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Gender differences in barriers to participation in after-school physical activities and related factors in Australian schoolchildren: a cross-sectional study

Short title: Barriers to after-school physical activity

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Keywords: Exercise, Child, gender, schools, adolescent

Gender differences in barriers to participation in after-school physical activities and related factors in Australian schoolchildren: a cross-sectional study

Abstract

Introduction: This study investigated the gender differences in reported barriers to participation in after-school physical activity (PA) and related health and socio-behavioural factors in Australian schoolchildren.

Methods: 5001 students aged 10 to 16 years completed the health and well-being survey in 2014 indicating that they would like to participate in after-school PA. Negative binomial regression models, stratified by gender, tested the relationship of age, reported health, junk food, participation in leisure PA, TV watching, weight status and socio-economic index for area score (related factors) with the total number of barriers.

Results: Girls were more likely to report a greater number of barriers to participation in after-school PA than boys ($p<0.05$). Older age was associated with a higher number of barriers in girls (B(95%CI) = 1.061 (1.032, 1.090)) but not in boys. In both boys and girls, being overweight (boys: very overweight (1.367 (1.081, 1.730)); girls: slightly overweight (1.186 (1.100, 1.278)) or very overweight (1.414 (1.197, 1.667)), compared to students that reported 'being about the right weight', was associated with a greater number of barriers. Schoolchildren who reported less than excellent health status perceived a greater number of barriers to after-school PA (girls: good (1.141 (1.060, 1.228)), fair (1.189 (1.070, 1.321)) and poor health (1.329 (1.093, 1.614)), boys: good health (1.166 (1.0728, 1.267))).

Conclusions: There are gender differences in barriers to participation in after-school PA; these should be taken into account when developing programs to increase schoolchildren's after-school PA.

So what: The prevalence of physical inactivity in Australian adolescents is staggering. We observed that girls reported a greater number of barriers to participation in after-school PA than boys; and being overweight and reporting poorer overall health was associated with a greater number of barriers. Affordable, gender- and age-specific after-school PA programs suitable for schoolchildren of all sizes and abilities are needed.

Keywords: Exercise, Child, adolescent, gender, schools

Introduction

Physical inactivity is one of the leading risk factors for chronic non-communicable diseases such as cardiovascular disease, type 2 diabetes, and some types of cancer.[1] Based on the 2016 World Health Organisation (WHO) data, the findings for school going adolescents (aged 11-17 years) are staggering, as the prevalence (crude estimate) of physical inactivity was 81% (77.6% of boys and 84.7% of girls).[2] In Australia, the prevalence of physical inactivity in school going adolescents in 2016 was even higher (89%), and especially high among Australian girls in whom the prevalence of physical inactivity was over 90%.[2]

High levels of physical inactivity, globally, have led to the development of a WHO Global Action Plan for Physical Activity (PA), which calls for a 15% reduction in global physical inactivity by 2030 amongst adults and adolescents.[3] The WHO Global Action Plan recommends that 'stakeholders should partner and support initiatives that increase the opportunities for PA before and after school hours, for children of all abilities (page 78)'.[3] It has been argued that participation in after-school programs is an important contributor to children's PA,[4] and the results of after-school PA interventions indicate improved fitness, body composition and reduced adiposity among attending schoolchildren.[5,6] Therefore,

participation in after-school PA may help decrease the prevalence of physical inactivity among schoolchildren and improve their overall health.

The WHO action plan also recommends that research is conducted to identify barriers of PA among those that are identified as least active in order to inform the development and implementation of interventions to increase participation in PA.[3] Adolescent girls are less active than boys,[7] and PA levels decline during adolescence.[8] In Australia, based on the 2015 AusPlay Survey, children younger than 15 years from low income families are less likely to engage in organised PA compared to their peers from high income families. [9] Frequently reported barriers to PA among adolescents include time constraints and competing leisure activities for PA, low perception of competence, lack of motivation, lack of parental support, lack of offers of and limited access to PA programs, and lack of recreational infrastructure.[10] Girls often reported the larger number of barriers to PA participation than boys,[11, 12] while schoolchildren from low socio-economic status (SES) schools reported more barriers compared to students from the high SES schools.[13] However, evidence on perceived barriers to after-school PA among schoolchildren is scarce,[14] and less is known about whether boys and girls differ in their perceptions of barriers to participation in after-school PA. Therefore, the aim of this study was to address the above-mentioned gaps by describing the gender differences in barriers to participation in after-school PA and related health and socio-behavioural factors in Australian schoolchildren.

