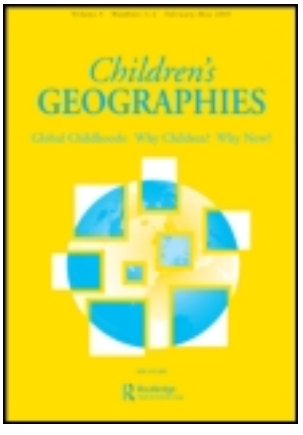

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A comparison study of children's independent mobility in England and Australia

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A comparison study of children's independent mobility in England and Australia

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We compared independent mobility (freedom to move around the neighbourhood – or similar – without adult accompaniment) among English and Australian schoolchildren. Parents reported mobility licences granted to their children (e.g. allowing them to cross main roads alone) and accompaniment on local trips. Children reported travel mode to school. We examined associations between mobility licences and independent school journeys, and accompaniment on local trips. Among 10–12-year-olds, English children had more licences than Australian children. Mobility licences were directly associated with independent school journeys among primary but not among secondary schoolchildren who travelled further; and inversely associated with parental accompaniment to other destinations. Influences on parental restrictions should be examined to promote children's independent mobility.

Keywords: active transport; adolescent; neighbourhood; urban; rural

Introduction

The World Health Organization (WHO 2010a) has identified physical inactivity as a 'leading risk factor for global mortality', particularly in relation to non-communicable disease. In line with recommendations of national health authorities (Australian Government Department of Health and Ageing 2004; National Association for Sport and Physical Education 2004) WHO advises that school-aged children engage in at least 1 h of moderate-to-vigorous physical activity per day (WHO 2010a). Early this millennium, active transport (i.e. non-motorized transport such as walking and cycling) to school was identified as a potential source of habitual physical activity (Tudor-Locke, Ainsworth, and Popkin 2001) that could help children to meet the recommended level. Since then research on this topic has proliferated (Faulkner et al. 2009). Because one of the strongest barriers and most consistent correlates of walking and cycling to school is distance between home and school (Davison, Werder, and Lawson 2008), this area of research is expanding to examine active transport to other local destinations (Carver et al. 2011). As a corollary to this, there has been a resurgence of interest in children's independent mobility (Badland et al. 2011; Fyhri et al. 2011; Villaneuva et al. 2012), which refers to children's freedom to move around their neighbourhood (or similar) unaccompanied by adults (Hillman, Adams, and Whitelegg 1990).

The seminal study on this topic (Hillman, Adams, and Whitelegg 1990), titled 'One False Move . . . A Study of Children's Independent Mobility', was published in 1990 by the Policy Studies Institute (PSI) London. Using surveys, parents reported the following 'mobility licences' granted to their children: whether they allowed their child to (1) cross main roads alone, (2) travel on their own to places other than school (within walking distance of home), (3) travel home from

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school alone, (4) go out alone after dark, (5) travel on local (non-school) buses alone, (6) cycle on main roads alone. Children reported on aspects of their actual mobility (e.g. whether they were accompanied on their journey home from school). The findings demonstrated a marked reduction in children's active transport and independent mobility in England over the previous 20 years since Hillman and colleagues first reported on this topic (Hillman, Henderson, and Whalley 1973, 1976). This trend was attributed largely to parental concern about traffic danger due to increases in road traffic volume in England during the 1970s and 1980s (Hillman, Adams, and Whitelegg 1990). As well as conducting their surveys in England in 1990, Hillman, Adams, and Whitelegg also conducted these surveys in Germany. The cross-sectional data demonstrated that overall, compared with English children, German children had greater independent mobility (Hillman, Adams, and Whitelegg 1990). Among the possible reasons suggested for this was the higher population densities of the study areas in Germany compared with the corresponding areas in England. In particular, German homes tended to be smaller than in England but there was greater provision of outdoor recreational facilities. Hillman and colleagues also cited a cultural difference between England and Germany regarding 'collective responsibility'. In Germany, unaccompanied children were generally overseen by other adults who would act in loco parentis where necessary, but this was less common in England (Hillman, Adams, and Whitelegg 1990, 82–85).

The recent resurgence of research activity on this topic is due to a multitude of factors including rising global rates of childhood obesity (WHO 2010b) and efforts to reduce dependency on fossil fuels, by promoting walking and cycling for transport (Bauman et al. 2008). Declines in active transport and independent mobility in developed nations, where the obesity rate is twice that of developing nations (WHO 2010b), are of significant public health concern as both can contribute significantly to children's overall physical activity (Mackett et al. 2007; Smith et al. 2012). Regular physical activity during youth is known to have important benefits for both physical and psycho-social health among children and young people, in relation to cardiovascular disease risk factor profiles, overweight and obesity, and self-esteem observed among active youth (Bailey and Martin 1994; Calfas and Taylor 1994; Raitakari et al. 1994). Independent mobility is important for children's physical, social, cognitive and emotional development (Kyttä 2004) and is associated with their physical activity levels (Mackett et al. 2007). Furthermore, independent mobility during childhood is also important for establishing bonds with peers (Prezza et al. 2001), and helps to create a stronger sense of community, reduce feelings of loneliness and concern about crime during adolescence (Prezza and Pacilli 2007).

