent associations are poorly understood. Notably, it is not clear whether body dissatisfaction typically precedes internalising symptoms or vice versa.

Theoretical models posit both directions of the body dissatisfaction–internalising association. On one hand, it has been suggested that body dissatisfaction arises in adolescence due to pubertal changes and that internalising symptoms then emerge in response to failed attempts to bring the body back in line with ideals of thinness (Stice & Bearman, 2001). We call this the 'body dissatisfaction-driven' hypothesis. In contrast, it has been argued that body dissatisfaction may develop as a downstream effect of a general tendency towards negative self-evaluation, which is evident in those with internalising symptoms (Presnell, Bearman, & Slice, 2004): the 'internalising-driven' hypothesis. Of course, the two are not mutually exclusive and the dominant directionality may vary over the course of development. Existing work provides evidence to support both positions, with age and gender seeming to moderate the hypothesised relationships in each case.

Body dissatisfaction-driven hypothesis

Longitudinal studies have consistently found that body dissatisfaction predicts increases in internalising symptoms for early adolescent girls (Bearman & Stice, 2008; Ferreiro, Seoane, & Senra, 2011, 2012; Ohring et al., 2002; Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006; Stice & Bearman, 2001). For instance, in the ProjectEAT cohort, those experiencing greater body dissatisfaction at age 12 went on to have increased depressive symptoms

5 years later (Paxton, Neumark-Sztainer et al., 2006).

In contrast to the established data for early adolescent girls, the findings are unclear for other populations. Although Ferreiro et al. have twice reported that body dissatisfaction predicted increased internalising symptoms in early adolescent boys (Ferreiro et al., 2011, 2012), several similar studies have found null results for this group (Bearman & Stice, 2008; Paxton, Neumark-Sztainer et al., 2006). Few studies have assessed the role of body dissatisfaction in younger children (e.g. those under 12 years) or in later adolescents (e.g. those aged over 15 years) making it unclear whether there are developmental periods of sensitivity for this association. In one exception, the ProjectEAT cohort showed that body dissatisfaction predicted internalising symptoms only in early adolescent girls and late adolescent boys (Paxton, Neumark-Sztainer et al., 2006). This is in line with the theory that boys are subjected to social pressures regarding appearances at an older age than girls (Holsen, Kraft, & Røysamb, 2001).

Internalising-driven hypothesis

Turning to the inverse relationship – in which internalising symptoms predict later body dissatisfaction – a rather different story emerges. A substantial number of studies have assessed, but found no evidence for, a significant association between internalising symptoms and later body dissatisfaction in girls (Paxton, Eisenberg, & Neumark-Sztainer, 2006; Presnell et al., 2004; Quick, Eisenberg, Bucchianeri, & Neumark-Sztainer, 2013; Stice & Whitenton, 2002), although there have been some exceptions (Bearman & Stice, 2008; Chen & Jackson, 2009).

On the other hand, there is a growing body of evidence suggesting that this relationship between internalising symptoms and later body dissatisfaction may be present for adolescent boys. Both Presnell et al. (2004) and Bearman, Presnell, Martinez, and Stice (2006) report that depressive symptoms in early adolescent boys predicted the development of body dissatisfaction up to 2 years later. Similarly, in the ProjectEAT cohort, depressive symptoms were associated with increased body dissatisfaction in boys, over 5 and 10 years on from early and late adolescence (Paxton, Eisenberg, et al., 2006; Quick et al., 2013).

In summary, the existing literature provides evidence in favour of both (a) body dissatisfaction predicting later internalising symptoms and (b) internalising symptoms predicting later body dissatisfaction. There is more evidence for the former in girls and for the latter in boys.

Limitations of existing literature

This literature is, however, limited in a number of ways. No study has simultaneously tested the two temporal hypotheses in the same model. Holsen et al. (2001) did consider both directions of association in the same study, but their model did not include the two concurrently. In the separate models, body dissatisfaction was found to predict later internalising symptoms in early adolescent girls and late adolescent boys. The inverse relationship was not significant. Simultaneous modelling of the two relationships is important because it allows us to untangle potential underlying causal relationships that can indicate suitable targets from prevention efforts.

