

sedentary behaviours

A large amount of time spent in sedentary behaviours is a potential contributor to the development of overweight among young people. Generally, it is assumed that time spent in sedentary behaviours may have displaced the time available for participation in some kind of physical activity, resulting in lower overall energy expenditure (British Heart Foundation, 2000). Consequently, there appear to be good reasons to improve our understanding of sedentary behaviours among young people.

When one thinks of young people being sedentary, the two images that most readily come to mind are of young people in front of a television set or a computer screen. While there is little doubt that 'small screen recreation' accounts for a significant proportion of the sedentary behaviours of many young people in developed countries, they are not the only sedentary behaviours. Young people also spend time sitting talking to their friends. Particularly during adolescence, time spent talking with friends serves many important social and cognitive developmental needs, is a source of great pleasure and provides a sense of belonging. Similarly, engaging in sedentary hobbies (drawing, writing, reading for pleasure or playing a musical instrument) are common and valued pastimes among most people.

Not all sedentary behaviours are recreational. There are many anecdotal reports that a large proportion of young people are devoting substantial amounts of their discretionary time to education-related sedentary behaviours, with the full support of their parents.

Other anecdotal reports, supported by studies of travel behaviour in the United States and Britain, also suggest that active travel (walking and cycling) has declined significantly among young people, being replaced by private car use (Roberts, 1996; Tudor-Locke, Ainsworth & Popkin, 2001). Indeed, Chapter 5 of this report showed very substantial declines in walking and cycling to school over the period 1985 to 2004. It is not clear, however, if the decline in walking and cycling has been accompanied by increased car travel, increased use of public transport, or both. The reasons for this apparent change are complex, but it does appear that young people from many parts of Australian society are spending more time travelling in a car than ever before.

The SPANS Survey asked students in Years 6, 8 and 10 to think about a normal week and to report the amount of time spent in each of 11 different sedentary behaviours on every day of the week. The categories of sedentary behaviour and their components were:

- > **Small screen recreation**
Watching TV/videos/DVDs, using the computer for fun.
- > **Education**
Using the computer for doing homework, being tutored, and Saturday school.
- > **Travel**
Included travel by car, bus, train or boat.
- > **Culture**
Included reading for fun, doing crafts or hobbies, and playing/practising a musical instrument.
- > **Social**
Included sitting around (chatting with friends, chilling), and going to church.

The time spent engaged in sedentary behaviours was then characterised in terms of the amount of time spent in each of the five categories by boys and girls in Years 6, 8 and 10 and the total number of hours spent in sedentary behaviours by urban/rural place of residence, socioeconomic status and cultural background. Small screen recreation is a special case of sedentary behaviour for several reasons. First, it is the only sedentary behaviour that is either not necessary or provides little intrinsic benefit. Second, there is some evidence that the rate of energy expenditure may fall to a particularly low level while watching TV (Klesges et al., 1993). Third, TV-watching is strongly associated with consumption of energy-dense foods (Coon & Tucker, 2002; Giammattei et al., 2003). Consequently, small screen recreation is examined in greater detail.

TIME SPENT IN SEDENTARY BEHAVIOURS BY SEX AND YEAR GROUP

Figure 6.1 and Table 6.1 show the number of hours/week spent in each of the five categories of sedentary behaviour for boys and girls in Years 6, 8 and 10. There was very little difference between boys and girls (the differences were not statistically significant) in the total number of hours spent in sedentary behaviours at any age. However, secondary school students spent markedly more time engaged in sedentary behaviours than their primary school counterparts. Year 6, 8 and 10 students spent 25 hours, 34 hours and 37 hours per week, respectively, engaged in sedentary behaviours.

SMALL SCREEN RECREATION

Boys spent three to five hours per week more than girls engaged in small screen recreation. Boys spent 18-22 hours per week (just under three hours per day) engaged in small screen recreation and girls spent 13-18 hours per week (approximately 2.5 hours per day). The differences between boys and girls were statistically significant for each Year. The time spent in small screen recreation increased by about three hours per week between primary and secondary school, for both boys and girls. Approximately 50-60% of all time spent in sedentary behaviour was spent in small screen recreation, except among Year 6 boys who spent 68% of their sedentary time in small screen recreation.

