Peer culture and body image concern among Australian adolescent girls: A hierarchical linear modelling analysis

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Abstract

Peers may influence the body image concerns and disordered eating behaviours of adolescent girls through the creation of appearance cultures within friendship cliques. The present study investigates the role of friendship cliques and school gender composition in impacting upon adolescent girls' body image concern and disordered eating behaviours, using hierarchical linear modelling (HLM), a statistical procedure employed in the analysis of nested data. A sample of 156 girls was drawn from four private schools located in the capital city of Western Australia (one single-sex school and three mixed-sex schools). Eighty students from the single-sex school and 76 female students from the mixed-sex schools, comprising 35 friendship cliques, completed questionnaires assessing body image, disordered eating, and a range of variables that have previously been associated with body image concern and disordered eating, including appearance-based social comparison, frequency of appearance-based conversation, appearance-based criticism, friends' concern with thinness, media influence and media pressure. Hierarchical linear modelling analyses found that friendship cliques in all-girls schools exhibited similar levels of body image concern and dieting behaviours, with various peer and other media influence variables accounting for these similarities. Friendship cliques in mixed-sex schools were not found to be similar with regard to body image concern or disordered eating. These findings support the notion that friendship groups can be an important source of influence on the body image concerns of adolescent girls in single-sex schools, and show that both individual and friendship clique level measures of attitudes and behaviours make independent contributions to the prediction of these body image concerns.

Keywords: Social networks; Body image; Peer influences; Dieting; Single-sex schooling

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Introduction

Emphasis on thinness as a foundational aspect of feminine beauty has been joined by more recent concerns about obesity in Australia, the United States, Canada, the United Kingdom and many other countries to increasingly portray thinness as a marker of successful self-management and desirable femininity. According to the widely adopted tripartite influence model (van den Berg et al. 2002), broad cultural mandates for thinness are transmitted to girls via three main channels: parents, peers, and the media. In this paper, we investigate one of these channels – peer influence -- by exploring how body related attitudes and behaviours are distributed within and between the friendship groups of Australian adolescent girls attending single-sex and mixed-sex schools. We extend the existing literature by using hierarchical linear modelling to examine the contribution of body related attitudes and behaviours measured at both the individual and friendship group level to the prediction of body image concern and disordered eating in adolescent girls.

In Australia, as in many countries in Western Europe and North America, women and girls are subject to frequent, intense exposure to images of very thin women as the embodiment of ideal femininity (Tiggemann and Miller 2010). A recent cross-cultural comparison of body ideals found that there was negligible difference in the body ideals endorsed by Australian women compared to those in North America and Western Europe (Swami et al. 2010). Even though these images are widely critiqued as unreal (i.e. manipulated by Photoshop) and unrealistic for most women, there is significant social privilege attached to thinness, particularly for women (for a recent review see Fikkan and Rothblum, 2012), and many Australian women and girls adopt the ideals represented by these

images, investing considerable time and energy in striving to emulate these very thin figures (e.g. Rodgers et al. 2011).

There is widespread concern in Australia about the impact of body dissatisfaction on young women's mental health and well-being (e.g. Hart et al. 2012; Hay et al. 2008). Although studies with Australian samples have shown that body size dissatisfaction affects women and men of all ages (e.g. Donaghue and Smith 2008; Mellor et al. 2010), body image concern is especially prevalent among young women; recent surveys have identified body image as among the top two concerns of Australian adolescent girls and young women (Mission Australia, 2010, 2011). Research conducted in Australia has found that body image concern is associated with low self-esteem and depression (e.g., Kostanski and Gullone, 1998; Tiggemann 2005), disordered eating (Tiggemann and Williams 2012), and reduced sexual confidence (Donaghue 2009). Many Australian school-based interventions have been developed in an effort to equip adolescent girls to better resist social and cultural pressures to be thin (e.g. O'Dea and Abraham 2000; Richardson and Paxton 2010). However, concerns about body dissatisfaction and eating disorders are often lost amid the louder public health warnings about the dangers of rising obesity in Australia, which has lead to the development of an intense focus on monitoring the bodies and eating habits of students in schools (Leahy 2009). Thus adolescent girls in Australian schools are subject to mixed messages about accepting versus controlling their bodies, and a climate of body surveillance in schools (Carey et al. 2011; Leahy 2009).

High schools as 'appearance cultures'

Among adolescents, many of the most important peer interactions are set within the broader context of their high school (Brown et al. 2008). These school environments have been found to intensify the wider cultural beliefs regarding the importance of beauty and thinness, to form what Jones et al. (2004) have labelled 'appearance cultures' within many

high schools. Appearance cultures have three main elements: appearance conversations, peer appearance criticism or teasing, and incorporation of appearance-focused media into interpersonal interactions (Jones et al. 2004). Empirical support has been found for all three elements of appearance cultures within high schools. For example, a study of adolescent girls in the UK found that these girls experience pressure within the school environment to evaluate their own and others' bodies in relation to the cultural thin-ideal (Rich and Evans 2008). In an Australian study, high school girls reported that appearance-focused conversations, appearance-based gossip, dieting, and weight monitoring formed a major part of their everyday interaction with friends at school (Carey et al. 2011). Appearance-focused media has also been shown to be widely incorporated into the school-based interactions of adolescent girls; Clark and Tiggemann (2006) found that Australian high school girls regularly looked at fashion and celebrity magazines at school with their friends, and material in these magazines was a frequent topic of conversation. In addition to these mass media products, more recent Australian research shows that social media is another key site of adolescent girls' appearance conversations, with the pictures posted to MySpace and Facebook pages a routine subject of discussion and surveillance (Carey et al. 2011; Tiggemann and Miller 2010). High levels of exposure to appearance-focused internet sites (such as MySpace) were found to be associated with weight dissatisfaction and increased drive for thinness (Tiggemann and Miller 2010). Appearance cultures can thus be understood as a key means by which wider cultural pressures for thinness and sexual attractiveness are translated into the everyday interactions of adolescent girls.