Method

This study employed a cross-sectional survey and was conducted in Australian schools.

Study population and data collection

Children were eligible to participate in the study if they attended a participating South Australian school and were in grades 6 to 9 years. A total of 17880 schoolchildren aged 10 to 16 years (grades 6 to 9) were recruited in 2014 from 189 government and nongovernment schools (20%) across South Australia. The South Australian Department for Education and Child Development (DECD), asked that schools administer the survey (Middle Years Development Instrument (MDI)) on health and well-being that is collected and recorded by DECD.[15] Schools were provided with an information letter about the survey to share with child caregivers. Participation in the survey was voluntary, and caregivers could elect to have their child withdrawn from the participant list (n=133). Schoolchildren also received the opportunity to opt-out (n = 136) after the teacher explained the project from a pre-prepared assent script; a total of 17611 schoolchildren completed the survey.

The survey was a modified version of the MDI, validated to meet the needs of Australian schoolchildren.[16] The MDI was originally developed in Canada, and it is a self-report questionnaire that assesses student experiences inside and outside of school.[17] The survey consists of 76 items across five areas of development: physical health and well-being, connectedness, social and emotional development, school experiences and use of after-school time. The survey was administered by teachers during school lessons between October 13 and November 21, 2014. Teachers were asked to administer the survey when students were attentive and alert (e.g., not before lunch or Friday afternoons). The survey was estimated to take approximately 70 minutes for students to complete. The majority of the students undertook the survey online. However, a paper-based questionnaire was administered in a few schools; and these were sent to DECD for data entry.

Measures

All schoolchildren were asked to list one activity they wish they could do after school from 3:00 pm to 6:00 pm. Those who reported they wished to engage in PA after school were included in the study, while schoolchildren who reported their wish to engage in sedentary activities were excluded.

Dependent variable was self-reported and was defined as the number of perceived barriers to PA. Schoolchildren were asked a question: "What stops you from participating in the activities that you want to participate in after school?" and were presented with 13 potential barriers to choose the ones relevant to them (see Table 2 for the list of potential barriers).

Independent variables (termed as related factors throughout the manuscript) were self-reported and included age, general health (poor, fair, good, excellent), weight status (very underweight, slightly underweight, about the right weight, slightly overweight, very overweight), leisure time PA, consumption of high-energy-dense and low in nutrients food and drinks such as soft drinks, lollies and potato chips (junk food). In order to assess their weight status, children were asked how they would rate their body weight, and the responses to choose from included: very underweight, slightly underweight, about the right weight, slightly overweight, very overweight. Leisure time PA was assessed with a question: "During the last week after school, how many days did you do sports and/or exercise for fun?" Possible responses were: never, once a week, twice a week, 3 times a week, 4 times a week, and 5 times a week (every day). Intake of high energy dense and low in nutrients drinks and food was assessed by a question: "How often do you have drinks/food like soft drinks, lollies, potato chips or something else? Possible responses to choose from included: never, once a week, two times a week, three times a week, four times a week, 5 times a week, 6 times a week and every day. We also included Socio-economic index for area (SEIFA) score that ranks areas in Australia according to relative socio-economic advantage and disadvantage. Data on SEIFA were obtained from the Australian Bureau of Statistics.[18]

Statistical analysis

Descriptive continuous variables are presented as mean and standard deviation if normally distributed and median and interquartile range if skewed. Categorical variables are presented as counts and percentages. Gender difference in participant characteristics was explored using Chi-square tests for categorical variables, and t-tests and Mann-U-Whitney tests if variables were continuous normally distributed and skewed, respectively. Gender differences in barriers to PA participation were explored via Chi-square test. The relationship of age, reported health, junk food, participation in leisure PA, TV watching, weight status and SEIFA score (related factors) and the total number of barriers to participation in after-school PA was analysed using negative binomial regression models. Considering the gender differences in PA participation, the analyses were performed for boys and girls separately. The significance threshold was set at 0.05. All analyses were performed using IBM SPSS Statistics 23. The study was approved by the (blinded) Human Research Ethics Committee.