EDUCATION

Boys and girls spent similar amounts of time engaged in sedentary educational activities (slightly higher among girls), from about three hours per week in primary school (10% of all sedentary time) to six to seven hours per week in secondary school (15-20% of total sedentary time). The difference between boys and girls was statistically significant for Year 6, but not for Year 8 or 10 students.

TRAVEL

Boys and girls also spent similar amounts of time engaged in sedentary travel (sitting in some kind of vehicle), from about one hour per week in primary school (5% of sedentary time) to two-and-a-half to three hours per week in secondary school (8% of sedentary time). The differences between the sexes were not statistically significant.

CULTURAL ACTIVITIES

Boys and girls both spent approximately three to four hours per week engaged in cultural activities and the time spent was, again, slightly higher among girls (the difference was significant for Year 6 students, but not for Years 8 and 10). Approximately 12% of sedentary time was spent in cultural activities. In contrast to the other classes of sedentary behaviours, time spent in cultural activities declined with increasing age.

SOCIAL ACTIVITIES

Girls spent about twice as much time as boys engaged in social sedentary behaviours. Year 6, Year 8 and Year 10 boys spent one, two and four hours per week, respectively, and Year 6, Year 8 and Year 10 girls spent two, four and six hours per week, respectively, engaged in sedentary social activities. These values equate to 4%, 7% and 11% of total sedentary time for Year 6, Year 8 and Year 10 boys, respectively and 8%, 12% and 16% of total sedentary time for Year 6, Year 8 and Year 10 girls, respectively. The differences between boys and girls were statistically significant for each Year.

Figure 6.1. Median hours per week spent in small screen recreation, educational, travel, cultural and social sedentary behaviours among boys and girls in Years 6, 8 and 10 (%)

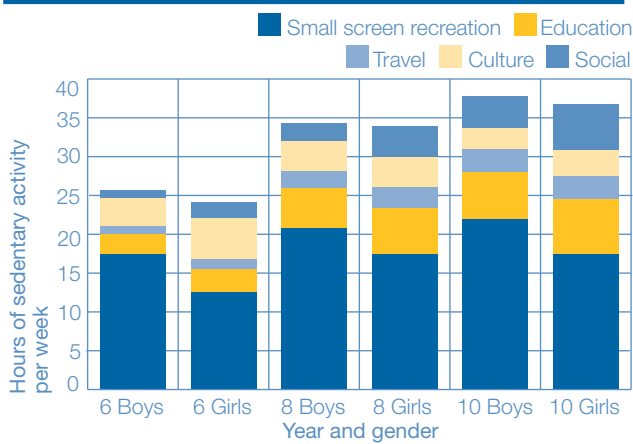


Table 6.1. Median hours per week spent in small screen recreation, educational, travel, cultural and social sedentary behaviours among boys and girls in Years 6, 8 and 10 (%)

	Boys			Girls		
	Year 6	Year 8	Year 10	Year 6	Year 8	Year 10
Small screen recreation	17.5	20.8	22.0	12.5	17.5	17.5
Education	2.5	5.1	6.0	3.0	5.8	7.0
Travel	1.0	2.3	3.0	1.3	2.8	3.0
Social	1.0	2.3	4.1	2.0	4.1	6.0
Cultural	3.7	3.8	2.7	5.3	3.8	3.3
Total	30.3	40.5	45.0	11.6	34.0	36.8

TIME SPENT IN SEDENTARY BEHAVIOURS BY RURALITY, SOCIOECONOMIC STATUS, CULTURAL BACKGROUND AND BMI CATEGORY

Figure 6.2 and Table 6.2 show the number of hours per week spent in all sedentary behaviours by rurality, socioeconomic status, cultural background and BMI category for boys and for girls in Years 6, 8 and 10. Table 6.2 is divided into six panels. The first five panels show the distribution of time spent by rurality, socioeconomic status, cultural background and BMI category for each of the five categories of sedentary behaviours: small screen recreation, education, social, travel and cultural. These data have not been analysed for statistical significance.

The sixth panel of Table 6.2 shows the median hours spent engaged in all sedentary behaviours. These data have been analysed for statistical significance and are discussed below.

RURALITY

Clearly, urban boys and girls were more sedentary than their rural counterparts. Urban boys spent four to nine more hours per week being sedentary than rural boys; the differences were significant for Years 6, 8 and 10. Urban girls spent six to 10 more hours per week being sedentary than rural girls. The differences between urban and rural girls approached statistical significance for Year 6 and Year 8 girls, but not for Year 10 girls.