In addition to exploring the role of school-level appearance cultures, researchers have also investigated the role of smaller friendship cliques within high schools in either intensifying or buffering the appearance pressures experienced by adolescent girls. A comprehensive study by Paxton and colleagues (Paxton et al. 1999) investigating the similarity of body image

concerns and eating behaviours within the friendship groups of adolescent girls (attending single-sex and mixed-sex schools in Australia) found friendship clique members to be similar in body image concerns, dietary restraint, and the use of extreme weight loss behaviours. More recently, another Australian study using a similar method (with girls attending single-sex schools) found that friends engaged in similar levels of dieting and extreme weight loss behaviours, but did not replicate Paxton et al.'s finding of similarities in body image concern (Hutchinson and Rapee 2007). Both of these studies used social network analysis methods to identify friendship cliques and found both above-chance levels of similarity among clique members, and that individual girls' scores on these weight-related attitudes and behaviours could be predicted from the scores of their friends. However, although these studies provide powerful evidence of the important role of friendship groups in the weight-related concerns of adolescent girls, they did not employ multi-level statistical methods to tease apart the contribution of individual and group level measures of weight-related attitudes and behaviours to the prediction of body image concern or disordered eating – a limitation that we address in this study. Evidence that girls not only share similar appearance concerns as their friends, but also that the micro-culture created by these shared attitudes and behaviours within a friendship group could predict additional variance in the body satisfaction and dieting behaviour of girls would provide an even more compelling case than currently exists for the key role of peer influence in mediating the wider cultural pressures of the thin ideal.

Single-sex and mixed-sex school environments

The Australian secondary education system comprises two categories of schools: government (public) schools, which receive almost all their funding from the state and federal government, and private schools, which receive approximately half of their funding from the government (Harrington, 2013) and which often have a religious affiliation ("Schooling in Western Australia", n.d. para.2). While all government schools in Western Australia are

coeducational, many private schools provide single-sex education ("Schooling in Western Australia", n.d. para.2). In Western Australia around 43% of all high school students attend a private school, and about 45% of these attend a single-sex school (Australian Bureau of Statistics, 1997). As body image pressures and concerns have been found to be highly gendered, it is likely that the gender composition of the school may influence the extent to which the school environment facilitates the development of appearance cultures.

It has been posited that single-sex girls' schools can present conflicting gender-role messages to adolescent girls (Mensinger 2001, 2005). According to this view, single-sex schools tend to emphasise both non-traditional academic achievement for girls while retaining strong traditional feminine values relating to beauty and sexual attractiveness. The extra burden created by the pressure to succeed academically while also embodying and enacting socially rewarded feminine characteristics (particularly thinness and beauty) has been conceptualised as a direct risk factor for disordered eating; indeed one study in the US found that girls in single-sex schools who aspired to this 'superwoman' ideal were much more likely to display signs of disordered eating than their classmates who did not (Steiner-Adair, 1986; but see also Mensinger et al. 2007 who found that conflicting gender roles were associated with disordered eating, but did not differ between single-sex and mixed-sex US schools). More recently, Drury et al. (2012) found that Columbian girls in single-sex schools reported greater pressure to conform to traditional gender norms than did girls in mixed-sex schools.

There are other differences between single-sex and mixed-sex schools that could also contribute to differences in appearance-related pressures. For example, in a single-sex school environment the greater number of other girls with whom to make body-based comparisons might influence how these girls perceive and evaluate their own bodies (Spencer et al. 2012); a recent meta-analytic review found that a higher frequency of weight-based social

comparison is associated with greater body dissatisfaction, particularly among young women (Myers and Crowther 2009). Furthermore, girls' friendships with boys in coeducational settings may play an important protective role, with one US study finding that high levels of platonic involvement with the opposite gender were related to greater body image satisfaction in Caucasian girls (Compian et al. 2004).

Several studies have explored whether there are differences in body satisfaction, thin-ideal aspiration, and disordered eating between girls at single-sex compared to coeducational schools, with mixed results. One study in Northern Ireland found girls in single-sex schools to be less satisfied with their physical appearance than girls attending mixed-sex schools (Granleese and Joseph 1993), and several Australian studies have found that girls in single-sex schools desire a significantly thinner figure than girls in mixed-sex schools (Davey et al. 2011; Dyer and Tiggemann 1996). However, other studies have failed to replicate these findings (Tiggemann 2001). Beyond the high school environment, studies comparing women in the US attending single-sex and mixed-sex colleges have also produced inconsistent findings, with Flicek and Urbas (2003) finding no differences in eating behaviour or body image concern as a function of college type, and Spencer et al. (2012) unexpectedly finding that women in women's colleges endorsed larger body ideals than women in mixed-sex colleges. Taken together these findings suggest that although school composition might be a factor affecting how female students experience body image pressures, the nature of this influence is variable, in some cases appearing to ameliorate and in others to intensify the pressure to be thin.

The present study

Regardless of school gender composition, it is clear that the peer subcultures embedded within the school environment are key determinants of adolescents' body image concern and disordered eating (Jones et al. 2004; Hutchinson and Rapee 2007; Paxton et al. 1999). While

not denying the importance of individual factors, we contend that peer culture is central to the experience of disordered eating and body image concern, shaping the way in which these concerns manifest. In this study we aim to further develop the work of Paxton et al. (1999) and Hutchison and Rapee (2007) concerning the role of friendship cliques and school gender composition in adolescent girls' body image concern and disordered eating behaviours, using hierarchical linear modelling (HLM; a statistical procedure employed in the analysis of nested data). HLM represents a more sophisticated approach towards the partitioning of within- and between-group variance than has previously been used in analyses of friendship cliques and body image concern, and allows us to examine whether the inclusion of clique-level measures can account for additional variance above that explained by the inclusion of individual-level measures. The majority of the predictor variables included in the study matched those used by Paxton et al. (1999), and included: self-esteem; relative body mass (BMI); media influence and pressure from media; peer influence; friends' concern with thinness; and appearance conversations. Additionally, in order to fully capture the components of appearance cultures identified by Jones et al. (2004) two further variables were included: comparison with peers, and appearance criticism. The mixed findings to date concerning the role of school composition in transmitting appearance and weight based pressures mean that we have no specific hypotheses concerning differences between girls attending single-sex and mixed-sex schools; however, given that school composition has been shown to be an important factor in body image concern in several studies, we analysed the single- and mixed-sex schools separately.