Results

In total, 17,611 schoolchildren completed the survey. Out of these 8,541 had complete data on all variables of interest. From these, 5,001 (59%) students (2,357 boys and 2,644 girls) reported they wish to participate in PA after school and were included in the study (Supplement Table 1; presents the list of PAs schoolchildren reported they wish they can do after school). The rest of the schoolchildren either did not respond to the question (3%) or reported they wish to engage in sedentary activities during after-school time (35%). Sedentary activities included, but were not limited to, travelling in a car as a passenger, watching TV, playing video games, writing, social media, academic classes, reading, drawing, arts and crafts, eating, and fishing. Compared to schoolchildren who reported they

wish to engage in more sedentary activities after school, those who reported they wish to do PA after school were more likely to report excellent general health, daily engagement in PA; and they were less likely to report being overweight and regular consumption of junk food (6 times a week or higher) (Supplement Table 2).

Table 1 presents the characteristics of participants and differences by gender. Mean (SD) age of schoolchildren was 13.4 (1.1) years. Compared to girls, boys were more likely to report their general health as excellent, exercising every day, have a lower number of barriers to PA, consuming junk food on a daily basis, and less likely to perceive themselves as being overweight ($p<0.001$ for all); however, SEIFA was not significantly different between genders.

The most reported barriers to participation in after-school PA for boys and girls included them having to go straight home after school (35.2 %), being too busy (31.2%), competing schedules (24.5%), being too difficult to get to the place activities were offered (23.5%), and costing too much (23.1%) (Table 2). Compared to girls, boys were more likely to report having to go straight home after school ($p<0.001$), and lack of safety as a barrier to participation in after-school PA ($p=0.004$). All other barriers were reported more by girls than by boys ($p \leq 0.05$ for all). Compared to boys, girls were more likely to report cost as a barrier to participation in after-school PA (17.1% vs 28.5%, $p<0.001$) and were twice as likely to report feeling that they were not going to be good enough at the activity (9.3% vs 18.7%, $p<0.001$). No gender difference was observed for the barrier 'The activity that I want is not offered'.

Table 3 presents the results of negative binomial regression models on the relationship between participant characteristics and the total number of reported barriers. For all schoolchildren, SEIFA score, consumption of junk food, participation in sports and/or exercise for fun after school and TV watching were not associated with the number of perceived barriers to participation in after-school PA. Older age was associated with the higher number of reported barriers in girls (B(95%CI) = 1.062 (1.033, 1.092), $p<0.001$) but not in boys. Compared to girls who reported excellent general health, the reported total number of barriers to participation in after-school PA was higher in girls who reported good (1.138 (1.057, 1.226), $p=0.001$), fair (1.201 (1.080, 1.335), $p=0.001$) and poor health (1.323 (1.084, 1.613), $p=0.006$). In boys, reporting good health (1.155 (1.060, 1.259), $p=0.001$) was associated with a greater number of reported barriers compared to reporting excellent health. Furthermore, compared to boys who reported being about the right weight, the number of barriers was higher in boys who reported being very underweight (1.274 (1.030, 1.575), $p=0.025$) or very overweight (1.404 (1.101, 1.791), $p=0.006$). In girls, the number of reported barriers to participation in after-school physical activities was higher in girls who reported being slightly overweight (1.188 (1.102, 1.282), $p<0.001$) or very overweight (1.423 (1.205, 1.680), $p<0.001$) compared to those who reported being about the right weight.

Discussion

In this study, which surveyed about 5000 Australian schoolchildren, we explored the gender differences in the number and type of reported barriers to participation in after-school PA and related health and socio-behavioural factors. Barriers to participation in after-school PA were more likely to be reported by girls than by boys. Older age was associated with the higher number of reported barriers in girls but not in boys. In both boys and girls being overweight

and reporting less than excellent overall health was associated with a greater number of barriers to participation in after-school PA.