SOCIOECONOMIC STATUS

Among boys, there was a clear, but weak, association between socioeconomic status and time spent in sedentary behaviours among secondary school, but not primary school, students. There was no consistent association between time spent in sedentary behaviours and socioeconomic status among girls. None of the differences across socioeconomic status categories were statistically significant.

CULTURAL BACKGROUND

Among boys, the most consistent association between cultural background and time spent in sedentary behaviours was for those of Asian cultural background. Boys of Asian cultural background spent about 15 hours per week more than boys of English-speaking background engaged in sedentary behaviours: the differences were significant for each school Year. None of the differences between boys from an English-speaking background and boys from European or Middle-Eastern cultural backgrounds were significant.

There did not appear to be a consistent association between cultural background and sedentariness among girls. However, a number of specific associations were identified. Secondary school girls from a Middle-Eastern cultural background spent about 10 hours per week more in sedentary behaviours than secondary school girls from an English-speaking background. Among Year 8 girls, those from an English-speaking background spent significantly fewer hours engaged in sedentary behaviours compared with girls from the other cultural backgrounds. Year 10 girls from an Asian background also spent significantly more hours engaged in sedentary behaviours than did girls from an English-speaking background.

BMI CATEGORY

The time spent in sedentary behaviours was generally greater among students who were overweight or obese. Although most of the differences were in the range zero to five hours per week, the difference was about 10 hours per week among Year 8 boys. The differences between obese and healthy weight Year 8 boys and between overweight and healthy weight Year 6 girls were statistically significant.

It is also of interest to note any substantial differences among the various demographic groups with regard to the amount of time spent in each category of sedentary behaviour. There is insufficient space here to present figures for all of these data, but the median values are presented in Table 6.1.

Briefly, the most striking features of the data were:

- > **Educational activities**
Higher among urban students, students from the highest socioeconomic status tertile and students from Asian cultural backgrounds.
- > **Travel**
Higher among urban students, students from the highest socioeconomic status tertile and overweight students.
- > **Cultural activities**
Higher among girls, urban students, students from the highest socioeconomic status tertile and students from Asian cultural backgrounds.
- > **Social activities**
Higher among girls (particularly those from Middle-Eastern backgrounds) and urban students.
- > **Total hours of sedentary behaviour**
Higher among urban students, among boys from Asian cultural backgrounds and girls from Middle-Eastern cultural backgrounds.

Figure 6.2. Median hours per week engaged in sedentary behaviours among boys and girls in Years 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

