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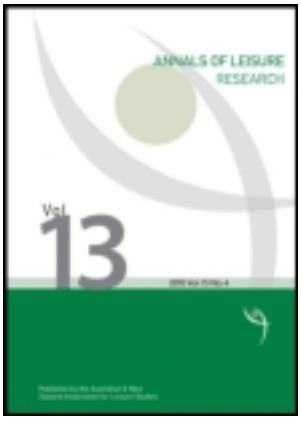

Annals of Leisure Research
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/ranz20

The relationship between body image, physical activity, perceived health, and behavioural regulation among Year 7 and Year 11 girls from metropolitan and rural Australia

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Published online: 30 May 2013.

To cite this article: Caroline Symons, Remco Polman, Melisa Moore, Erika Borkoles, Rochelle Eime, Jack Harvey, Melinda Craike, Lauren Banting & Warren Payne (2013): The relationship between body image, physical activity, perceived health, and behavioural regulation among Year 7 and Year 11 girls from metropolitan and rural Australia, Annals of Leisure Research, 16:2, 115-129

To link to this article: http://dx.doi.org/10.1080/11745398.2013.793166

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Annals of Leisure Research, 2013
Vol. 16, No. 2, 115–129, http://dx.doi.org/10.1080/11745398.2013.793166

Routledge
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The relationship between body image, physical activity, perceived health, and behavioural regulation among Year 7 and Year 11 girls from metropolitan and rural Australia

Caroline Symons[a]*, Remco Polman[a], Melisa Moore[b], Erika Borkoles[a], Rochelle Eime[a,c], Jack Harvey[c], Melinda Craike[d], Lauren Banting[a] and Warren Payne[a]

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This study examined the relationship between educational year level, regional differences in adolescent girls' body image perceptions, body mass index (BMI), physical activity (PA) level, self-reported health, and dietary behaviour. Also, the role of PA behavioural regulation on body image was examined. The sample ($N = 732$; Year 7 aged 12.23 years and Year 11 aged 16.18 years) included girls in Year 7 ($n = 489$) and in Year 11 ($n = 243$), recruited from 17 metropolitan and 14 rural schools in Victoria, Australia. Girls completed a self-report questionnaire. Novel outcomes from this study revealed year level and region differences in girls' body image perceptions, BMI, and health behaviours. Body dissatisfaction was associated with poorer perceived health, and health behaviours, such as low PA levels and dieting and external PA motivational orientation. Interventions are needed to promote positive body image and intrinsic motivation for PA to increase PA levels among adolescent girls living in metropolitan and rural regions of Australia.

Keywords: body image; physical activity; adolescent girls; year level; rural; metropolitan

Introduction

According to a 2010 national survey of 50,240 young people in Australia, body image was the top issue of concern for girls and increased with age, from 28% of 11–14 year olds to 33% of 15–19 year olds to 40.3% of 20–24 year olds (Mission Australia 2010). In Western societies the cultural ideal of the thin and toned physique for girls is socially powerful and ever present within the media and popular culture. This beauty ideal is pervasive and near impossible to meet unless people resort to excessive dieting and/or exercise (Cusumano and Thompson 1997). Adolescent girls appear to be one of the most vulnerable groups to these body image pressures (Abbott and Barber 2010). The increase in adipose tissue around the hips, waist, buttocks, and thighs during pubertal development takes many girls away from the very thin aesthetic cultural ideal. This may result in post-pubescent girls having greater body dissatisfaction than pre-pubescent girls (Levine and Smolak 2004), along with an

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increased body consciousness and concern for presenting themselves in physical activity (PA) contexts (James 2000).

Women often desire a smaller body size; however, puberty is associated with an increase in percentage of body fat, which in turn is often related to poor body image and body dissatisfaction (Barker and Galambos 2003; Muth and Cash 1997). In a five-year longitudinal study of 2516 young women, lower body satisfaction predicted higher levels of unhealthy weight control behaviour and lower levels of exercise (Paxton, Eisenberg, and Neumark-Sztainer 2006). According to Levine and Smolak (2004, 74), 'in various developed countries, between 50% and 80% of adolescent girls would like to be thinner and the prevalence of self-reported dieting varies from 20% to 60%'. In a Norwegian study examining the relationship between perceived health and body image in early- and mid-adolescence it was found that negative health perceptions were prevalent and directly associated with body dissatisfaction (Meland, Haugland, and Breidablik 2007). Similar findings have been reported in other European studies (e.g. Field 2004; Wilkosz et al. 2011).