Girls in this study, compared to boys, were more likely to report a greater number of barriers to after-school PA across a range of domains including a lack of time/scheduling, other commitments (homework/siblings), cost, being able to get to the venue, belief in abilities and social support. Observing a greater number of barriers in girls than in boys is consistent with the available evidence.[11, 12, 19, 20] Others reported no significant difference in reported barriers to PA among boys and girls who participate on a sports team, while among youth not on the sports team, boys reported significantly less barriers to PA than girls.[21] Some of the barriers reported in our study are consistent with studies that focused exclusively on adolescent girls who reported being self-conscious about participating in exercise; not interested or motivated to participate and having a lack of time to participate as barriers to PA participation.[22, 23] This may have translated into the lower level of participation in PA among girls reported in this and other studies.[24, 25]

The gender differences highlighted in the domains of other commitments (e.g., taking care of siblings and doing other things at home, being too busy) and costs may reflect socio-cultural influences on PA. Evidence from developed countries [26] indicate that girls participate in home duties more often than boys, and that the time girls spend in household work increases as they age. This could help explain why girls may be more likely than boys to report a lack of time or incompatible schedule as a barrier to PA participation. However, reported lack of time may also be due to school commitments/study, homework, spending time with friends and family or other social activities;[27, 10] or the girls may find that the activities they are interested in are not actually offered. Indeed, one of the key findings outlined by the recent

Australian evidence review related to PA in young Australians is that there is a lack of age-appropriate or engaging service-offerings in organised sport and PA outside of school hours for children under 8 years of age and teenagers.[28] It would be important to consider offering a variety of and inclusive physical activities at different times; as well as to engage with young girls to learn about their preferred activities and preferred activity times to inform development of targeted programs. Childcare and managing household are still often perceived as the lead role girls and women play, so shifting these socio-cultural norms would help free up more leisure time the girls can spend in being more physically active for health.[29]

The gender difference in perceived costs may reflect gender differences in social support to take part in PA programs. In the study that surveyed 402 parents of children aged 5-17 years old from New South Wales, Australia, parents of girls, compared to parents of boys, were more likely to allow their daughter to participate in organised sports if the costs were lower.[30] Campaigns to raise parents' awareness about the importance of PA for children's health, and decreasing costs related to participation in PA programs may help increase parental support and decrease the gender gap in PA participation.

In both boys and girls, being very overweight was associated with a greater number of barriers to participation in after-school PA. This is in line with previous research indicating that overweight children reported a greater number of barriers to PA when compared with non-overweight children.[31, 32]. To improve PA interventions for overweight children, it is also important to better understand the actual factors that promote or act as a barriers to PA among overweight children.[32] Overweight children are particularly vulnerable to body-related barriers to PA, such as children being self-conscious about their looks and body when

doing PA or not wanting others to see their body when doing PA.[32, 33] They were also more likely to report, compared to normal-weight children, other barriers such as not liking PA, not being good at it,[33] lack of energy, skills or willpower.[34] Moreover, overweight boys and girls in general report higher body dissatisfaction [35] and lower self-esteem than their normal-weight counterparts.[36] This can potentially create a vicious cycle in which overweight children engage in even less PA leading to overweight/obese children likely transitioning into overweight/obese adults [11] In addition, in our study, increasing age among girls, but not in boys, was associated with a greater number of barriers to after-school PAs. This may partly explain the reported decline in PA levels among girls as they age.[24, 37] Our study builds on previous PA research providing novel data on factors associated with perceived barriers to after-school PA.

Policy and practice implications

Boys and girls reported multiple barriers to participation in after-school PA. Some of the responses may serve as intervention targets including the provision of more affordable and/or free after-school PA programs for children and adolescents; providing transport home; raising awareness about the available opportunities for after-school PA and health benefits of PA among both schoolchildren and their parents to improve parental support; and provision of safe playgrounds and safe routes to places where after-school PA programs are offered. Children who reported being overweight and of less than excellent health status reported more barriers to participation in PA. Therefore, it is important to provide after-school PA programs tailored for children of all sizes and abilities.