To date, studies have focused almost exclusively on early adolescents, with very few looking at children aged 12 years or under. Given the importance of pubertal changes in the theoretical links between body dissatisfaction and internalising symptoms (Bearman & Stice, 2008; Paxton, Neumark-Sztainer et al., 2006), it will be informative to assess this relationship from prepuberty into adolescence. In one exception, Ferreiro et al. (2012) assessed 10-year olds and found that body dissatisfaction was associated with later depressive symptoms in male children (aged 10) but not in female children (Ferreiro et al., 2012). This does not corroborate with the suggestion that boys have later onset of the body dissatisfaction–internalising relationship (Holsen et al., 2001). Further work is clearly needed to understand the dynamic nature of these longitudinal associations.

The existing literature has also largely been limited by small sample sizes which restrict the power of models to detect effects, especially given the existing evidence that the associations may well vary between the genders and across different ages. The exception to this difficulty is the ProjectEAT cohort (discussed above) in which 2,500 early and middle adolescent girls and boys have now been followed for 10 years (Quick et al., 2013). Further work of this scope is required to generalise the findings from this cohort with confidence.

Aims of this study

Based on the status of the current literature, the aims of this study were as follows:

1. To examine the temporal associations between body dissatisfaction and internalising symptoms over a 3-year period using cross-lagged models in two cohorts.
2. To explore age and gender differences in these associations.

Method
Participants

Participants were 11,466 children and adolescents from two longitudinal cohorts, each with three time points at 1-year

intervals. Data were drawn from a wider study of mental health in schools in England (Wolpert et al., 2011).

In the younger cohort, children were in Year 4 (aged 8 and 9 years) at the first wave of data collection (T1, mean age = 8.70 years, SD = 0.31). The three time points cover an age range of 8–11 years. Data were available for 5485 students (49.1% female, n = 2691) from 138 state primary schools (representing a 94.5% response rate). Of these, 3346 had data at all three time points, 1311 participated at any two time points, and a further 828 had data available at only one time point. In terms of ethnicity, 73% were classified as White, 14.9% Asian, 5.3% Black, 3.9% Mixed ethnic background and 3% belonged to other ethnic groups or were unclassified. In comparison with national data, the proportion of children belonging to minority ethnic groups (27%) was higher than the 23% in primary schools nationally. As an indicator of deprivation, 22.3% of participants were eligible for free school meals (FSM), which is higher than the 17.3% in primary schools nationally (Department for Education, 2010).

In the older cohort, participants were 5981 (53.9% female, n = 3224) children in Year 7 at the first time point (mean age = 11.71 years, SD = 0.31), from 37 state secondary schools. This represents a 95.2% response rate. Hence, the three time points cover an age range of 11–14 years. Data were available for 2647 participants at all three time points, 2181 at any two time points and 1153 had data available at one time point. In terms of ethnicity, 77.5% were classified as White, 12.2% Asian, 5.8% Black, 2.9% Mixed ethnic background, .6% other ethnicity and 1% were unclassified. Proportion of children belonging to minority ethnic groups (22.5%) was higher than the 19% in secondary schools nationally. Nineteen per cent of participants were eligible for FSM, and similar to the younger sample, this was higher than the 14.2% observed at national levels (Department for Education, 2010).

In both samples, comparisons of the characteristics of participants with data at all three waves and those without indicate that attrition was not biased based on gender but was significantly predicted by deprivation and ethnic minority status. Comparison of the study variables at time point one indicates that higher internalising scores and greater body dissatisfaction predicted missing data at any time point compared to those with complete data.

In sum, participants across the two cohorts were similar in terms of demographics and generalisability to the wider population, whereby both samples have consistent variations from national data in terms of slightly higher proportions of FSM eligible and ethnic minority participants.

Procedure

Ethics permission for the collection of data utilised in this study was received from the research ethics committee of University College London. Schools were recruited to the study through the local authorities in England, and all pupils in the particular year group (at time 1 – Year 4 in primary and Year 7 in secondary schools) were eligible to participate in the study. Information regarding the study was sent, and consent for participation was sought from parents via mail at every time point. All participants received information about the study, including explanation of the confidentiality of their responses and their right to decline to participate and dropout at any time. The surveys were computer-based, and participants could access their questionnaire with a unique code that was assigned to them. The questionnaires were completed by participants using computers in school within the normal school day, usually in a structured session with their classmates. The procedure applied uniformly across participants in both cohorts and items in the measures were presented on screen one-by-one, with the option to skip items.