During the early adolescent years there is also a marked decline (up to 50%) in physical activity (PA), specifically for girls (Zick et al. 2007). This is a major health concern as participation in regular PA is associated with good health (Bauman and Smith 2000) and adolescent PA is also a strong predictor of adult PA (Gordon-Larsen, Nelson, and Popkin 2004; Perkins et al. 2004). More importantly, PA of at least a moderate intensity improves body image amongst women (Arbour and Ginis 2008) and appears to be a vital feature of a positive body image amongst adolescents (Frisen and Holmqvist 2010).

The decline in adolescent PA is attributed to a number of factors, including the experience of significant life transitions during this period. Girls aged 12–15 years who move from middle school to high school (Humbert et al. 2008) experience an increased awareness of and interest in sexuality and relationships, as well as the biological changes associated with puberty (Levine and Smolak 2004). The latter part of this transitional period (16–19 years) also includes increases in study pressures and greater levels of independent living (Eime et al. 2010).

For adolescents, high levels of self-determined motivation have been positively associated with PA behaviour (Gillison, Standage, and Skevington 2006). Deci and Ryan's (1985, 1991) Self-Determination Theory (SDT) proposes a multi-dimensional motivation perspective for understanding behavioural processes, which includes three main types of motivation: intrinsic motivation; extrinsic motivation; and amotivation. These motivation types function on a continuum of varying degrees of self-determination (Deci and Ryan 1985, 1991). Self-determination refers to the extent an individual has internalized the motive for certain behaviour and the degree of autonomy one feels in carrying out that behaviour (Deci and Ryan 1985; Ryan and Deci 2000). Intrinsic motivation represents the highest level of self-determination and occurs when an individual is inherently interested in or enjoys the activity itself, regardless of the outcomes. In contrast, extrinsic motivation refers to engaging in an activity to achieve a desired outcome that is separate from the activity/behaviour. Extrinsic motivation is further categorized into four forms, depending on one's level of self-determination (Deci and Ryan 1985). In order from most to least self-determined: *Integrated regulation* occurs when the individual values the activity/behaviour, however motivation to engage in the activity/behaviour comes from a desire to achieve an outcome separate from the behaviour. Integrated regulation is rarely measured as it is difficult to distinguish from identified motivation and

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commonly used scales have not validated the use of an integrated subscale. *Identified regulation* refers to the situation when the individual identifies with the value of an activity but is still motivated by the outcome of the activity. *Introjected regulation* occurs when the behaviour has been internalized to some extent, although behaviour is still mostly driven by self-imposed rewards (e.g. pride) or punishments (e.g. embarrassment, guilt feelings). *External regulation* is the least self-determined form of extrinsic motivation, and is when behaviour is fully driven by external forces and the individual typically experiences the behaviour as controlled or alienated (Ryan and Deci 2000). A third 'type' of motivation – amotivation – refers to having no intention to engage in the behaviour and is often referred to as a lack of motivation (Deci and Ryan 1985, 1991).

SDT may be a useful framework to examine body image and PA as perceptions of one's weight and physique commonly motivate PA, especially amongst young women. For example, a negative body image (i.e. perceiving oneself to be heavier than one's actual weight) in British adolescent girls was associated with greater relative amounts of controlled motivation for exercise (e.g. exercising primarily to lose weight) and low levels of participation (Markland and Ingledew 2007). Also, higher levels of body satisfaction in Swedish girls and boys have been associated with increased intrinsic motivation for exercise (Frisen and Homqvist 2010). This suggests that fostering self-determined (intrinsic) motivation might result in a more positive body image and increased PA participation.

Another factor that might influence body image, PA, and health perceptions is geographical location. For example, differences in PA and perceived health have been reported between rural and metropolitan adolescents. Surprisingly, given the greater opportunities to be active, women in rural Australia are less physically active and report poorer health (Australian Institute of Health and Welfare [AIHW] 2010; Wilcox et al. 2000). There is some research comparing levels of overweight and obesity in rural and metropolitan adolescents, but evidence is equivocal (e.g. Aucote and Cooper 2009; Dollman and Pilgrim 2005). In light of research findings that have demonstrated the influence of body image on health perception and health behaviours such as PA, there may also be regional differences in girls' body image perceptions. To date however, no study has examined differences in body image between adolescent girls from metropolitan or rural areas in Australia, and few studies from elsewhere in the world (Jackson, Rashed, and Saad-eldin 2003).