Parental attitudes, rules and restriction; and family encouragement and social support may shape schoolchildren's after-school PA;[38] and it has been argued that involvement of family

members may be crucial for sustainable increase in children's PA.[39] To better guide the development of tailored family-based after-school PA programs, additional understanding (e.g., via qualitative research) from both schoolchildren and their family members the program is targeted at may be needed to inform about the preferred types of after-school PA, logistics associated with engaging in after-school PA and other intrapersonal, socio-cultural and environmental factors that may influence parental support and a decision of schoolchildren to engage in after-school PA. Family members and children, as key stakeholders, may be crucial for the development of effective programs to increase schoolchildren's after-school PA.

Schoolchildren highlighted in this study that a lack of time, being too busy, having too much homework, scheduling and a need to get home after school hindered their ability to participate in after-school PA. This indicates that this group of schoolchildren may not benefit from after-school PA programs. Instead, offering structured and/or unstructured physical activities during school hours (e.g., lunch breaks, spare periods) may provide an opportunity for schoolchildren to participate in PA with their friends, thus overcoming scheduling, cost and social barriers. Promoting collective social activities for adolescents may be facilitated by existing mechanisms such as the *10,000 steps challenge* [40] or the *Premiers Be Active Challenge.*[41] Furthermore, providing a calendar to schoolchildren and their parents of local community events which foster social PA with minimal cost may provide a useful mechanism for promoting PA amongst this cohort on the weekend.

Girls, compared to boys, were more likely to report a greater number of barriers to participation in after-school PA; and the older age was associated with a greater number of barriers in girls but not in boys. Girls were also more likely than boys to report not

participating in PA because none of their friends was interested or want to go. Therefore, the findings of this study support the development of gender- and age-specific PA programs that are free or affordable, safe to get to, and emphasize socialization.

Strengths and limitations

This is a cross-sectional study, so findings should be interpreted as associations rather than causal inferences. All variables were self-reported, which may be associated with recall and social desirability bias. Additional variables such as household income, parental views on children's engagement in after-school physical activities, and qualitative data generated from the interviews with children and parents may have provided a greater insight into the barriers to participation in after-school PA among schoolchildren; however, these were not available. The study sample was limited only to schoolchildren who reported their willingness to engage in after-school PA. Therefore, the results of this study are not generalizable to all Australian children. Despite the limitations, this is one of the first studies in Australia to report gender differences in barriers to after-school PA participation and related factors in schoolchildren from various geographic regions. Health data and barriers to participation in PA were collected using a standardised, validated survey,[16] which allows for consistent measurement of concepts and comparisons across studies.

Conclusions

In this study, about 5000 Australian schoolchildren were surveyed. Girls were more likely to report barriers to participation in after-school PA than boys. Older age was associated with a higher number of barriers in girls but not in boys. In both boys and girls, being overweight and reporting less than excellent health status was associated with a greater number of barriers to participation in after-school PA. This study indicates the need for affordable,

gender- and age-specific after-school PA programs as well as those that are tailored for children of all sizes and abilities.

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158 **Table 1.** Characteristics of study participants