Measures
Internalising symptoms

Internalising symptoms were measured using the *Emotional Difficulties* scale of the Me and My School questionnaire, which is a 10-item self-report scale (e.g. 'I feel lonely', 'I worry a lot') with three response options: never, sometimes and always (Deighton et al., 2013; Patalay, Deighton, Fonagy, Vostanis, & Wolpert, 2014). Responses are coded such that higher scores indicate greater internalising symptoms. Validation indicates that the measure has good content validity, internal reliability, discriminant capacity and construct validity (Deighton et al., 2013; Patalay et al., 2014). Cronbach's alpha ranged from .72–.79 at each time point in both cohorts.

Body dissatisfaction

Body dissatisfaction was assessed by responses to the question 'I like the way I look' with participants responding to a 3-point scale: never, sometimes and always coded 2, 1 and 0, respectively. As such a higher value represented greater dissatisfaction with one's body.

Analysis

The main aim of this study was to investigate the competing hypotheses regarding longitudinal associations between body dissatisfaction and internalising symptoms. Specifically, is it that internalising symptoms drive later body dissatisfaction, or vice versa, is it that body dissatisfaction drives later internalising symptoms? In addition, we aimed to examine whether these relationships vary by both age and gender.

To investigate this, cross-lagged path models were estimated in both cohorts. The model accounted for temporal stability within each construct over time and concurrent correlations between the two constructs at each time point. Most importantly, the model included cross-lagged paths between constructs, between adjacent time points in both directions (i.e. internalising predicting body dissatisfaction and body dissatisfaction predicting internalising). Items of the internalising scale were included in the model to derive the latent internalising factor score at each time point, and as such, item thresholds were held constant across time and errors were correlated over time to limit measurement error. These cross-lags allow simultaneous examination of the competing hypotheses, to estimate both amount and direction of effects while controlling for effects in the opposite direction. The fit of the models to the data was assessed using: root mean square error of approximation (RMSEA), where values closer to 0 represent good fit; the comparative fit index (CFI) and Tucker–Lewis index (TLI), where values closer to 1 indicate good fit; and the chi-square statistic. The cross-lagged models were estimated in Mplus 7 (Muthén & Muthén, 2012), using weighted least squares means and variance-adjusted estimation and imputation for the missing values based on full information maximum likelihood.

First, we carried out the analysis in the entire samples (boys and girls combined) and examined the moderator effects of gender using the grouping option in Mplus and examining differences in model fit (using *difftest* in Mplus) while constraining the pathways to be equal across gender and allowing them to vary. Based on this analysis, which indicated that gender significantly moderated the pathways (stability and lags) in both cohorts, we subsequently analysed four samples (younger girls, younger boys, older girls and older boys). The analyses were also conducted for complete cases only (listwise deletion), to examine the consistency of the results. As the results were very similar across the two approaches, for simplicity we present here only those results from the full (imputed) sample. There was one exception, in

the older girls, which we highlight in the main text of the results.

Results

Descriptive statistics

Table 1 presents descriptive statistics split by age and gender. Latent internalising symptoms factor scores were estimated at each time point across each sample and ranged from −1.29 to 3.08. Responses to the body dissatisfaction item are presented in terms of proportion responding to each of the response options (always, sometimes and never) at each time point.

As can be seen in Table 1, expected differences were seen in levels of internalising symptoms and proportion indicating dissatisfaction with their bodies based on both age and gender. Overall, girls had higher internalising symptoms in both the younger and older cohorts compared to boys ($t = 8.53 – 11.81$, all $p < .001$) and the mean levels of symptoms demonstrated an increasing trend from age 8 to 14 years. Body dissatisfaction demonstrated similar levels across time points in the younger cohort, but the proportions differ significantly across boys and girls ($\chi^2 (2) = 9.10–66.94$, all $p < .05$). In the older boys, around 10% report body dissatisfaction at all three time points. However, in the older girls, higher proportions report body dissatisfaction compared to boys ($\chi^2 (2) = 70.72–203.39$, all $p < .001$), with an increasing trend from ages 11–12 years (12.6%) to 13–14 years (21.3%). Additionally, a consistent decrease is observed in proportion attesting to be satisfied with their appearance.