Twenty years on from the publication of their study (Hillman, Adams, and Whitelegg 1990), PSI researchers repeated the surveys in England. In addition, international researchers were invited to conduct equivalent surveys in other countries, including Australia, to allow an international comparison of children's independent mobility to be made. This paper compares data gathered in 2010 in England with data from the equivalent Australian study.

While declines in active transport and independent mobility among English children have been reported previously (Hillman, Adams, and Whitelegg 1990), little is known about levels of independent mobility among Australian children. Surveys that included the measures of Hillman, Adams, and Whitelegg (1990) were conducted in Canberra in 1991 (Tranter 1993). Levels of children's independent mobility in Canberra were reported to be lower than in Germany, but were similar to those in England (Tranter and Whitelegg 1994). It is important, however, to study children's independent mobility in other urban and rural areas of Australia, because unlike other Australian cities, Canberra was a planned city, based on the winning design of an international competition (National Archives of Australia 2012). To date, there are few published studies of children's independent mobility elsewhere in Australia (Whitzman and Pike 2007; Romero 2010).

Although there is evidence that participation in active transport among Australian children has declined over recent decades (Salmon et al. 2005), most Australian data on children's active transport were gathered in urban (Carver et al. 2005; Salmon et al. 2005; Carver, Timperio, and Crawford 2008a; Hume et al. 2009) rather than in rural areas (Merom et al. 2006). The gathering and analyses of data from Australian schoolchildren and their parents in both urban and rural areas will contribute to the evidence base on active transport and independent mobility. This will be strengthened further by comparing active transport and independent mobility in Australia with these behaviours in England. While both countries are host to a variety of cultures/migrants, England and Australia have strong historical, cultural and regal ties. In particular, associations between mobility licences and children's *actual* independent mobility will be examined, making an important contribution to the literature, as the earlier English longitudinal study (Hillman, Adams, and Whitelegg 1990) did not link data from each child with their parents' data.

Specifically this paper aims to compare the following between England and Australia: mobility licences granted to schoolchildren; modes of travel to school; levels of independent mobility when walking or cycling to school, and on trips to local destinations (other than school). In addition, this paper examines how mobility licences are associated with (1) actual independent mobility on the school journey and (2) with parental accompaniment to local destinations (other than school).

Methods

In England and in Australia the formal education of children is organized in a similar way, commencing with a 'Reception' or 'Preparatory' year, with progression through Years 1–6 of primary (or elementary) school, followed by up to 6 years of secondary school (Years 7–12). In England, children begin the first year of primary school in September and must be 5 years old before August 31 of the following year. In the State of Victoria, Australia, children begin the first year of primary school in February and must be 5 years old before April 30 that year. Therefore, in England some children (depending on their date of birth) may have the opportunity to start school at a slightly earlier age than in Australia. In each country, we contacted the principals of state-run schools and invited their school to participate. Independent/private/faith schools were not invited to participate. Our study targeted children at the same school stages in England and in Australia: primary schoolchildren in Years 3–6 and secondary schoolchildren in Years 7–10, and their parents.

In England in 2010, PSI researchers aimed to gather data that were comparable to data from earlier PSI surveys in 1971 and 1990 (Hillman, Adams, and Whitelegg 1990). Therefore, the same five geographical areas were used as in the previous studies, and (where possible) the same schools were recruited (in 1971, only primary schools were recruited; in 1990, primary schools and secondary schools located close to those primary schools were recruited). Overall, 7 out of the 10 schools that had participated previously were recruited in 2010. Where schools were unable or unwilling to participate, substitute schools in the same area were selected. The study locations originally selected in 1971 were categorized into five broad area types: 'Inner City' – Islington in central North London; 'Urban' – Nottingham, a city in the Midlands; 'Suburban' – Stevenage, a 1950s 'new town' constructed North of London; 'Small town' – Winchester, a provincial country town; 'Rural' – a village and a small town in Oxfordshire.

In Australia, state-run secondary schools in the State of Victoria, Australia, were randomly sampled and the closest primary school to each was identified. These schools were assigned to similar settlement types to those chosen by researchers at PSI. While the characteristics of the Australian settlement types could not exactly mirror those in England due to Australia's lower population density, the following criteria were applied to ensure diversity: 'Inner City' – within 5 km of Melbourne's Central Business District; 'Urban' – non-inner-city

Table 1. Population densities of study areas in England and Australia.