	All **n = 5001**	**Boys** **n = 2357**	**Girls** **n = 2644**	**Significance** ***p***
Age (years) mean ± SD	13.39± 1.15	13.45 ± 1.16	13.33 ± 1.14	<0.001
General Health (%) Poor Fair Good Excellent	 118 (2.4) 622 (12.4) 2472 (49.4) 1789 (35.8)	 53 (2.3) 250 (10.6) 1099 (46.6) 955 (40.5)	 665 (2.5) 372 (14.1) 1373 (51.9) 834 (31.5)	<0.001
Weight status (%) Very underweight Slightly underweight About the right weight Slightly overweight Very overweight	 100 (2.0) 631 (12.6) 3075 (61.5) 1050 (21.0) 145 (2.9)	 75 (3.2) 345 (14.6) 1486 (63.0) 392 (16.6) 59 (2.5)	 25 (1.0) 286 (10.8) 1589 (60.1) 658 (24.9) 86 (3.3)	<0.001
Physical activity (%) Never Once a week Twice a week 3 times a week 4 times a week 5 times a week (every day)	 725 (14.5) 945 (18.9) 1036 (20.7) 898 (18.0) 530 (10.6) 867 (17.3)	 338 (14.3) 371 (15.7) 504 (21.4) 410 (17.4) 255 (10.8) 479 (20.3)	 387 (14.6) 574 (21.7) 532 (20.1) 488 (18.5) 275 (10.4) 388 (14.7)	<0.001
Energy dense food (%) Never Once a week Twice a week 3 times a week 4 times a week 5 times a week 6 times a week Every day	 153 (3.1) 1070 (21.4) 910 (18.2) 869 (17.4) 555 (11.1) 444 (8.9) 249 (5.0) 751 (15.0)	 58 (2.5) 461 (19.6) 427 (18.1) 389 (16.5) 269 (11.4) 207 (8.8) 125 (5.3) 421 (17.9)	 95 (3.6) 609 (23.0) 483 (18.3) 480 (18.2) 286 (10.8) 237 (9.0) 124 (4.7) 330 (12.5)	<0.001
SEIFA (mean ± SD)	986.5 ± 68.29	987.3± 67.98	985.8± 68.57	0.5
Barriers to physical activity median (25%, 75%)	2 (1, 3)	1 (1, 3)	2 (1, 3)	<0.001

159 Gender differences in continuous and categorical variables were explored using t-test and
160 Mann-U Whitney test for normally distributed and skewed variables, respectively. Gender
161 differences in categorical variables were explored via Chi-square test. SEIFA: Socio-
162 economic index for area.

163 **Table 2.** Gender differences in barriers to participation in after school physical activities

164 reported by Australian schoolchildren

Barriers to participation in after school activities. **n (%)**	**All n = 5001**	**Boys n = 2357**	**Girls n = 2644**	**Significance *p***
I have to go straight home after school	1761 (35.2)	921 (39.1)	840 (31.8)	<0.001
I'm too busy	1558 (31.2)	675 (28.6)	883 (33.4)	<0.001
The schedule does not fit times that I can attend	1224 (24.5)	502 (21.3)	722 (27.3)	<0.001
It is too difficult to get there	1177 (23.5)	492 (20.9)	685 (25.9)	<0.001
It costs too much	1157 (23.1)	403 (17.1)	754 (28.5)	<0.001
I have too much homework to do	1077 (21.5)	455 (19.3)	622 (23.5)	<0.001
The activity that I want is not offered	956 (19.1)	442 (18.8)	514 (19.4)	0.5
None of my friends are interested or want to go	849 (17.0)	360 (15.3)	489 (18.5)	0.002
I don't know what is available	731 (14.6)	276 (11.7)	455 (17.2)	<0.001
I am afraid I will not be good enough at activity	715 (14.3)	220 (9.3)	495 (18.7)	<0.001
My parents do not approve	636 (12.7)	277 (11.8)	359 (13.6)	0.050
I need to take care of siblings or do other things at home	550 (11.0)	222 (9.4)	328 (12.4)	<0.001
It's not safe for me to go	190 (3.8)	109 (4.6)	81 (3.1)	0.004

165 All variables are presented as counts and percentages. Gender differences in barriers to
166 participation in after school activities were explored via Chi-square test.

167 **Table 3.** Barriers to participation in after school physical activities and related health and
168 socio-behavioural factors in Australian schoolchildren: the results of negative binomial
169 regression models