We hypothesised that:

1. Friendship clique members will share similar levels of body image concern and disordered eating behaviours.

2. Body image concern will be predicted by body mass index (BMI), self-esteem, pressure from media, and friends' concern with thinness, in line with the findings of Paxton and colleagues (1999).
3. Disordered eating behaviour will be predicted by pressure from the media, appearance conversations, comparison with peers, and body image concern, in line with the Tripartite Influence Model (van den Berg et al. 2002).
4. Clique-level variables will significantly predict body image concern and disordered eating behaviours over and above the contribution of individual factors.

Method

Participants and Procedure

Participants were 224 female Year 10 students from one of four private schools (one single-sex, three mixed-sex) in a large Australian city. Ninety male students also participated in the study, but as none were found to be members of the identified friendship cliques involving girls (discussed below), their data are not included here. All schools were initially approached by mail, email, or personal contact, and each was provided with a letter outlining the study and inviting participation. This initial contact was followed by a series of formal and informal correspondence with each school during which the conduct of the project was co-negotiated. Consent forms and an information letter outlining the study were sent to the home addresses of all Year 10 students at the school, allowing informed consent to be collected from both students and their parents prior to the administration of any questionnaires.

Questionnaires were administered in classroom groups as part of the regular class period. In all cases the classroom teacher supervised the questionnaire administration, aided by an instruction and information sheet. All questionnaires were completed within 40 minutes. Participants completed the friendship nomination questions first, followed by the body image,

social pressure, and disordered eating measures. Participants were also provided with a debriefing form at the end of the session. This study received ethics approval from the Murdoch University ethics committee.

The response rate for the single-sex school was 90%, and for the mixed-sex schools averaged 64%. This represents a significant difference, χ^2 (4) = 195.1, p <.001. The schools were all located in high SES suburbs of Perth (the capital city of Western Australia) and all were private (non-government) and affiliated with a Christian religion (either Catholic or Uniting Church). The annual school fees for the mixed-sex schools ranged from $4000 to $8000 per year, and were $6000 per year for the single-sex school, locating them within the middle band of private schools in Western Australia. Students at the single-sex school were significantly younger than those at the mixed-sex schools (*M*s = 14.75 and 15.57 years, respectively, $t(161) = -13.65$, $p < .001$). Age and body-size characteristics of students from each of the four schools are presented in Table 1.

Insert Table 1

Measures

Friendship nomination. Each participant was provided with a list of all Year 10 students at their school, which showed each student's name alongside an arbitrarily-assigned identification number. Participants were required to provide their own identification number at the top of their questionnaire package, and to use only the identification numbers of their friends when replying to the friendship nomination questions. This ensured that no names appeared anywhere on the questionnaire.

Responses to the following questions adapted from Paxton and colleagues (Paxton et al. 1999; Drury et al. 2012) were used to define friendship groups:

(1) Using the list provided, write down the numbers of your best friends, that is, the friends who you hang around with the most and are closest to.

(2) Is there a particular group of friends you normally hang around with? (a) Yes. (b) No, I hang around with a number of different 'groups' or with people from a number of different 'groups.' (c) No, I spend most of my time with one other friend. (d) No, I spend most of my time alone.

(3) If you answered (a) to Question 2, write down the numbers of the friends in the 'group' you hang around with.

(4) If you answered (b) to Question 2, write down the numbers of the friends from the different 'groups' you hang around with.

(5) If you answered (c) to Question 2, write down the number of the friend you spend most of your time with.

The UCINET-VI statistical package (Borgatti et al. 1999) was used to analyse the data resulting from these questions. Firstly, the data were symmetrised so that only reciprocated ties were maintained, after which a hierarchical clustering matrix, utilising responses to Questions 3 and 4 above, was used to identify non-overlapping cliques. In order to corroborate the accuracy of these friendship groupings, cliques so identified were then compared against the raw sociometric data. This resulted in a small number of alterations which served to maximise the individuals assigned to cliques without compromising the cohesion of these groups.

Secondly, dyads were excluded from any further clique analyses as they have been found to show different patterns of interaction and influence than larger groups (Brown 1989). In addition, as independence of groups was a necessary requirement for the statistical analysis, cliques were not allowed to overlap. Any individual found to have links to more than one group was allocated to the group to which they had the most potent ties, and those individuals

who could not readily be allocated to any single group were omitted (8 all-girls' and 3 coeducational). Seventeen cliques in the single-sex school and 18 cliques in the mixed-sex school were thus identified, accounting for a total of 156 participants (80 single-sex, 76 mixed-sex). These cliques ranged in size from 3 to 11, with a mean of 4.42 members (*SD*=1.90). Mean size did not differ significantly between schools, $F(3,32) = 2.12$, $p = .117$, $\eta^2 = .166$.

The strength of friendship ties was calculated as the total of within-clique links present divided by the possible number of links. The majority of ties (58.33%) exhibited the maximum cohesion score of 1.00, and the overall mean cohesion was 0.86 (*SD*=0.19). There was no significant difference in terms of cohesion of the cliques between schools, $F(3,31) = .35$, $p = .792$, $\eta^2 = .033$, or by school type, $t(33) = -0.37$, $p = .713$.

A total of 68 girls (35 from the single-sex school, 33 from mixed-sex schools) did not fit into one of these cliques and were thus omitted from the analysis. In addition, none of the cliques identified by this method included both boys and girls, although this was a possibility in the mixed-sex school cliques, and thus all boys were omitted from the analysis.