Cross-lagged models

First, models were estimated including pathways representing the 2-year time lags (i.e. time 1 to time 3) to investigate the possibility of unique predictions across these time points. However, these longer pathways were not significant and were hence excluded to achieve more parsimonious models. To estimate whether the paths were significantly moderated by gender, cross-lag models in each cohort were estimated, with all paths: (a) constrained to be equal

by gender and (b) unconstrained and allowed to vary freely by gender. Difference tests indicate that the unconstrained model fitted the data better than the constrained model (younger cohort $\Delta\chi^2(11) = 31.36$, $p = .001$; older cohort $\Delta\chi^2(11) = 20.75$, $p = .036$). Based on these findings, subsequent analyses were carried out separately for boys and girls, allowing the measurement model to be separately estimated for each sample (see Figures 1 and 2).

Model fit statistics (RMSEA, CLI, TLI and chi-square) are presented for each model in Figures 1 and 2. Overall, RMSEA in all four models was <.05, whereas CFI and TLI were >.90, indicating acceptable model fit (Bollen & Curran, 2006). The standardised coefficients for the model are shown in Figures 1 and 2 for each of the respective samples.

As can be seen from Figures 1 and 2, in both age groups, the stability coefficients indicate moderate to high stability in both constructs (.38–.74) over three measurement points. Concurrent association between the constructs indicated small-moderate correlations (.22–.36) between internalising symptoms and body dissatisfaction at any given time point.

Considering Figure 1, in the younger sample, the cross-lags indicate that internalising symptoms significantly predicted higher body dissatisfaction in the following year in both boys and girls, whereas the pathways from body dissatisfaction to internalising symptoms had small coefficients that were not statistically significant.

In the older sample (aged 11–14 years), the pattern of effects was different for girls and boys. As can be seen for the older girls in Figure 2A, the pathways from internalising symptoms to body dissatisfaction were not significant, whereas the pathways from body dissatisfaction predicting internalising at the subsequent time point were statistically significant (T1–T2, $\beta = .08$, $p = .004$; T2–T3, $\beta = .10$, $p < .001$). In the older girls, when the analysis was conducted on complete cases only the pathway from internalising symptoms at Time 2 to body dissatisfaction at Time 3 was also statistically significant ($\beta = .09$, $p < .001$), suggesting that in females of this age group, internalising symptoms might still be a predictor of future body dissatisfaction. The inconsistency in findings for the internalising-driven

Table 1 Descriptive statistics for internalising symptoms and body dissatisfaction

	Internalising symptoms[a] [mean factor score (SD)]			Body dissatisfaction[b] [% always/sometimes/never[c]]		
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Younger girls	0.25 (0.49)	0.24 (0.57)	0.29 (0.60)	54.9/34.2/10.8	52.3/36.8/10.9	45.7/43.9/10.4
Younger boys	0.006 (0.50)	0.014 (0.62)	0.022 (0.65)	58.6/29.4/12.0	56.8/33.3/9.8	58.4/34.5/7.0
Older girls	0.30 (0.64)	0.40 (0.63)	0.47 (0.61)	35.0/52.4/12.6	26.3/58.6/15.1	20.6/58.1/21.3
Older boys	0.025 (0.65)	0.032 (0.67)	0.037 (0.69)	46.7/43.2/10.1	41.7/48.9/9.4	40.5/48.4/11.2

[a]Scores ranged from −1.29 to 3.08.
[b]Estimates based on all data available at each time point.
[c]In response to 'I like the way I look'.

hypothesis in adolescent girls in the two samples (complete cases and full sample) might be due to the biased attrition in relation to these constructs. For the older boys (Figure 2B), the directionality of effects was similar to younger boys and girls whereby internalising symptoms predicted future body dissatisfaction significantly (T1–T2, $\beta = .09$, $p = .003$; T2–T3, $\beta = .14$, $p < .001$) and body dissatisfaction did not predict internalising symptoms.