The aim of the study on which this paper is based was to examine body image perceptions, BMI, perceived health, PA patterns, dietary behaviour, and PA behavioural regulation of adolescent girls from two critical periods of adolescence and from metropolitan and rural settings. Although no prediction could be made for all comparisons we hypothesiszed that: (1) older adolescent girls would report poorer body image. This would be accompanied by increased BMI, and reduced levels of PA, for the older adolescent girls; (2) rural adolescent girls would report lower levels of PA and poorer perceived health than metropolitan adolescent girls which would be associated with a poorer body image; (3) increased body dissatisfaction would be associated with higher BMI levels, more unhealthy weight control behaviours, poorer self-reported health, lower levels of PA, and more external PA behavioural regulation.

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Methods

Participants

This study consisted of 732 girls from metropolitan (n = 521; 71.2%) and rural (n = 211; 28.8%) schools in Victoria, Australia. The age of the Year 7 cohort was $M = 12.23$; $SD = .48$ years and for the Year 11 participants $M = 16.18$; $SD = .69$ years. The metropolitan sample consisted of 366 Year 7 and 155 Year 11 participants and the rural sample of 123 Year 7 and 88 Year 11 participants. The Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Advantage and Disadvantage developed by the Australian Bureau of Statistics (ABS) to measure socio-economic status of areas ranged from 817 to 1141 ($M = 1011$; $SD = 63$). This suggests that this was a representative sample as the SEIFA Index of Relative Socio-economic Advantage and Disadvantage is centred around a value of 1000.

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Measures

Body image was assessed using three questions taken from the World Health Organization (WHO) Cross-National Survey (Currie 1998). These questions asked participants about general satisfaction/dissatisfaction with their physical appearance: 'Do you think your body is: *much too thin* / *a bit too thin* / *about the right size* / *a bit too fat* / *much too fat* / *I don't think about it*'; 'Do you think you are: *very good looking* / *quite good looking* / *about average* / *not very good looking* / *not at all good looking* / *I don't think about my looks*'; and 'Are you on a diet to lose weight? *No, because my weight is fine* / *no, but I need to lose weight* / *yes*'. Several studies have used these questions to gather information on body image within adolescent populations (Meland, Haugland, and Breidablik 2007). Note, because the first question ('Do you think your body is . . .') of the WHO Cross-National Survey is the most likely to be related to weight, we only used this question to make a comparison with BMI and behaviour regulation.

Body mass index (BMI) was calculated by dividing each participant's self-reported weight (in kilograms) by their height in metres squared (kg/m^2). BMI has been adjusted by applying a uniform increase of 5.7% to account for known biases in self-reported height and weight (Giacchi, Mattei, and Rossi 1998).

Participants' self-report level of PA was based on a single item asking participants to indicate the number of days out of the past seven that they had engaged in PA for a total of one or more hours per day (Bull et al. 2004). This item was based on Active Australia's sufficient PA recommendations. Participants were classified as: sedentary (active on no days or 1 day per week); low active (2 or 3 days per week); moderately active (4 or 5 days per week); or highly active (6 or 7 days per week) (Morley et al. 2011).

Self-reported health was measured using the single item SF-1 (Ware and Kosinski 2001), which provides an assessment of general health. The SF-1 has been used in several studies and has demonstrated reliability and validity as a measure of self-reported health (Avery et al. 2006).

A modified version of the Behavioural Regulation in Exercise Questionnaire (BREQ-2; Markland and Tobin 2004) was included to measure intrinsic motivation, three types of extrinsic motivation (identified, introjected, and external regulation), and amotivation. The BREQ-2 uses a 5-point Likert scale (1 = '*not true for me*' to 5 = '*very true for me*') and in common with other measures of the behavioural regulation continuum in different contexts the BREQ-2 does not include an

integrated regulation subscale. Good validity and reliability has been reported for the BREQ-2 (Markland and Tobin 2004). The Cronbach's alpha for each of the subscales in the present study was acceptable (between .71 and .87).