Body image concern. Body image concern was assessed using the Body Shape Questionnaire-Revised-10 (BSQ-R-10;Mazzeo 1999). This is a 10-item scale designed to measure body image preoccupation; for example, "Have you been particularly self-conscious about your shape when in the company of other people?" Participants are asked to indicate the extent to which each item is true of themselves, on a 6-point scale varying from *Never* (1) to *Always* (6). A mean of the 10 items was computed for each individual, with higher scores indicating greater body image concern. This scale demonstrates acceptable criterion validity in its correlation with measures of disordered eating (Mazzeo 1999), and exhibited excellent internal reliability (Cronbach's $\alpha = .96$).

Disordered eating. Disordered eating attitudes and behaviours were assessed using the 26-item version of the Eating Attitudes Test (EAT-26;Garner et al. 1982). This version, which correlates well with the original 40-item scale (r = .98) and has been validated for use in adolescent populations, consists of three subscales (Dieting, Bulimia/Food Preoccupation, and Oral Control). Participants were asked to rate the frequency of a variety of thoughts and behaviours (for example: "I avoid eating when I am hungry") on a 6-point scale, ranging from *Always* (1) to *Never* (6). A mean of the 26 items was calculated for each individual, as well as mean scores for each of the three subscales. Cronbach's alpha for this sample was .88.

Self esteem. The Rosenberg Self Esteem Scale (RSES; Rosenberg 1965) was used to assess general self-esteem. Participants indicated their agreement with 10 items, such as "At times I think I am no good at all", on a 4-point scale ranging from *Strongly Agree* (1) to *Strongly Disagree* (4). A mean of the 10 items was computed for each individual, with higher scores indicating higher self-esteem. This scale is well-established for use with adolescents, and demonstrates adequate temporal reliability (r = .87; Krones et al. 2005). Cronbach's alpha for this sample was .91.

Peer and media influence. Two agents of influence on adolescent body image concern and disordered eating behaviours were assessed, namely friends and media. Both scales were adapted from Paxton and colleagues (Paxton et al. 1999) and assessed how important participants believed their friends and the media to be in shaping five key areas: their ideas of the perfect body, the diet products they used, the exercises they used to tone up, how to get the perfect body, and diets they used to lose weight. An example item is "How important do you believe your friends are in influencing your ideas of the perfect body?" Assessments were made on a 5-point scale ranging from *Not at all* (1) to *Extremely* (5), and a mean score calculated for each individual, with higher scores indicating greater perceived influence. Both

the peer influence (Cronbach's α = .91) and media influence (Cronbach's α = .95) scales demonstrated excellent internal reliability.

Pressure from media. Pressure from media was assessed using two items adapted from Paxton and colleagues (Paxton et al. 1999): "How much pressure to be thin do you feel from advertising?" and "How much pressure to be thin do you feel from magazines and TV?" Both items were rated on a 5-point scale ranging from *None* (1) to *A lot* (5), with mean scores calculated for each individual. Cronbach's alpha for this sample was .93.

Friends' concern with thinness. Friends' concern with thinness was assessed using 12 questions adapted from Paxton and colleagues (Paxton et al. 1999) and Schutz and colleagues (Schutz et al. 2002; see Table 2). These items were rated on a 5-point scale, with higher scores indicating greater perceived peer concern. Individual scores were computed as a mean of the 12 items. This scale demonstrated adequate internal reliability (Cronbach's α = .75).

Insert Table 2

Appearance conversations. One item adapted from Paxton and colleagues (Paxton et al. 1999) was used to assess girls' appearance-based conversations with friends: "How often do you and your friends talk about weight, weight loss, and dieting?" This item was rated on a 5-point scale ranging from *Never* (1) to *Always* (5).

Comparison with peers. Two items adapted from the Social Comparison to Models and Peers scale (Jones 2001) were used to assess comparison with peers. Girls were asked to indicate on a 5-point scale ranging from *Never* (1) to *Always* (5) how often they compared their weight and shape to other girls (e.g. "How often do you compare your weight to that of other girls?". The mean of the two items was computed for each individual. This scale demonstrated good internal reliability (Cronbach's α = .90).

Appearance criticism. Appearance criticism was assessed using two items adapted from Jones and colleagues (Jones et al. 2004):"How often do boys say that you would look better if

you were thinner?" and "How often do girls say that you would look better if you were thinner?" These items used a 5-point rating scale, *Never* (1) to *Always* (5), and demonstrated good internal reliability (Cronbach's α = .87).

Clique-level variables. A number of clique-level variables were calculated from these individual measures for use in the hierarchical linear modelling analyses. These variables were calculated as the simple arithmetic mean of the individual variable scores for each member of a clique, assuming equal contribution by all clique members. The result was a clique score for each of the following variables: media influence, pressure from media, appearance conversations, comparison with peers, peer influence, and appearance criticism.

Results

In order to ascertain the representativeness of the clique sample as compared to the sample as a whole, a multivariate analysis of variance (MANOVA) was conducted to compare those placed in friendship cliques with those excluded on the dependent variables of interest, namely body image concern and disordered eating. The results showed no significant difference between clique members (body image concern $M = 2.78$, $SD = 1.14$; disordered eating $M = 0.28$, $SD = 0.30$) and unallocated students (body image concern $M = 2.90$, $SD = 1.23$; disordered eating $M = 0.34$, $SD = 0.33$), Wilks' LAMBDA=0.99, F (2, 193) = 1.02, p =.361.

Differences between the schools in terms of the measured variables were then investigated using a series of multivariate analyses of covariance (MANCOVA), with age as a covariate. Only those students who had been assigned to a clique were included. The first MANCOVA compared the three mixed-sex schools, and was not significant, Wilks' LAMBDA = 0.50, F (36,146) = 1.06, p = .390. The three mixed-sex schools have therefore been combined in the following analyses.