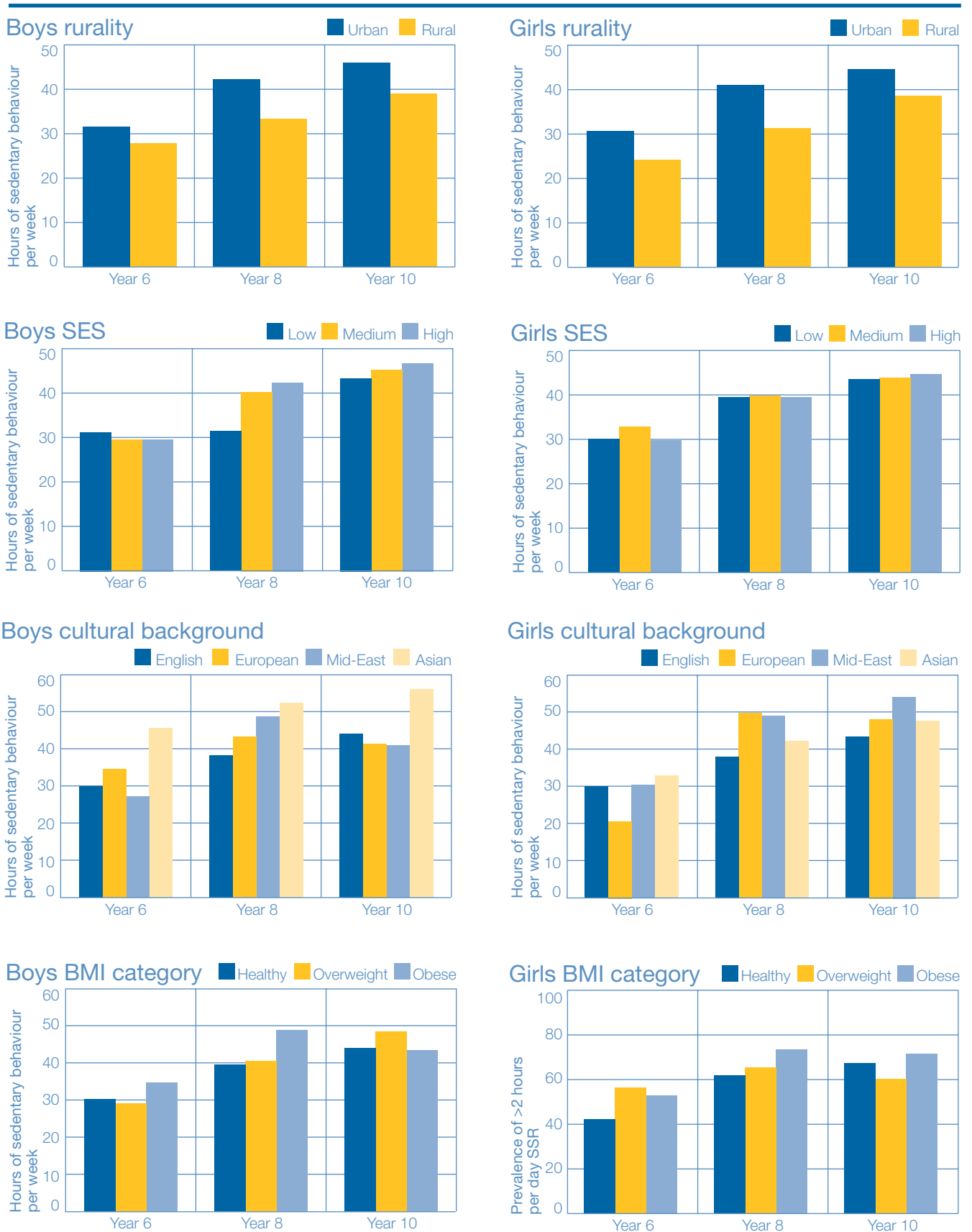


Table 6.2. Median hours per week spent in each category of sedentary behaviour and total sedentary behaviour by boys and girls in Years 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category

	Boys			Girls		
	Year 6	Year 8	Year 10	Year 6	Year 8	Year 10
Small screen recreation						
Rurality						
Urban	17.0	21.5	22.5	12.6	18.3	17.5
Rural	20.6	17.0	19.5	12.0	13.3	17.0
SES						
Low	19.6	20.3	23.0	13.5	18.8	19.0
Medium	17.8	21.7	22.3	14.0	18.5	20.5
High	15.3	19.4	21.0	10.0	15.5	15.0
Cultural background						
English-speaking	17.8	20.0	21.6	12.7	17.0	17.3
European	20.8	24.0	25.0	10.3	25.5	15.7
Middle-Eastern	16.5	30.8	18.0	16.5	26.0	32.7
Asian	12.6	22.8	26.8	9.6	17.3	17.5
BMI category						
Healthy weight	17.6	19.5	21.2	12.3	17.0	17.5
Overweight	18.4	21.8	24.6	16.8	18.9	17.1
Obese	14.4	27.7	22.3	16.3	21.0	17.1
Education						
Rurality						
Urban	2.7	5.5	6.5	3.1	6.0	8.0
Rural	1.5	3.1	3.4	2.0	4.8	5.3
SES						
Low	2.3	4.5	6.0	3.2	5.0	6.4
Medium	2.2	4.5	5.7	2.4	5.0	6.3
High	3.2	7.5	6.8	4.0	6.8	8.7
Cultural background						
English-speaking	2.5	5.0	5.5	2.8	5.4	6.5
European	5.3	6.3	8.0	2.0	7.0	6.0
Middle-Eastern	2.1	5.6	8.6	4.5	7.5	7.3
Asian	7.9	11.8	13.6	4.6	9.9	14.5
BMI category						
Healthy weight	2.5	5.3	6.0	2.9	6.3	7.0
Overweight	3.0	4.5	6.3	3.0	5.0	7.2
Obese	2.5	6.1	6.1	4.3	5.0	9.1