Related factors	Boys Exp(B) (95%CI), *p*	Girls Exp(B) (95%CI), *p*
Age	1.001 (0.969, 1.037), 0.910	1.062 (1.033, 1.092), <**0.001**
SEIFA score	0.999 (0.999, 1.000), 0.735	1.000 (0.999, 1.000), 0.448
Reported health		
Poor	1.244 (0.9547, 1.620), 0.105	1.323 (1.084, 1.613), **0.006**
Fair	1.126 (0.979, 1.294), 0.095	1.201 (1.080, 1.335), **0.001**
Good	1.155 (1.060, 1.259), **0.001**	1.138 (1.057, 1.226), **0.001**
Excellent	Ref.	Ref.
Energy dense food		
Once a week	1.070 (0.823, 1.394), 0.613	0.981 (0.822, 1.174), 0.836
2 times a week	1.010 (0.775, 1.319), 0.941	0.956 (0.798, 1.148), 0.629
3 times a week	0.897 (0.687, 1.175), 0.425	0.966 (0.805, 1.161), 0.709
4 times a week	1.030 (0.784, 1.357), 0.831	0.990 (0.818, 1.200), 0.917
5 times a week	0.968 (0.730, 1.286), 0.820	1.123 (0.925, 1.365), 0.244
6 times a week	0.930 (0.687, 1.261), 0.638	1.013 (0.814, 1.260), 0.911
Every day	1.002 (0.769, 1.309), 0.987	0.998 (0.827, 1.207), 0.987
Never	Ref.	Ref.
Sports and/or exercise for fun		
Never	1.094 (0.956, 1.253), 0.190	1.084 (0.967, 1.215), 0.169
Once a week	1.101 (0.967, 1.253), 0.147	0.965 (0.868, 1.073), 0.512
Twice a week	0.994 (0.880, 1.122), 0.920	0.989 (0.888, 1.101), 0.836
3 times a week	1.063 (0.936, 1.209), 0.3445	0.999 (0.896, 1.114), 0.982
4 times a week	0.912 (0.785, 1.059), 0.229	1.051 (0.926, 1.192), 0.441
5 times a week/daily	Ref.	Ref.
TV watching		
No	0.946 (0.818, 1.095), 0.459	1.046 (0.912, 1.199), 0.514
Yes	Ref.	Ref.
Reported weight		
Very underweight	1.274 (1.030, 1.575), **0.025**	0.823 (0.575, 1.161), 0.277
Slightly underweight	1.075 (0.962, 1.202), 0.201	1.083 (0.976, 1.200), 0.130
Slightly overweight	1.104 (0.990, 1.232), 0.076	1.188 (1.102, 1.282), **<0.001**
Very overweight	1.404 (1.101, 1.791), **0.006**	1.423 (1.205, 1.680), **<0.001**
About the right weight	Ref.	Ref.

170 SEIFA: Socio-economic index for area.

171

172 **Supplement Table 1.** Physical activities the students reported they wish they can do after

173 school

Activity	All n = 5001	%	Boys n = 2357	%	Girls n = 2644	%
Soccer	523	10.5	352	14.9	171	6.5
Swimming/pool sports	428	8.6	120	5.1	308	11.7
Basketball	355	7.1	214	9.1	141	5.3
Sport	301	6.0	155	6.6	146	5.5
Football	266	5.3	215	9.1	51	1.9
Netball	258	5.2	2	0.1	256	9.7
Dancing	250	5.0	12	0.5	238	9.0
Gymnastics/acrobatics/Calisthenics	192	3.8	15	0.6	177	6.7
Tennis	169	3.4	84	3.6	85	3.2
Bike riding/scooter/cycling	154	3.1	125	5.3	29	1.1
Horse riding	134	2.7	7	0.3	127	4.8
Surfing/boarding/water sports	132	2.6	74	3.1	58	2.2
Exercise/fitness/physical education	119	2.4	49	2.1	70	2.7
Cricket	119	2.4	111	4.7	8	0.3
Skydive/bungee/extreme sports	117	2.3	96	4.1	21	0.8
Volleyball	105	2.1	17	0.7	88	3.3
Outdoor physical activities	82	1.6	41	1.7	41	1.6
Shopping	82	1.6	10	0.4	72	2.7