We then conducted a MANCOVA testing differences between the two school types, again with age as a covariate. This MANCOVA was also not significant, Wilks' LAMBDA = 0.80, F (24,264) = 1.32, p = .147. Descriptive statistics relating to these variables are presented in Table 3.

Insert Table 3

Next, a series of correlational analyses were carried out separately by the two school types. As seen in Tables 4 and 5, significant intercorrelations between variables were found for both single-sex and mixed-sex school students. The pattern of correlations was generally similar between schools, although some differences in peer and media influence are clear. For the single-sex school students, peer influence was not correlated with any of the dependent variables (body image concern, dieting behaviour, bulimia, oral control), whereas in mixed-sex school students, significant correlations were found between peer influence and body image concern and dieting behaviour. Similarly, media influence was correlated with body image concern, dieting behaviour, and oral control in single-sex school students, and only with dieting behaviour in mixed-sex school students. No multicollinearity was observed for either single-sex (mean VIF = 1.97) or mixed-sex school students (mean VIF = 1.76).

Insert Table 4

Insert Table 5

In order to test the first hypothesis, namely that friendship group members would share similar levels of body image concern and disordered eating behaviours, a set of ANOVAs were conducted. These were conducted separately for single-sex and mixed-sex school students. As scores on the Bulimia and Oral Control subscales exhibited extremely low variability, tests of these variables were inappropriate and thus Dieting Behaviour was investigated in place of disordered eating as a whole.

This MANOVA was significant for single-sex school students,Wilks' LAMBDA = 0.41, $F(38, 128) = 1.87$, $p = .005$, with examination of the univariate F values revealing significantly greater between- than within-group variance on body image concern (clique means ranging from 1.53-3.98, $M = 2.81$, $SD = 0.71$), $F(19,66) = 2.25$, $p = .008$, $\eta^2 = .393$, as well as dieting behaviour (clique means ranging from 0-0.92, $M = 0.30$, $SD = 0.28$), $F(19,65) = 2.09$, $p = .015$, $\eta^2 = .379$. Thus it was concluded that friendship cliques in single-sex schools could be characterised by their level of body image concern and dieting behaviour.

No significant differences were obtained for girls in mixed-sex schools (body image concern clique means ranging from 1.74-4.07, $M = 2.78$, $SD = 0.58$; dieting behaviour clique means ranging from 0.04-0.65, $M = 0.28$, $SD = 0.17$), Wilks' LAMBDA = 0.67, $F(38,104) = .62$, $p = .954$, indicating that friendship cliques in mixed-sex schools could not be characterised by their level of body image concern or dieting behaviour. Examination of the standard deviations also revealed greater variability among the all-girls' scores than among the coeducational students. These results are thus consistent with our first hypothesis for girls at single-sex schools, but not for those at mixed-sex schools.

To test the remaining hypotheses, a series of HLM analyses were conducted (separately by school type) to investigate the individual- and clique-level predictors of body image concern and disordered eating in single-sex and mixed-sex schools, taking into account the hierarchically organised nature of the clique data. Two-level models were used, with individual variables entered at Level 1 and clique variables at Level 2. Separate analyses were conducted for body image concern and disordered eating, and models were estimated separately for single-sex and mixed-sex school students, where warranted. Model estimation followed the guidelines set forth by Bryk and Raudenbush (Bryk and Raudenbush 1992)

using HLM 6.08. The restricted maximum likelihood estimation method was used in all analyses.

As a first step in each analysis, a fully unconditional model which included only the outcome was estimated. Where this model was significant, HLM was deemed to be warranted. Level 1 random-intercepts (fixed slopes) models were then estimated where appropriate. All variables were group mean centred. Lastly, Level 2 intercepts-as-outcomes models were specified, in which clique-level predictors were entered into the model along with individual-level predictors. Potential Level 2 predictors were determined using exploratory analysis, and those variables deemed to be theoretically important were then entered into the final equation. All Level 2 predictors were grand mean centred. Differences in the deviances for the Level 1 and 2 models were compared to evaluate the improvement of fit between models.

Predicting Body Image Concern

A fully unconditional model was first estimated to determine whether the variability in body image concern was significantly different from zero. For single-sex school students, this model was significant, $\chi^2(16, N = 80) = 40.68$, $p = .001$, with 23.36% of the variance in body image concern being within groups, indicating that HLM was warranted.

To test hypothesis 2, a Level 1 model was then specified, whereby BMI, self-esteem, pressure from media, and friends' concern with thinness were entered as individual-level predictors of body image concern. No evidence of multicollinearity was observed (mean VIF = 1.24). Table 6 provides the fixed and random effects for the Level 1 and 2 models.

Insert Table 6

For the Level 1 model, as can be seen in Table 6, BMI, self-esteem, and pressure from media were significant predictors of body image concern such that girls with higher BMI and

perceived media pressure, and lower reported self-esteem, experienced greater body image concern. These results are partially consistent with the hypothesis. Overall this model was significant, indicating that there was still considerable variation in the intercept to be explained, and therefore Level 2 predictors were entered.

The Level 2 intercepts-as-outcomes model included clique-level variables as predictors, in addition to the individual-level predictors investigated in Level 1. Exploratory analyses revealed comparison with models, comparison with peers, appearance conversations, media influence, and media pressure to be potential predictors. However, we judged that media influence and pressure would encompass comparison with models at a group level, and thus this latter variable was not entered as a predictor. As seen in Table 6, media influence, media pressure, and comparison with peers were significant clique-level predictors of body image concern. Specifically, friendship cliques in single-sex schools that were characterised by greater media influence and comparison with peers, and less media pressure, were found to exhibit greater body image concern. These results are consistent with hypothesis 4. Overall this model was not significant and thus no additional variation in the intercept model remained to be explained. No evidence of multicollinearity was found (mean VIF = 2.31)

For mixed-sex school students, the unconditional model predicting body image concern was not significant, $\chi^2(17, N = 76) = 12.33$, $p > .500$, in line with the MANOVA results. The intra class correlation indicated that only 0.03% of the variance was at the group level, and therefore HLM was not found to be warranted in this instance.