Table 6.2. Median hours per week spent in each category of sedentary behaviour and total sedentary behaviour by boys and girls in Years 6, 8 and 10 by rurality, socioeconomic status, cultural background and BMI category (continued)

	Boys			Girls		
	Year 6	Year 8	Year 10	Year 6	Year 8	Year 10
Travel						
Rurality						
Urban	1.0	2.4	3.2	1.3	3.0	3.0
Rural	0.8	1.3	2.4	1.0	2.0	2.8
SES						
Low	0.7	2.0	3.0	1.0	2.5	2.8
Medium	0.8	2.3	2.9	1.3	2.5	2.5
High	1.3	2.5	3.5	1.7	3.5	3.3
Cultural background						
English-speaking	1.0	2.3	3.2	1.3	2.8	3.2
European	0.0	0.8	3.0	0.3	3.5	1.3
Middle-Eastern	0.0	2.7	3.8	1.4	7.0	3.0
Asian	2.3	2.6	2.3	1.1	2.3	2.4
BMI category						
Healthy weight	0.8	2.3	3.0	1.0	2.7	2.8
Overweight	1.0	1.7	3.7	1.8	3.5	4.4
Obese	1.3	1.3	3.0	1.7	3.3	2.5
Social						
Rurality						
Urban	1.0	2.5	4.3	2.0	4.1	6.0
Rural	0.7	1.0	2.0	1.3	3.9	5.5
SES						
Low	1.0	2.3	3.0	1.5	3.6	5.9
Medium	1.0	2.5	4.3	2.0	4.2	6.3
High	0.6	2.0	4.3	2.0	4.7	6.0
Cultural background						
English-speaking	0.7	2.0	4.1	2.0	4.0	6.1
European	1.9	1.8	3.0	1.2	7.3	6.5
Middle-Eastern	1.3	2.8	4.5	2.2	8.5	8.1
Asian	2.4	3.0	3.4	1.5	2.0	4.2
BMI category						
Healthy weight	1.0	2.2	4.0	2.0	4.1	6.1
Overweight	0.7	2.5	4.6	2.0	4.0	5.3
Obese	2.0	2.3	2.2	1.0	7.0	4.5

Table 6.2. Median hours per week spent in each category of sedentary behaviour and total sedentary behaviour by boys and girls in Years 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (continued)

	Boys			Girls		
	Year 6	Year 8	Year 10	Year 6	Year 8	Year 10
Cultural						
Rurality						
Urban	4.0	4.0	3.0	5.5	3.8	3.5
Rural	2.7	3.1	2.2	4.2	3.8	2.5
SES						
Low	2.8	2.8	1.4	3.5	4.2	2.9
Medium	3.5	4.0	3.0	5.8	3.3	2.5
High	4.9	4.7	3.7	6.7	3.8	3.9
Cultural background						
English-speaking	3.7	3.5	2.5	5.3	3.4	2.9
European	2.5	2.8	3.0	4.0	7.9	0.0
Middle-Eastern	1.7	1.2	0.3	3.9	0.0	4.9
Asian	7.1	5.9	3.3	7.1	6.8	4.3
BMI category						
Healthy weight	4.0	3.7	2.5	5.1	4.0	3.1
Overweight	3.3	3.8	3.5	6.3	4.0	3.5
Obese	4.2	4.5	4.2	4.9	2.5	3.6
Total						
Rurality						
Urban	31.4	41.9	45.7	30.8	41.2	44.7
Rural	27.5*	33.0*	38.6*	24.2	31.4	38.7
SES						
Low	31.3	38.6	43.5	29.9	39.3	43.3
Medium	29.7	40.5	45.5	32.7	39.6	43.7
High	29.8	42.6	46.9	29.7	39.3	44.5
Cultural background						
English-speaking	29.9	38.3	44.1	30.1	38.0	43.5
European	34.6	43.3	41.5	20.7	49.8*	48.2
Middle-Eastern	27.3	48.7	41.0	30.5	49.0*	54.2
Asian	45.6*	52.3*	56.0*	33.0	42.3*	47.8*
BMI category						
Healthy weight	30.3	39.7	44.1	29.2	38.4	44.3
Overweight	29.2	40.6	48.6	34.6*	40.1	44.3
Obese	34.8	49.0*	43.5	33.7	44.6	35.8

* Indicates a statistically significant difference at $P < .05$. Comparisons are: between urban and rural; low and medium socioeconomic status compared with high socioeconomic status; European, Middle-Eastern and Asian cultural backgrounds compared with English-speaking cultural background; and overweight and obese compared with healthy weight. Comparisons are within each sex/Year group category.