Procedure

A total of 17 metropolitan and 14 rural secondary schools in Victoria, Australia took part in the study. These schools represented all educational sectors (private, state, and catholic schools) and a broad range of socio-economic status (SEIFA scores) (Australian Bureau of Statistics 2006). In addition, the rural schools were selected taking into consideration the Accessibility and Remoteness Index of Australia (ARIA+) categories (by population and area in non-metropolitan Victoria).

Before recruitment commenced, approval to conduct the study was granted by the University of Ballarat Human Research Ethics Committee, the Victoria University Human Research Ethics Committee, the Victorian Department of Education and Early Childhood Development, and the relevant Victorian Catholic dioceses and independent school principals. The primary sampling units were schools. Within each selected school, either a member of the research team or a designated teacher, generally the Year or Physical Education Coordinator, explained the study to all female students in Years 7 and 11. This person invited them to participate, and distributed plain language information statements and parental and participant consent forms. Students who returned both completed consent forms (parental and participant) completed the questionnaire, usually during school class time. This study was conducted in 2008–2009.

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Statistical analysis

Data were screened for normality and outliers prior to data analysis. No data point had undue influence on the proposed statistical models. The chi-square statistic was used to compare differences between region (metropolitan vs rural) and year level (Year 7 vs Year 11) in body image, diet behaviour, self-reported health, and PA status. Effect sizes were calculated using Cramer's V. Analysis of variance (ANOVA) was conducted to examine differences in BMI between regions and year levels. As indicated, we only used the first question of the WHO Cross-National Survey (Currie 1998) to make a comparison with BMI and behaviour regulation. As such, ANOVA was conducted to assess differences in BMI between the five body image categories. Finally, a 5 (body image) by 2 (metropolitan vs rural) by 2 (Year 7 vs Year 11) multivariate analysis of variance (MANOVA) was conducted to establish differences in PA behaviour regulation (5 scales). A follow-up ANOVA was performed when there was a significant main or interaction effect. Tukey post-hoc comparisons determined the exact location of the differences.

Results

Year level differences

Our prediction that older adolescent girls would report higher levels of body image disturbance was not supported (see Table 1). There was no significant effect for year level on body image (χ^2 (4, $n = 715$) = 7.22, $p = .13$; Cramer's V = .10). Also, no

Table 1. Region (metropolitan vs rural) and year level (Year 7 vs Year 11) differences in body image, perception of looks, and BMI.

	Region		Year Level		
	Metropolitan % (n)	Rural % (n)	Year 7 % (n)	Year 11 % (n)	Total Sample % (N)
Body image					
A bit too thin	8.3 (42)	4.8 (10)	8.4 (40)	5.0 (12)	7.3 (52)
About the right size	55.5 (281)	56.3 (117)	55.3 (263)	56.5 (135)	55.7 (398)
A bit too fat	25.1 (127)	33.2 (69)	27.1 (129)	28.0 (67)	27.4 (196)
Much too fat	4.2 (21)	1.9 (4)	2.5 (12)	5.4 (13)	3.5 (25)
I don't think about it	7.1 (36)	3.9 (8)	6.7 (32)	5.0 (12)	6.2 (44)
Perception of looks					
Very good looking	5.0 (25)	4.8 (10)	4.0 (19)	6.7 (16)	4.9 (35)
Quite good looking	22.4 (113)	18.4 (38)	23.5 (111)	16.7 (40)	21.2 (151)
About average	44.8 (226)	44.4 (92)	43.6 (206)	46.9 (112)	44.7 (318)
Not very good looking	6.9 (35)	9.7 (20)	7.6 (36)	8.0 (19)	7.7 (55)
Not at all good looking	5.4 (27)	1.5 (3)	4.0 (19)	4.6 (11)	4.2 (30)
I don't think about my looks	15.6 (79)	21.3 (44)	17.3 (82)	17.2 (41)	17.3 (123)
BMI	20.9 (4.1)	21.7 (3.3)	20.4 (3.7)	22.6 (3.8)	21.2 (3.9)

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difference was found for perception of appearance between year level (χ^2 (5, n = 712) = 6.25, p = .03; Cramer's V = .09). With regard to dieting behaviour, there was a difference for year level (χ^2 (2, n = 715) = 16.95, p < .001; Cramer's V = .15). Year 11 girls were significantly more likely to be on a diet and less likely to be satisfied with their body weight and thought they should be on a diet than Year 7 girls.