Skateboarding	72	1.4	57	2.4	15	0.6
Running	70	1.4	25	1.1	45	1.7
Martial arts/sword sports	55	1.1	40	1.7	15	0.6
Archery	53	1.1	37	1.6	16	0.6
Hockey	53	1.1	25	1.1	28	1.1
Trampoline/fun centre	54	1.1	31	1.3	23	0.9
Beach	49	1.0	11	0.5	38	1.4
Gym	52	1.0	17	0.7	35	1.3
Rugby	52	1.0	40	1.7	12	0.5
Paintball/laser skirmish	50	1.0	47	2	3	0.1
Dog walk/play with animals	43	0.9	11	0.5	32	1.2
Guides/scouts/cadets	43	0.9	22	0.9	21	0.8
Badminton	45	0.9	20	0.9	25	1.0
Australian football	42	0.8	36	1.5	6	0.2
Baseball	38	0.8	35	1.5	3	0.1
Ice skating/skating	40	0.8	6	0.3	34	1.3
Motorcross	39	0.8	36	1.5	3	0.1
Acting	33	0.7	5	0.2	28	1.1
Boxing/wrestling	37	0.7	19	0.8	18	0.7
Cheerleading	33	0.7	0	0	33	1.3
Drums	37	0.7	22	0.9	15	0.6
Drama	30	0.6	7	0.3	23	0.9
Softball	28	0.6	2	0.1	26	1.0
Athletics	23	0.5	4	0.2	19	0.7

Parkour	25	0.5	20	0.9	5	0.2
Shooting/hunting	26	0.5	21	0.9	5	0.2
Rock climbing	18	0.4	11	0.5	7	0.3
Ball games/active games	20	0.4	18	0.8	2	0.1
Karate	14	0.3	5	0.2	9	0.3
Snow boarding/skiing	14	0.3	11	0.5	3	0.1
Boating/sailing	9	0.2	3	0.1	6	0.2
Sexual activities	11	0.2	10	0.4	1	0
Bowling/lawn bowls	7	0.1	4	0.2	3	0.1

174

175 **Supplement Table 2.** Characteristics of study participants for students who wished to do
176 physical activities after school and students who wished to do sedentary activities after
177 school.

	Students who reported they wish to do physical activities after school n = 5001	**Students who reported they wish to do sedentary activities after school n = 3285**	**Significance *p***
Age (years) mean ± SD	13.39 ± 1.15	13.58 ± 1.17	**<0.001**
Girls n (%)	2644 (52.9)	1559 (52.2)	**<0.001**
General Health n (%)			**<0.001**
Poor	118 (2.4)	116 (3.5)	
Fair	622 (12.4)	588 (17.9)	
Good	2472 (49.4)	1610 (49.0)	
Excellent	1789 (35.8)	971 (29.6)	
Weight status n (%)			**0.010**
Very underweight	100 (2.0)	67 (2.0)	
Slightly underweight	631 (12.6)	424 (12.9)	
About the right weight	3075 (61.5)	1900 (57.8)	
Slightly overweight	1050 (21.0)	784 (23.9)	
Very overweight	145 (2.9)	110 (3.3)	
Physical activity n (%)			**<0.001**
Never	725 (14.5)	931 (28.3)	
Once a week	945 (18.9)	674 (20.5)	
Twice a week	1036 (20.7)	597 (18.2)	
3 times a week	898 (18.0)	465 (14.2)	
4 times a week	530 (10.6)	243 (7.4)	
5 times a week (every day)	867 (17.3)	375 (11.4)	
Energy dense food n (%)			**0.007**
Never	153 (3.1)	125 (3.8)	
Once a week	1070 (21.4)	703 (21.4)	
Twice a week	910 (18.2)	563 (17.1)	
3 times a week	869 (17.4)	512 (15.6)	
4 times a week	555 (11.1)	341 (10.4)	
5 times a week	444 (8.9)	282 (8.6)	
6 times a week	249 (5.0)	205 (6.2)	
Every day	751 (15.0)	554 (16.9)	
SEIFA (mean ± SD)	986.5 ± 68.29	988.6 ± 67.50	0.2

178 Gender differences in quantitative and categorical variables were explored using t-test and
179 Chi-square test, respectively. SEIFA: Socio-economic index for area. Note: students who
180 responded with an inappropriate comment or ‘don’t know’ were excluded.
181