MORE THAN TWO HOURS PER DAY OF SMALL SCREEN RECREATION

By far the greatest research interest, with regard to sedentary behaviour, is in the amount of time young people spend watching television and its association with increased fatness (Amisola & Jacobson, 2003). TV-viewing is a special type of sedentary behaviour, for several reasons. First, as shown previously, it accounts for a large proportion of total sedentary time. Second, it is far easier and more common to eat while watching TV than while engaged in any other sedentary behaviour, and the food consumed tends to be relatively energy dense (Coon & Tucker, 2002; Giammattei et al., 2003). That is, not only is energy expenditure low, but energy intake can also be quite high while watching television: a 'double whammy' in terms of energy imbalance. Third, there is arguably greater intrinsic value in the other categories of sedentary behaviour described previously than in TV-viewing and, consequently, interventions to reduce the time spent watching TV, rather than the time spent in most other sedentary behaviours, in order to make more time available for being physically active, are preferable. Of course, young people engage in other forms of small screen recreation as well as watching television, but these have received less research interest than TV-viewing. Watching videos and DVDs and playing computer games were also included in the time spent in small screen recreation.

Figure 6.3. Prevalence of engaging in more than two hours per day of small screen recreation (SSR) among boys and girls in Years 6, 8 and 10 (%)

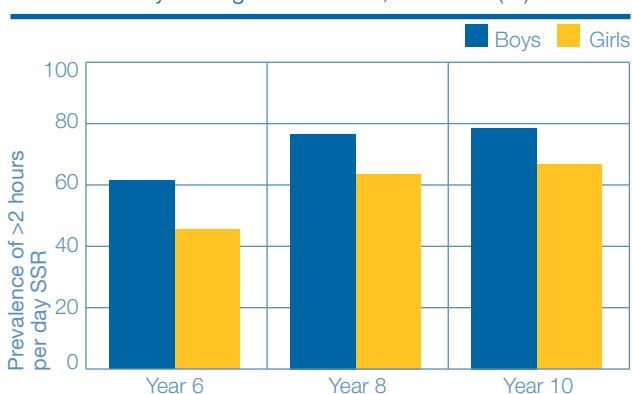


Table 6.3. Prevalence of engaging in more than two hours per day of small screen recreation (SSR) among boys and girls in Years 6, 8 and 10 (%)

	Year 6	Year 8	Year 10
Boys	61.2	76.2	78.4
Girls	44.9*	66.1*	66.5*

* Indicates a statistically significant difference at $P < .05$ between boys and girls within the same Year group.

The time spent engaged in small screen recreation was summed across all days of the week for each young person, the daily mean time spent in these activities calculated and then the young people who reported spending two or more hours per day, on average, in small screen recreation were identified. Two hours per day was chosen as the cut-point because *Australia's Physical Activity recommendations for Children and Young People* (Department of Health and Ageing, 2004) state that 'Children should not spend more than two hours per day using electronic media for entertainment (eg computer games, TV, Internet), particularly during daylight hours'. This section presents the prevalence of more than two hours a day of small screen recreation and how this was distributed by sex and Year group, urban/rural place of residence, socioeconomic status, cultural background and BMI category.

THE PREVALENCE OF MORE THAN TWO HOURS PER DAY OF SMALL SCREEN RECREATION BY SEX AND YEAR GROUP

Figure 6.3 and Table 6.3 show the prevalence of engaging in more than two hours per day of small screen recreation among boys and girls in Years 6, 8 and 10. The prevalence increased markedly between primary and secondary school, with about three-quarters of secondary school boys and two-thirds of secondary school girls spending more than two hours per day engaged in small screen recreation. The prevalence was statistically significantly higher among boys than girls in each school year.

THE PREVALENCE OF MORE THAN TWO HOURS PER DAY OF SMALL SCREEN RECREATION BY RURALITY, SOCIOECONOMIC STATUS, CULTURAL BACKGROUND AND BMI CATEGORY

Figure 6.4 and Table 6.4 show the prevalence of engaging in more than two hours per day of small screen recreation by rurality, socioeconomic status, cultural background and BMI category for boys and girls in Years 6, 8 and 10.