The ANOVA for BMI showed a significant interaction effect (F (1607) = 6.38; p = .01; eta = .01) and significant main effect for year level (F (1607) = 29.84; p < .001; eta = .05). As predicted, the younger girls had lower BMI values than the older girls (20.41 vs 22.56). However, the post-hoc comparisons for the interaction effect showed that the Year 7 metropolitan girls had lower BMI values (20.09) than the Year 7 rural (21.26) and Year 11 metropolitan (22.76) and Year 11 rural (22.24) girls.

Contrary to predictions, there was no difference in PA levels for year level (χ^2 (3, n = 717) = 5.81, p = .12; Cramer's V = .09). However, a significant difference for year level was observed in self-reported health (χ^2 (3, n = 702) = 21.11, p < .001; Cramer's V = .17) with Year 7 girls more likely to report being in excellent health and Year 11 girls in 'good' or 'fair to poor health'. The MANOVA for PA behaviour regulation did not show a significant difference for year level (Wilks' λ = .94; p = .65) nor were there significant interaction effects (p > .05).

Geographic differences

There was a significant effect for region in body image (χ^2 (4, n = 715) = 10.64, p = .03; Cramer's V = .12). More metropolitan-living girls reported being 'a bit too thin',

whereas more rural-living girls reported being 'a bit too fat'. No differences were found for perception of appearance (χ^2 (5, $n = 712$) = 10.51, $p = .06$; Cramer's V = .12), dieting behaviour (χ^2 (2, $n = 715$) = 0.68, $p = .71$; Cramer's V = .03), or BMI (F (1607) = 0.97; $p = .33$; eta = .00), or for the regions.

As reported above, the post-hoc comparisons for the significant interaction effect for BMI showed that the Year 7 metropolitan girls had lower BMI values in comparison to the Year 7 rural, Year 11 metropolitan, and Year 11 rural girls. There was also a significant difference for region in PA levels (χ^2 (3, $n = 717$) = 10.55, $p = .01$; Cramer's V = .12). The rural-living girls were less likely to be sedentary (13% vs 21%) and more likely to report moderate levels of PA than metropolitan-living girls (35.7% vs 26.9%).

Converse to predictions, there was no effect for region in self-reported health (χ^2 (3, $n = 702$) = 6.83, $p = .07$; Cramer's V = .10). Similarly, the MANOVA for PA behaviour regulation did not show a significant difference for region (Wilks' $\lambda = .99$; $p = .30$), nor were there significant interaction effects ($p > .05$).

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Body image

The ANOVA for body image and BMI was significant (F (1602) = 60.71; $p < .001$; eta = .29). Post-hoc comparisons showed that the 'about the right size' and 'I don't think about it' groups did not differ in BMI. Also, the 'a bit too thin' and 'I don't think about it' groups did not differ. However, the 'a bit too fat' and 'much too fat' groups differed from all other groups and each other (see Table 3).

Chi-square analysis showed that there was a significant difference between body image perceptions and dieting behaviour (χ^2 (8, $n = 714$) = 359.9, $p < .001$; Cramer's V = .50). Table 2 shows that 'a bit too fat' and 'much too fat' body image categories reported significantly more often that they were 'not on a diet but should begin to lose weight' or were actually 'on a diet' in comparison to the other categories.

As expected there was a significant effect of body image on self-reported health (χ^2 (12, $n = 692$) = 162.9, $p < .001$; Cramer's V = .28). The 'I don't think about it' body image group was more likely to report being in excellent health compared to the

Table 2. Body image and diet behaviour and perceived general health.