Predicting Disordered Eating and Dieting Behaviour

As noted earlier, the oral control and bulimia subscale scores exhibited low variability and thus could not be further tested. Therefore, dieting behaviour was investigated in lieu of disordered eating as a whole. The unconditional model for dieting behaviour in single-sex

school students was significant, $\chi^2(16, N = 80) = 36.16$, $p = .003$, with 20.07% of the variance being within groups.

In order to test hypothesis 3, a Level 1 model with dieting behaviour as an outcome variable was therefore specified, with pressure from media, appearance conversations, comparison with peers, and body image concern entered as individual-level predictors. There was no evidence of multicollinearity (mean VIF = 2.10). Table 7 provides the fixed and random effects for the Level 1 and 2 models.

Insert Table 7

As can be seen in Table 7, appearance conversations, comparison with peers, and body image concern were significant predictors of dieting behaviour, such that girls reporting more appearance conversations, less comparison with peers, and greater body image concern reported higher levels of dieting behaviour. These results are partially consistent with our hypothesis, although pressure from the media did not emerge as a significant predictor. Overall this model was significant, indicating that there was still significant variation in the intercept to be explained, and therefore Level 2 predictors were entered.

Exploratory analysis revealed influence from friends, appearance conversations, and appearance criticism to be potential predictors of dieting behaviour at a clique level, and therefore these variables were entered at Level 2. No evidence of multicollinearity was found (mean VIF = 1.43). As can be seen in Table 7, friend influence and appearance conversations were significant clique-level predictors of dieting behaviour. Specifically, friendship cliques characterised by higher levels of influence from friends and more appearance conversations were found to display higher dieting behaviour scores. Overall this model was not

significant, and thus no additional variation in the intercept remained to be explained. This is consistent with hypothesis 4.

For mixed-sex school students, the unconditional model predicting disordered eating was not significant, $\chi^2(17, N = 76) = 16.37$, $p > .500$, with only 1.17% of the variance being at the group level. HLM was therefore not found to be warranted for mixed-sex school students, in line with the earlier MANOVA results.

Discussion

This study sought to extend our understanding of the influence of friendship cliques and school gender composition on adolescent girls' body image concern and disordered eating. The friendship clique environment was found to shape the body image concern and dieting behaviour of girls in single-sex, but not mixed-sex, schools, suggesting that friendship group influence varies according to the school gender composition. The finding for girls in the single-sex schools are consistent with those of Paxton and colleagues (Paxton et al. 1999), who found friendship clique members to be similar with regard to their body image concerns, dietary restraint, and the use of extreme weight loss behaviours.

Specifically, we found girls in single-sex schools to be more likely to share similar levels of body image concern and dieting behaviour within their friendship cliques as compared to their school classmates as a whole. Cliques characterised by greater media influence and comparison with peers, and less perceived media pressure, were found to exhibit greater body image concern, while cliques reporting greater influence from friends and more appearance conversations reported higher levels of dieting behaviour. These findings are as expected, with the exception of media pressure, given that a positive predictive relationship was found between media pressure and body image concern at an individual level. The hierarchical modelling used in our analysis has allowed us to detect a reversal of the relationship between perceived media pressure and body image concerns when that perceived pressure is shared by

peers as compared to being experienced individually. This points towards the idea that something distinctive is occurring in the group environment which does not manifest at an individual level. It may be that when friends share the view that media images constitute a 'pressure', it is easier to externalise, and thus resist, their influence. This is consistent with conceptualisations of media influence that identify internalisation as the mechanism by which media images exert their effects (Presnell et al. 2004) and which promote critical media literacy as at least a partial protection against the influence of media images (Yamamiya et al. 2005). Our findings suggest the intriguing possibility that this kind of intervention might be most effective when critical media literacy is incorporated into the micro-culture of the friendship group, rather than being conceptualised as part of the repertoire of resistance of individual girls. However, this finding was not replicated within the friendship cliques in mixed-sex schools; more research is needed to further investigate this effect, and to identify whether reduced individual internalisation is the mechanism by which the clique-level identification of media pressures works to reduce body image concern.

Unexpectedly, friendship cliques in mixed-sex schools were not found to be similar with regard to their body image concern and dieting behaviours. This finding is inconsistent with those of Paxton et al (1999). It is important to be cautious in interpreting our null findings, and to keep in mind that overall levels of body-image concern and dieting behaviour did not differ between girls in the single-sex and mixed-sex schools. It is possible that some other kind of similarity forms the basis for cliques in the mixed-sex schools in our sample; greater diversity in the student body in terms of demographic characteristics (such as ethnicity, socioeconomic status or family composition) might reduce the salience of body image related issues as a basis for similarity among friends. There may also be differences in the gender-related attitudes and values of families who choose mixed-sex rather than single-sex private schooling for their daughters (see Jackson and Bisset 2005 for a discussion of parents'

reasons for choosing single or mixed-sex schooling in the United Kingdom). However, we have no data that can directly address these other potential bases of friendship group similarity and their relationships with body image related issues; they remain important questions for future research.

It does not appear that the lack of cohesion with respect to body image concern and dieting in girls' friendship cliques within mixed-sex schools arises as a result of including boys as part of the girls' peer groups; all cliques found in these schools were homogenous with regard to gender composition. While of course it remains possible that the presence of boys does influence how girls' friendship cliques form in mixed-sex schools, more investigation into the specific mechanisms by which the presence of boys might influence the body image pressures experienced by girls is needed. Future research should also include measures of gender role expectations in order to examine whether differences in gender role conflict between single-sex and mixed-sex schools can account for the differences in the importance of body image and dieting to the characterisation of friendship cliques within these school environments (Mensinger 2001, 2005).