RURALITY

There was a tendency toward a higher prevalence among urban students, with the differences between urban and rural students being significant for Year 8 and Year 10 boys and Year 8 girls.

SOCIOECONOMIC STATUS

There was a tendency toward a decreasing prevalence of engaging in more than two hours per day of small screen recreation with increasing socioeconomic status. The association was weak among boys, but stronger among girls. The prevalence of engaging in more than two hours per day of small screen recreation was significantly lower among Year 6 and Year 10 girls in the highest socioeconomic status tertile compared with girls in the other two tertiles.

CULTURAL BACKGROUND

There was not a clear association between cultural background and the prevalence of engaging in more than two hours/day of small screen recreation, other than a non-significant tendency toward a higher prevalence among girls from a Middle-Eastern cultural background.

BMI CATEGORY

There were no clear associations between BMI category and the prevalence of engaging in more than two hours per day of SSR among boys. However, there was a somewhat more distinct association among girls. For all three Year groups, the prevalence of engaging in more than two hours per day of SSR increased across BMI categories, except in the case of overweight among Year 10 girls. None of the differences among girls were statistically significant.

Figure 6.4. Prevalence of engaging in more than two hours per day of small screen recreation (SSR) among boys and girls in Years 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

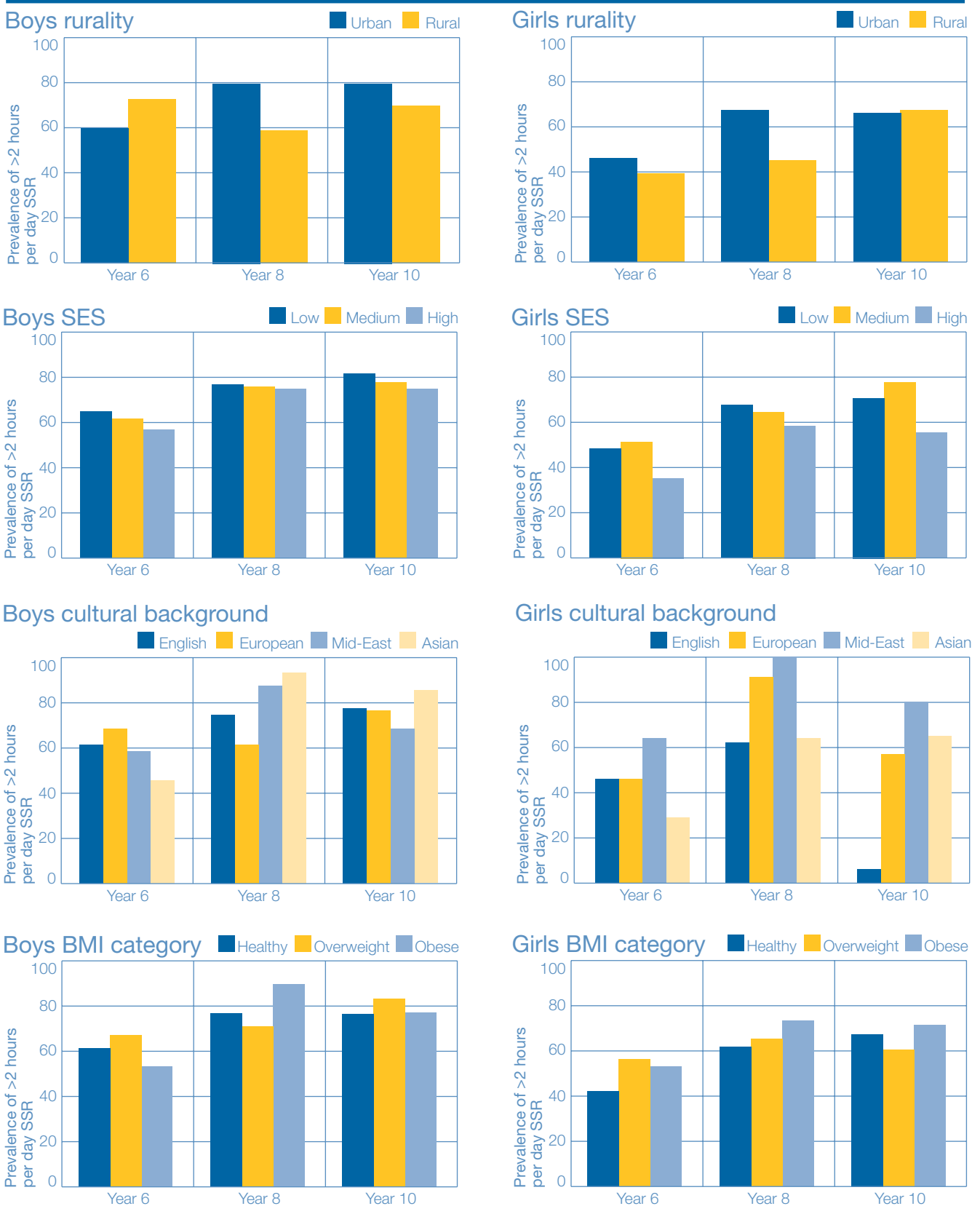


Table 6.4. Prevalence of engaging in more than two hours per day of small screen recreation (SSR) among boys and girls in Years 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

	Boys			Girls		
	Year 6	Year 8	Year 10	Year 6	Year 8	Year 10
Rurality						
Urban	59.4	79.9	79.7	45.9	66.7	66.4
Rural	72.7	59.5*	69.4*	39.1	45.5*	67.1
SES						
Low	65.4	77.3	81.9	47.9	67.4	70.0*
Medium	61.7	76.0	78.3	50.6*	64.1	76.8*
High	57.2	75.4	74.9	35.5	58.2	54.7
Cultural background						
English-speaking	62.0	74.6	78.0	45.7	61.7 ⁿ	66.4
European	68.8	61.5	76.5	46.2	90.9	57.1
Middle-Eastern	58.8	87.5	69.2	64.3	100	80.0
Asian	45.8	94.4*	86.0	29.0	64.3	64.7
BMI category						
Healthy weight	60.7	76.4	77.3	42.1	61.7	67.3
Overweight	66.1*	70.9	82.4	56.3	65.3	60.3
Obese	53.7	89.3	77.8	52.9	73.3	71.4

* Indicates a statistically significant difference at $P < .05$. Comparisons are: between urban and rural; low and medium socioeconomic status compared with high socioeconomic status; European, Middle-Eastern and Asian cultural backgrounds compared with English-speaking cultural background; overweight and obese compared with healthy weight. Comparisons are within each sex/Year group category.