Discussion
Summary of these results

The aim of this study was to explore the temporal precedence of internalising symptoms and body dissatisfaction and to understand how these associations may vary across childhood and adolescence and between genders. This study was the first to test the two competing temporal hypotheses within the same model, giving the unique advantage of allowing us to directly compare the relative strength of the associations, allowing us to untangle the question of 'which drives which for whom'.

This study found marked age and gender differences in the associations between body dissatisfaction and internalising symptoms. In the younger sample, greater internalising symptoms consistently predicted greater body dissatisfaction 1-year later, for both genders, with no evidence for an inverse relationship. In the older sample, this held true for boys. For girls, although there was some evidence for continuing internalising-driven body dissatisfaction,

the inverse relationship was more salient, that is greater body dissatisfaction predicted later internalising symptoms. This suggests that some level of bidirectionality in these longitudinal relationships exists in adolescent girls. In terms of the magnitude of the associations (using a standardised r interpretation, Durlak, 2009), the significant pathways were mostly small to medium effects, suggesting these are meaningful relationships of sufficient strength to warrant attention.

Links with previous studies

These findings both corroborate and extend existing studies in this field. When taken collectively, the existing research supports a moderating effect of gender. The gender-specific findings in the older sample are in line with existing research findings: the majority of studies in adolescents show internalising problems being associated with later body dissatisfaction for boys (Bearman et al., 2006; Paxton, Eisenberg, et al., 2006; Quick et al., 2013) and body dissatisfaction being associated with later internalising problems for girls (Bearman & Stice, 2008; Ferreiro et al., 2011; Paxton, Neumark-Sztainer et al., 2006). What the current study adds is that we can now be confident that the directionality of these associations holds even when taking into account the potential for the reverse being true while also controlling for stability within constructs over time.

The findings for the younger cohort, with children aged 8–11 years, add to a far less well-established
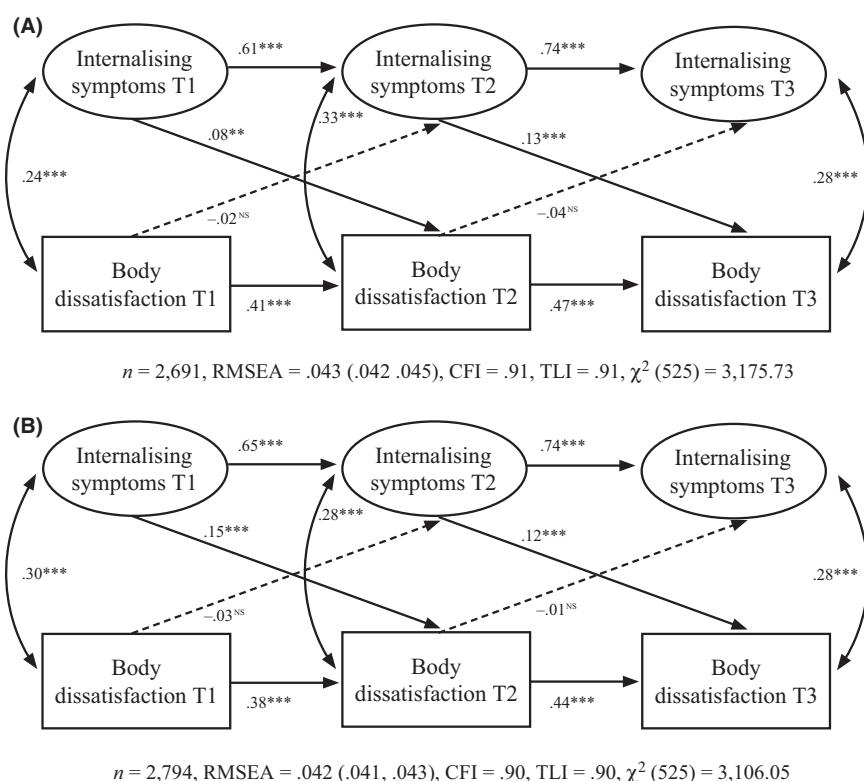