	Body Image					
	A bit too thin % (n)	About the right size % (n)	A bit too fat % (n)	Much too fat % (n)	I don't think about it % (n)	Total Sample % (N)
On a diet						
No, because my weight is fine	92.3 (48)	85.9 (341)	14.8 (29)	4.0 (1)	86.4 (38)	64.0 (457)
No, but I need to lose weight	3.9 (2)	11.6 (46)	69.4 (136)	68.0 (17)	9.1 (4)	28.7 (205)
Yes	3.9 (2)	2.5 (10)	15.8 (31)	28.0 (7)	4.6 (2)	7.3 (52)
General health						
Excellent	19.1 (9)	20.1 (78)	4.7 (9)	0.0 (0)	38.1 (16)	16.2 (112)
Very good	31.9 (15)	53.9 (209)	35.9 (69)	17.4 (4)	38.1 (16)	45.2 (313)
Good	36.2 (17)	24.0 (93)	41.2 (79)	26.1 (6)	19.1 (8)	29.3 (203)
Fair or poor	12.8 (6)	2.1 (8)	18.2 (35)	56.5 (13)	4.8 (2)	9.3 (64)

other groups. Also, the 'a bit too thin' and 'about the right size' body image groups were more likely to report excellent health in comparison to the 'a bit too fat' and 'much too fat' body image groups. The 'about the right size' body image group was more likely to report being in very good health, whereas the 'much too fat' body image group was more likely to report being in 'fair or poor' health.

A significant association was observed between body image perceptions and PA level (χ^2 (12, $n = 702$) = 31.02, $p = .002$; Cramer's V = .12). Those participants in the 'a bit too thin' body image category were more likely to be sedentary (32.7%), the 'much too fat' body image category more likely to have low levels of PA, and the 'about the right size', 'a bit too fat', and 'I don't think about it' body image groups more likely to have moderate levels of PA. Also, the 'I don't think about it' body image group had more individuals reporting high levels of PA than the other categories.

The MANOVA for PA behaviour regulation showed a significant main effect for body image (Wilks $\lambda = .85$; $p < .001$; Eta = .04). Follow-up ANOVAs showed significant differences for all dependent variables except amotivation (see Table 3). Supporting our a priori predictions, post-hoc comparisons showed that the 'about the right size' and 'I don't think about it' groups scored significantly higher than the other three groups on intrinsic motivation, whereas the 'a bit too fat' and 'much too fat' groups scored significantly higher on external regulation and introjected regulation (all $p < .01$). The 'much too fat' group also scored higher than the 'a bit too fat group' in external regulation. Finally, the 'a bit too thin' group scored significantly lower on identified regulation than all other groups ($p < .01$).

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Discussion

The present study examined the relationship between body image perceptions, BMI, perceived health, PA patterns, dietary behaviour, and PA behavioural regulation of adolescent girls from two critical periods of adolescence and from metropolitan and rural settings. We found differences between the year levels, geographic location, and body image perceptions which will be discussed in turn.

Year level differences

Contrary to findings by Mission Australia (2010), Year 11 girls were no more likely than Year 7 girls to report body image dissatisfaction. This is a positive finding, considering the cultural ideal of a thin physique, and the bodily changes associated with puberty that older adolescent girls may be experiencing, making them a group vulnerable to body image concerns (Mission Australia 2010). A possible explanation is that public health campaigns, initiatives, and school interventions are having a positive impact on the body image perceptions of girls of all ages. For example, in Australia, there are a number of important initiatives and public campaigns that focus on promoting and enhancing positive body image including '*inspire-action-vision*' (Equality Rights Alliance 2011) and '*Y's Girl Project*' (YWCA Victoria 2009). However, we did find that Year 11 girls were more likely to be on a diet or not on a diet but felt they needed to restrict food to lose weight. Older adolescent girls reported greater control over food choices and spent more time in social environments and as such might have been more influenced by their peers and media to go on a diet (Scully et al. 2005).

As predicted, we found year level differences in BMI with older girls reporting higher levels, which are expected within the normal developmental framework.

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Table 3. Means, Standard Deviations, and ANOVA results for BMI and PA behaviour regulation in relation to girls' body image classification.