Limitations

There are several important methodological limitations to this study that need to be noted. Foremost, this study included only one single-sex school, although all single-sex schools in the area were invited to participate. This reluctance of single-sex girls' schools to participate in research projects related to disordered eating has been previously documented by Mensinger (Mensinger 2005). Ironically, although it was more difficult to recruit single-sex schools, the response rate from the single-sex school we did include was substantially higher than from the mixed-sex schools. We have no clear information that allows us to account for this difference.

Although all of the schools in the study were private schools and were similar in socioeconomic status, the inclusion of only one single-sex school means that results relating to the differences between school types may be influenced by idiosyncratic features of the particular school that was studied, and wider conclusions should be drawn with great caution. The students from the single-sex school were younger than those from the mixed-sex schools by an average of 9 months (although all were in year 10), which opens the possibility that age may influence the importance of similarities in body image concerns to friendship groups. It is also possible that other demographic factors including the ethnic and racial background of students, which were not directly controlled in the current study, may differ between schools and be partially responsible for the pattern of results.

Beyond the difficulties that inevitably arise from the inability to unconfound school composition from other factors that might influence body image concern and disordered eating, there are other methodological limitations that should also be considered. In particular, the method of calculating clique-level measures used in this study (as in Paxton et al. 1999) gives equal weight to the attitudes and behaviours of all identified clique members. This does not capture the ways in which friendship cliques may have leaders or otherwise disproportionately influential members, whose attitudes and behaviours may 'set the tone' for the clique. We also do not have information about the stability or longevity of the friendship cliques that we identified, which may be a factor in the similarity of body image and eating concerns among friends. Furthermore, our methods do not allow for any effect of the degree of variance among clique members' body-related attitudes and behaviours; it is not hard to imagine that cliques in which all members share very similar attitudes might function in a different way from those in which there is a greater diversity (even if the mean attitudes and behaviours of these cliques were similar). Future research should explore methods of

identifying clique leaders, and of creating clique-level variables that capture some of these more nuanced elements of the micro-cultures created within friendship cliques.

Implications and conclusions

On the whole, these findings have many important theoretical and clinical implications. On a theoretical level, these findings have provided further evidence for the proposition that features of the micro-cultures within friendship cliques contribute to disordered eating and body image concerns, by testing these relationships using analytic techniques that allow for the dependent nature of the data obtained from friends. These findings have implications for the development and delivery of eating disorder and body image concern prevention and intervention programs, specifically by identifying friendship cliques as critical contexts within which prevention programs should be directed. Many current prevention programs provide information designed to encourage individual girls to identify and 'resist' peer and wider cultural pressure, and thereby transform these cultural issues into an individual responsibility; our findings suggest that efforts to directly address the dynamics of appearance cultures within schools by developing materials that encourage girls to discuss critiques of appearance pressures with their friends might be a useful additional strategy in attempts to support adolescent girls in their development of means of resisting the ubiquitous and powerful pressures to be thin.

Overall, the results of this study show that there are friendship clique similarities in body image concerns and dieting behaviours in some schools, but not in others. Our findings suggest that school composition (single versus mixed sex) may be one important factor in the development of friendship cliques that share similar levels of body image concern and dieting behaviour, but further studies that include a larger number of single-sex schools are needed to confirm this finding. Our results do nonetheless provide strong evidence that the extent to which girls' friendship cliques are organised around appearance-based concerns is itself

highly variable, and opens important questions for future research about the relationships between school-level appearance cultures, clique-level micro-cultures and individual attitudes and behaviours around body image concern and disordered eating.

Our findings in relation to media pressure provide initial support for the possibility that peer groups may not only amplify the effects of individually held beliefs but in some cases may alter the nature of these effects. The resistance to media influence that is the goal of many prevention programs may therefore be nurtured by the perception that one's peers share critical attitudes towards images presented in the media. Interventions targeted at the peer level could thus go some way towards reconciling the inconsistencies that adolescent girls have reported between the hopeful messages promoted by body acceptance programs offered in their schools and the lived reality of their day to day experiences with their friends (Carey et al. 2011).

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Tables

Table 1

Body-size Characteristics (Mean, SD) of Participants by School

Variable	All-girls' (n=115)	Coeducational school 1 (n=44)	Coeducational school 2 (n=35)	Coeducational school 3 (n=30)	Significance
Age (years)	14.75 (.29)	15.64 (.53)	15.47 (.33)	15.49 (.37)	$\chi^2(90) = 209.04$, $p < .001$
Height (cm)	164.24 (7.82)	164.40 (8.50)	165.48 (8.58)	164.48 (6.63)	$\chi^2(123) = 109.07$, $p = .811$
Weight (kg)	54.69 (9.99)	55.10 (7.53)	56.42 (8.40)	59.11 (8.40)	$\chi^2(129) = 97.87$, $p = .981$
BMI	20.31 (3.53)	20.52 (2.76)	20.87 (3.70)	21.90 (2.92)	$\chi^2(474) = 445.88$, $p = .891$

Table 2

Items Assessing Friends' Concern with Thinness (from Paxton et al. 1999)

Item[a]
1. How important are weight and shape to your friends?
2. Compared to other things in their lives, how important do you think your friends' body weight and shape are to them?
3. How important do you think it is to your friends that your weight stay the same as it is now?
4. How important do you think it is to other girls at school that your weight stay the same as it is now?
5. How often do your friends encourage you to lose weight?
6. How often do your friends comment on each other's weight?
7. How often do your friends encourage each other to lose weight?
8. How often do your friends diet?
9. How often do your friends worry about their weight?
10. How often do your friends worry about what they eat?
11. How often do your friends skip meals?
12. Do you think that your friends take a lot of notice of each others' weight and shape?