ⁿ Indicates that statistical significance could not be calculated due to low numbers.

DISCUSSION

These data provide a comprehensive view of sedentary behaviours among young people. Young people spend a large number of hours engaged in sedentary behaviours: Year 6 students spend about 24 hours per week in sedentary behaviours and secondary school students about 35 hours per week, not including the time spent sitting in classrooms. A little more than half of this time is spent watching television or playing on a computer. On average, boys spend three to five hours per week more than girls in sedentary behaviours. Three-quarters of secondary school boys and two-thirds of girls spend more than two hours per day engaged in small screen recreation. Increasing the number of young people who meet the criterion put forward by *Australia's Physical Activity Recommendations for Children and Young People* (Department of Health and Ageing, 2004) of less than two hours a day using electronic media for entertainment is an immediate and important goal.

Urban students are more sedentary than rural students. They spend more time engaged in every category of sedentary behaviour compared with rural students and greater proportions of urban students spend more than two hours per day in small screen recreation. There was a tendency to spend more time participating in sedentary educational, cultural and travel activities and less time engaged in small screen recreation with increasing socioeconomic status. In terms of differences between students from different cultural backgrounds, students of Asian cultural background clearly spent more time engaged in sedentary educational and cultural behaviours and Middle-Eastern girls spent more time socialising with friends. The associations between sedentary behaviours and overweight were only weak to modest.

Young people reported spending a lot of time engaged in sedentary behaviours, half of which was small screen recreation. There appears to be some scope to reduce the amount of time spent in sedentary behaviours without interfering with educational, cultural or social activities. However,

there is one aspect of small screen recreation that SPANS was not able to address and which needs to be understood: the time of day at which most small screen recreation takes place. That is, if most of the small screen recreation takes place during the evening (after dark) then opportunities to replace it with more active behaviours may be limited. If the hours between the finish of school and the evening meal are spent in small screen recreation then there may be opportunities to replace it with more active pastimes.

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