	Body Image						
	A bit too thin *M (SD)*	About the right size *M (SD)*	A bit too fat *M (SD)*	Much too fat *M (SD)*	I don't think about it *M (SD)*	Total Sample *M (SD)*	*ANOVA*
BMI	18.6 (3.7)	20.2 (20.8)	23.3 (3.8)	29.8 (4.8)	20.3 (3.0)	21.2 (3.9)	60.7; $p < .001$; Eta = .29
PA behaviour regulation							
amotivation	1.71 (1.0)	1.45 (0.6)	1.52 (0.7)	1.77 (1.0)	1.41 (0.7)	1.50 (0.7)	1.65; $p = .16$; Eta = .01
external regulation	1.91 (0.8)	1.84 (0.8)	2.39 (0.8)	3.13 (0.9)	1.80 (0.8)	2.04 (0.9)	12.0; $p < .001$; Eta = .07
intrinsic motivation	3.61 (0.9)	3.96 (0.9)	3.62 (0.9)	3.36 (1.2)	4.22 (0.9)	3.83 (0.9)	5.83: $p < .001$; Eta = .03
introjected regulation	2.41 (1.1)	2.69 (1.1)	3.18 (1.0)	3.59 (0.8)	2.75 (1.2)	2.84 (1.1)	9.99; $p < .001$; Eta = .06
identified regulation	3.18 (0.9)	3.72 (0.8)	3.68 (0.8)	3.71 (0.9)	3.86 (1.0)	3.68 (0.8)	3.95; $p = .04$; Eta = .02

Despite previous research, which has shown that older adolescent girls tend to report lower PA levels (Humbert et al. 2008; Levine and Smolak 2004), we did not find differences in PA level between the two year levels. A possible explanation is that the one-item question to assess PA levels in the present study was not sensitive enough to distinguish between PA levels. In addition, the present study had relatively few participants who could be classified as obese. It might be that girls who are more physically active are more likely to complete surveys of this nature. This might also explain the finding that the two year levels did not differ in the PA motivational orientation. However, older adolescent girls were less likely to report being in excellent health. Increased pressures related to work, study, body changes, or dieting behaviour (Eime et al. 2010) might explain these year level differences.

Geographic differences

A significant difference was observed between the metropolitan-living and rural girls in body image and BMI. The former were more likely to report being 'too thin' and more likely to be categorized as underweight, whereas the latter were more likely to report being 'a bit too fat' or categorized as normal weight. Barker et al. (2000) suggested that perceptions of fatness are important in predicting PA and dieting behaviours rather than actual fatness. Although the rural-living girls reported being fatter, their dieting behaviour was not different from the metropolitan-living girls.

Research on regional differences in PA has been equivocal. Contrary to predictions and previous findings (AIHW 2010; Wilcox et al. 2000), the rural-living girls tended to engage more in moderate levels of PA than the metropolitan-living girls. Although girls who perceive themselves to be 'too fat' or who 'feel fat' tend to use exercise as a means of losing weight (Felts et al. 1996; Wardle and Marsland 1990), we did not observe such motivational differences for PA between the metropolitan and rural girls.

The present study supports findings that adolescent girls in rural areas are more physically active than their metropolitan counterparts (Booth et al. 2006; Hume et al. 2011). In a recent nationally representative survey involving 12,188 Australian secondary school students from Year 8 to Year 11, students in rural areas were significantly more likely than those living in metropolitan regions to report undertaking recommended levels of PA (18% vs 14%) (Cancer Council & Heart Foundation 2011). Despite previous findings that rural populations report lower levels of health (AIHW 2010), we did not find regional differences in self-reported health.

Body image

As expected, body image perceptions were strongly associated with self-reported BMI. Girls with poorer body image perceptions had a higher BMI and girls who rated themselves as too thin had a lower BMI. Also, a poorer body image was strongly associated with unhealthy weight control behaviours, poorer self-reported health, lower PA level, and higher extrinsic motivation for PA, in comparison with adolescent girls who reported satisfaction with their body image or 'didn't think about it'.

Previous research has found an association between higher BMI values and poor body image or body dissatisfaction in adolescent girls (Paxton, Eisenberg, and Neumark-Sztainer 2006). Our results support these findings in that the adolescent

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girls who perceived they were in the 'much too fat' category had the highest BMI. In addition, the adolescent girls in the 'a bit too thin' category had the lowest BMI. These findings suggest that in societies where slimness is valued, overweight adolescent girls are particularly vulnerable to body dissatisfaction perceptions (Paxton, Eisenberg, and Neumark-Sztainer 2006; Wertheim, Paxton, and Blaney 2004).