[a] Each item rated on a 5-point scale from *Never* (1) to *Always* (5)

Table 3

Descriptive Statistics (Mean, SD) for Measured Variables by School

Variable	All-girls' (n=86)	Coeducational school 1 (n=28)	Coeducational school 2 (n=32)	Coeducational school 3 (n=18)
Body image concern[a]	2.79 (1.14)	2.68 (1.22)	2.85 (1.02)	2.69 (1.20)
Dieting behaviour[b]	0.29 (0.46)	0.28 (0.35)	0.28 (0.48)	0.33 (0.41)
Bulimia[b]	0.27 (0.26)	0.28 (0.36)	0.36 (0.46)	0.28 (0.28)
Oral control[b]	0.27 (0.40)	0.32 (0.51)	0.14 (0.19)	0.26 (0.40)
Self-esteem[c]	3.00 (0.58)	2.79 (0.63)	2.78 (0.41)	3.01 (0.53)
Peer influence[d]	2.26 (1.05)	2.10 (0.93)	2.28 (1.04)	2.46 (1.15)
Media influence[d]	3.05 (1.29)	2.87 (1.08)	3.30 (1.40)	3.54 (1.35)
Friends' concern with thinness[d]	2.24 (0.54)	2.33 (0.60)	2.52 (0.49)	2.52 (0.53)
Appearance conversations[d]	2.45 (0.86)	2.29 (1.08)	2.81 (0.97)	2.28 (0.96)
Pressure from media[d]	2.75 (1.19)	2.29 (1.24)	2.61 (1.07)	2.94 (1.15)
Comparison with peers[d]	2.92 (1.18)	2.93 (1.14)	3.09 (1.13)	3.0 (1.22)
Appearance criticism[d]	1.34 (0.78)	1.63 (1.16)	1.31 (0.60)	1.28 (0.73)

[a] Possible score ranged from 1 to 6; [b] Possible score ranged from 0 to 3; [c] Possible score ranged from 1 to 4; [d] Possible score ranged from 1 to 5

Table 4

Correlations between Measured Variables for All-Girls' Students (df=84)

	1	2	3	4	5	6	7	8	9	10	11
1.Body image concern	-										
2.Dieting behaviour	0.61***	-									
3.Bulimia	0.22*	0.35**	-								
4.Oral control	0.11	0.27*	0.14	-							
5.Self-esteem	-0.65***	-0.36***	-0.33**	-0.19	-						
6.Peer influence	0.14	0.17	0.14	0.12	-0.11	-					
7.Media influence	0.42***	0.30**	-0.05	0.23*	-0.25*	0.31**	-				
8.Friends' concern with thinness	0.43***	0.51***	0.17	0.31**	-0.40***	0.27*	0.32**	-			
9.Appearance conversations	0.42***	0.48***	0.18	0.29**	-0.28**	0.32**	0.29**	0.64***	-		
10.Pressure from	0.61***	0.45***	0.04	0.24*	-0.40***	0.02	0.66***	0.42***	0.33**	-	

media											
11.Comparison with peers	0.76***	0.41***	0.06	0.09	-0.63***	0.18	0.48***	0.51***	0.41***	0.65***	-
12.Appearance criticism	0.44***	0.35***	0.19	0.20	-0.36***	0.08	0.19	0.27*	0.33**	0.32**	0.43***

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

Table 5

Correlations between Measured Variables for Coeducational School Students (df=76)

	1	2	3	4	5	6	7	8	9	10	11
1.Body image concern	-										
2.Dieting behaviour	0.68***	-									
3.Bulimia	0.52***	0.62***	-								
4.Oral control	0.03	0.01	-0.20	-							
5.Self-esteem	-0.53***	-0.38***	-0.31**	-0.10	-						
6.Peer influence	0.31**	0.29*	0.12	-0.02	-0.08	-					
7.Media influence	0.20	0.35**	0.22	-0.12	-0.15	0.42***	-				
8.Friends' concern with thinness	0.07	0.23	0.14	-0.01	-0.07	0.53***	0.19	-			
9.Appearance conversations	0.27*	0.30**	0.11	-0.08	-0.08	0.54***	0.13	0.64***	-		
10.Pressure from	0.37**	0.42***	0.21	-0.01	-0.33**	0.46***	0.54***	0.43***	0.22	-	

media											
11.Comparison with peers	0.71***	0.58***	0.43***	-0.08	-0.47***	0.26*	0.30**	0.30*	0.29*	0.52***	-
12.Appearance criticism	0.11	0.24*	0.34**	-0.18	-0.09	0.15	0.12	0.26*	0.25*	0.27*	0.18

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

Table 6

Hierarchical Linear Modelling Results Predicting Body Image Concern in All-Girls' Students

	Level 1		Level 2	
Fixed effects	Coefficient	*SE*	Coefficient	*SE*
Within cliques				
Intercept	2.81***	.17	2.81***	.08
Body mass index	.11***	.02	.11***	.02
Self-esteem	-.86***	.14	-.86***	.14
Pressure from media	.42***	.06	.42***	.07
Friends' concern	- .13	.17	-.13	.17
Between cliques				
Media influence			.44*	.18
Pressure from media			-.61*	.25
Appearance conversations			.13	.21
Comparison with peers			1.09***	.19
Random effects	Variance	χ^2 (df)	Variance	χ^2 (df)
τ (Between cliques)	.44	134.94***	.03	18.03
σ^2 (Within cliques)	.31	(16)	.31	(12)

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

Table 7

Hierarchical Linear Modelling Results Predicting Dieting Behaviour in All-Girls' Students

	Level 1		Level 2	
Fixed effects	Coefficient	*SE*	Coefficient	*SE*
Within cliques				
Intercept	.30**	.07	.30***	.04
Pressure from media	.08	.05	.08	.05
Appearance conversations	.12*	.06	.12*	.06
Comparison with peers	-.13*	.06	-.13*	.06
Body image concern	.25**	.07	.25**	.07
Between cliques				
Peer influence			.23*	.09
Appearance conversations			.24*	.09
Appearance criticism			.20	.13
Random effects	Variance	χ^2 (df)	Variance	χ^2 (df)
τ (Between cliques)	.05	57.45***	.01	15.67
σ^2 (Within cliques)	.11	(16)	.11	(13)

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