n = 2,691, RMSEA = .043 (.042 .045), CFI = .91, TLI = .91, χ^2 (525) = 3,175.73

n = 2,794, RMSEA = .042 (.041, .043), CFI = .90, TLI = .90, χ^2 (525) = 3,106.05

Figure 1 Cross-lagged models for (A) younger girls and (B) younger boys (aged 8–11 years)
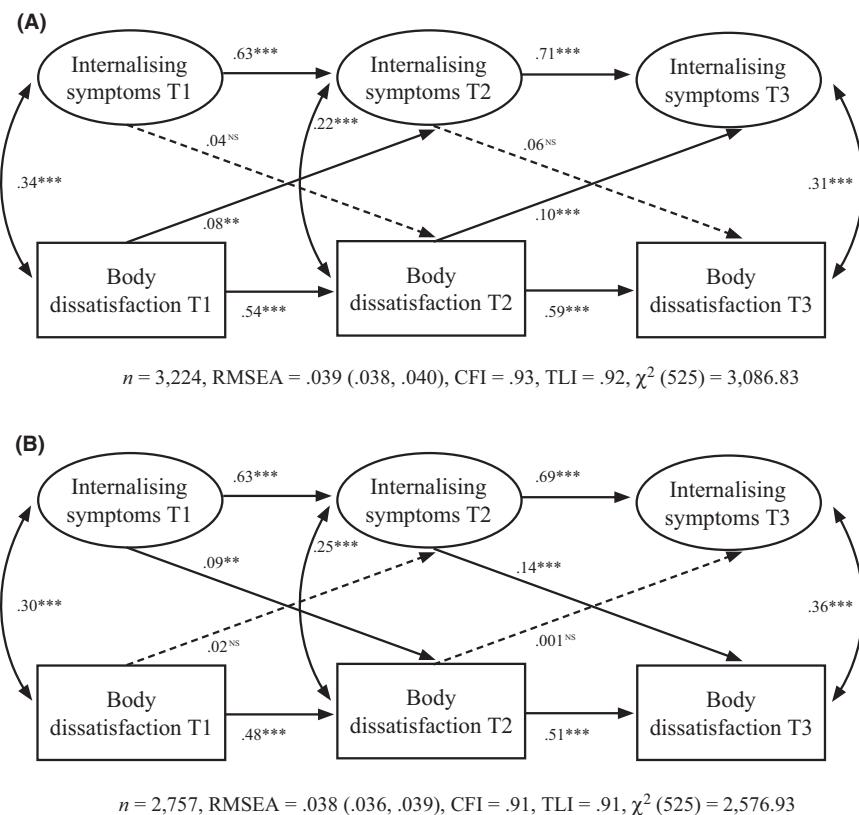
Figure 2 Cross-lagged models for (A) older girls and (B) older boys (aged 11–14 years)

literature. In the one previous longitudinal study with a young sample (although note that children were aged 10 years at baseline, compared with 8 years in the current study), body dissatisfaction was found to predict later depressive symptoms for both boys and girls (Ferreiro et al., 2012). These findings stand in contrast to the clear message from the current study that, in the younger age group, internalising symptoms consistently predicted later body dissatisfaction for both genders (with the reverse not being true). It is possible that age and sample differences could explain these different findings. However, it is also important to note that Ferreiro et al. (2012) did not test competing temporal hypotheses simultaneously, meaning that the potential bidirectionality of these effects was not taken into account.

Taken collectively, the findings support the theory of a gender-specific vulnerability for girls, but one that only emerges during early adolescence. One potential explanation is that, due to a general negative cognitive bias, those children that experience internalising symptoms also go on to feel negatively about their body (Beck, 2002). Then, as children transition into adolescence, boys continue on this 'internalising-driven' trajectory, whereas girls deviate from it. For girls, it appears that the salience of body image increases at this point (Adams, Katz, Beauchamp, Cohen, & Zavis, 1993; Blowers, Loxton, Grady-Flesser, Occhipinti, & Dawe, 2003), meaning that body dissatisfaction comes to dominate as a risk factor for later internalising symptoms.