The girls in the more dissatisfied categories were, as predicted, more likely to engage in dieting behaviour or to feel that they needed to lose weight. The association between body dissatisfaction and dieting is a consistent finding in past research (Barker et al. 2000; Levine and Smolak 2004; Paxton, Eisenberg, and Neumark-Sztainer 2006). Poor body image, coupled with dieting, can lead to eating disorders in some adolescents (Stice et al. 2000). It is therefore important to educate and promote healthy eating and lifestyle habits among adolescent girls.

The finding that girls with body dissatisfaction ('a bit too thin', 'a bit too fat', 'much too fat') reported lower levels of PA, whereas girls with a positive body image ('about right size', 'I don't think about it') indicated higher levels of PA, supports our predictions and the findings reported in the existing literature (e.g. Arbour and Ginis 2008). Because of the cross-sectional nature of our study, it is unclear whether participating in regular PA contributed to these girls' positive body image or having a positive body image may have facilitated increased PA participation (Frisen and Holmqvist 2010). The low PA among girls with body dissatisfaction is problematic, considering the numerous physical and psychological health benefits derived from regular PA. Additionally, girls reporting the greatest body image dissatisfaction ('much too fat') were more likely than all other groups to rate their general health as fair or poor. In contrast, girls with a positive body image ('about right size'/'don't think about it') were more likely to report an excellent health status (Meland, Haugland, and Breidablik 2007; Field 2004; Wilkosz et al. 2011).

Girls with greater body dissatisfaction not only reported lower PA levels; they were also more likely to engage in PA for extrinsic reasons (i.e. external regulation and introjected regulation). Girls with a positive body image and more moderate levels of PA, on the other hand, were more likely to be intrinsically motivated to engage in PA. There is strong support for the positive relationship between self-determined motivation and regular PA participation (Gillison, Standage, and Skevington 2006; Ntoumanis 2001). In addition, there is some evidence that positive body image is associated with increased levels of intrinsic motivation and in turn with increased PA levels (Frisen and Homqvist 2010; Markland and Ingledew 2007). As such, this study provides support for the notion that fostering intrinsic motivation for PA (e.g. enjoyment rather than weight loss) is important in increasing PA levels, which in turn is likely to result in a more positive body image perception – although this relationship is probably bidirectional in nature.

Limitations

There were a number of limitations to the present study that require consideration. First, a low percentage of participants were considered to be obese. It may be that adolescent girls who are obese are less likely to participate in these types of studies than their non-obese counterparts. This presents an issue for all body image research. A second limitation relates to the use of self-report measurements of PA. Assessing

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PA participation among any age group is problematic, particularly among children and adolescents who are likely to engage in a variety of sport/PA throughout the day (e.g. organized sport, exercise, lifestyle activities, and active transport). Thus, there is significant potential for recall error when reporting their PA (Telford et al. 2004). Thirdly, the cross-sectional design of the study does not allow inferring causality.

Conclusion

In conclusion, the study findings highlight the need to consider geographic location and year level when examining and improving body image, health, and lifestyle factors among adolescent girls. Additionally, consistent with existing body image literature, outcomes from this study suggest body image dissatisfaction is related to low PA level, high BMI (or low BMI for girls perceiving themselves to be 'too thin'), extrinsic motivation for PA, and poor self-reported health. In contrast, positive body image perceptions were associated with a moderate/high PA level, intrinsic motivation, and good/excellent self-reported general health. Findings from this study have important implications for researchers, health promoters, health professionals, teachers, parents, and the general public alike, who are interested in improving body image perceptions and health among adolescent girls. Education programmes and everyday conversations with adolescent girls should emphasize the diversity of body shapes and developmental changes of this cohort as well as healthy eating and lifestyle habits, including the benefits of intrinsically rewarding PA. Interest and enjoyment in the preferred physical activities underline this intrinsic motivation, whilst references to PA as a means to lose weight / achieve the 'ideal' thin body of contemporary Western society may be counterproductive. Longitudinal research is needed to flesh out the causal relationship between positive body image and increased PA for this cohort.

Acknowledgements

This study was funded by Sport and Recreation Victoria, a division of the Department of Planning and Community Development, Victorian Health Promotion Foundation (VicHealth), Victoria University, and the University of Ballarat. Thank you to all of the students and schools who participated in the study. Rochelle Eime is supported by a VicHealth Research Practice Fellowship. Caroline Symons and Erika Borkoles are both supported by Collaborative Research Network funding.

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