Given the timing of this gender-specific vulnerability, it seems plausible that this reflects risk specifically triggered by pubertal changes (e.g. in terms of physical development and changing gender roles and expectations). As girls go through puberty, their bodies tend to move further away from the appearance ideals presented in mass media, whereas for boys, the reverse is true (McCarthy, 1990). As such, responses to body dissatisfaction in girls (e.g. dieting) are less likely to be effective, explaining why this would result in the development of internalising symptoms (Bearman & Stice, 2008). There is also evidence that, during this period, girls tend to self-objectify more than boys (Siegel, Yancey, Aneshensel, & Schuler, 1999), experience more teasing around weight and shape (Ata, Ludden, & Lally, 2007), and perceive more pressure from friends and family to be thin (Ata et al., 2007; McCabe & Ricciardelli, 2001). These mechanisms may explain why the salience of body image increases for girls in particular at this point and why this may drive an increased propensity for internalising symptoms.

The findings from this study also have implications for our understanding of the gender disparities in the prevalence of a range of internalising disorders (Green et al., 2005). This study adds to the work of others that have pointed to body dissatisfaction as a key risk factor which may help to explain these gender-specific trajectories (Bearman & Stice, 2008; Stice & Bearman, 2001). As can be seen from the results in this study, body dissatisfaction seems to

emerge as a specific risk factor for girls in early adolescence, which might help to explain why a greater numbers of girls experience internalising symptoms and clinical presentations of internalising disorders.

Strengths and limitations of this work

A strength of this study is the large, broadly representative sample of children and adolescents across England and the inclusion of two cohorts spanning different developmental stages, with parity in procedure and measures. Additionally, the large sample size meant that the study was sufficiently powered to conduct the cross-lagged models incorporating latent variables with correlated errors over time, thus minimising measurement error.

However, the study does include some limitations. The available measure of body dissatisfaction was a single item, rather than a fully validated scale. At best, this item captures a limited concept of body dissatisfaction: it is focused solely on a global evaluation of appearance, hence providing no information on cognitive, perceptual or behavioural components, or on specific aspects of appearance (e.g. weight, shape, muscularity; Cash & Smolak, 2011). This generic focus may be particularly problematic for this study, given the known differences between boys' and girls' experiences of body dissatisfaction (e.g. the differential focus on muscularity as opposed to thinness, Cafri & Thompson, 2004).

The study does not include measures of a number of key variables that may be potential confounders or mechanisms of the relationships explored here. These include, for example, body mass index and pubertal status. These are important constructs to consider in the development of body dissatisfaction and internalising symptoms (Siegel et al., 1999). Future work would benefit from including these data in cross-lagged models of this kind.

The scale of this study meant that we were limited to self-reported measures. These limitations reflect a general difficulty of large community-based studies: what is gained in sample size is often lost in the number and complexity of measures that it is possible to administer. This work may be complemented, however, by smaller scale studies using sophisticated measurement approaches including clinical interviews and psychological testing.

Implications and future directions

The implications of this study are that it may be helpful to create intervention programmes that reflect gender-specific trajectories of risk during adolescence. Targeting internalising symptoms may have downstream benefits for younger children and adolescent boys' body dissatisfaction, but preventative interventions for adolescent girls may be best placed to target body dissatisfaction as well.

The intimate link between body dissatisfaction and internalising symptoms in this study suggests that intervention researchers from both fields would benefit from measuring outcomes encompassing both constructs. Without this, downstream benefits of preventative programmes targeting one area may not be recognised.

Given the limitations of this study, future work determining whether these findings can be replicated in other large cohort studies would be valuable, in addition to exploring these relationships at different developmental stages (e.g. late adolescence, early adulthood). In particular, using cross-lagged models to (re-)analyse data that have the potential to examine longitudinal associations between body dissatisfaction and internalising symptoms would help to elucidate the true directionality underlying these constructs.

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Key points

- Body dissatisfaction and internalising symptoms are correlated but temporal patterns in their development are not clear.
- Body dissatisfaction in preadolescence is driven by internalising symptoms in boys and girls.
- In early adolescence, internalising symptoms continue to drive body dissatisfaction in boys, whereas, in girls, body dissatisfaction becomes the more salient driver of internalising symptoms.
- Preventative interventions would benefit taking into account age and gender differences in risk pathways.

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