England	Persons/ hectare		Australia	Persons/ hectare
Islington	143	Inner City	Fitzroy, Clifton Hill, Collingwood[a]	38
Nottingham	42	Urban	Mont Albert North, Surrey Hills[b]	26
Stevenage	36	Suburban	Knoxfield, Ferntree Gully[c]	16
Winchester	26	Small town[d]	Gisborne	0.4
Oxfordshire (Chipping Norton)	6	Rural 1[d]	Korumburra	0.1
Oxfordshire (Hook Norton)	1	Rural 2[d]	Kyneton	0.2

[a]The 'Inner City' study area comprised the adjoining neighbourhoods of Fitzroy, Clifton Hill and Collingwood.
[b]The 'Urban' study area comprised the adjoining suburbs of Mont Albert North and Surrey Hills.
[c]The 'Suburban' study area comprised the adjoining suburbs of Knoxfield and Ferntree Gully.
[d]Population density data were available only for the whole shire in which the study area was located; this included extensive bush/agricultural land.
Sources: Mid-2009 Population Estimates for Census Area Statistics, England (Office for National Statistics 2011) and Australian Bureau of Statistics (2010), Australia

area of Melbourne, population density > 2000 people/km^2; 'Suburban' – outer area of Melbourne, population density < 2000 people/km^2; 'Small Town' – rural (as defined by the Australian Bureau of Statistics 2007), population > 6000 people; 'Rural' – rural, population < 6000 people. The population density of each study area is presented in Table 1.

In Australia, the principal of each randomly selected secondary school was provided with details of the study and an invitation for the school to participate. If the invitation was accepted the principal of the primary school located closest to that secondary school was asked to participate. In areas where school enrolments were low (<300 pupils), several primary schools were approached to boost potential participation rates. Secondary schools in two separate rural areas were recruited as teachers at the first school recruited anticipated low participation rates. In total, 16 Australian schools were recruited (9 primary, 6 secondary and 1 combined primary and secondary school).

Each eligible child was given an envelope containing a Parent Questionnaire to take home to their parents to fill out. These questionnaires were distributed during February–March in England and during August–October in Australia, to match seasonality as closely as possible. The children's survey was conducted at each school by a researcher during normal school hours. In Australia, active parental consent was required for each child's participation, while in England parents were given the ability to have their child opt out of the study. Data were gathered from 551 child–parent pairs in England and 688 child–parent pairs in Australia. Ethics approval was obtained from the human research ethics committees at PSI and at Oxford Brookes University in England, and from the Deakin University Ethics Committee and the Department of Education and Early Childhood Development, Victoria, Australia.

Measures

Mobility licences

Six items from the Parent Questionnaire recorded whether the child was allowed to: (1) cross main roads alone, (2) travel on their own to places other than school (within walking distance of home), (3) travel home from school alone, (4) go out alone after dark, (5) travel on local (non-school)

buses alone, (6) cycle on main roads alone. The values assigned to each response were: 0 'no' and 1 'yes'. The six response values were summed to give a Mobility Licence score (value range 0–6). Missing values were imputed conservatively (Panter et al. 2010) with value 0 'no' in cases where there were responses for at least four licences, otherwise (in only one case) a value of 'missing' was assigned to the Mobility Licence score.

As well as examining mobility licences, the following measures were used to assess mode of travel to school and *actual* independent mobility on journeys between home and school, as well as on journeys to other local destinations within walking distance of home. In this paper, we focus on independent journeys made using active rather than motorized transport as such trips can provide a regular source of habitual physical activity which is beneficial to physical and mental health (Tudor-Locke, Ainsworth, and Popkin 2001).

Mode of travel on school journey

Two Child Questionnaire items measured travel mode on the day of the survey on journeys to and from school, respectively. Response options were: 'Walked most or all of the way'; 'Cycled'; 'School bus'; 'Local bus or train or tram'; 'Car'; 'Other'. For each item a corresponding question asked about level of accompaniment. Response options were: 'Travelled on my own'; 'With parent'; 'With another adult'; 'With older child/teenager'; 'With child of same age or younger'.

Independent mobility on the school journey

A dichotomous variable was created to indicate whether each child made at least one independent journey to/from school using active transport. A value of '1' was assigned if the child walked/cycled (or scootered) to or from school unaccompanied by an adult, otherwise a value of '0' was assigned.

Distance to school

Although distance to school was not included in the original scope of the international comparison study, this variable was generated using Geographical Information Systems (GIS) software, ArcGIS (ESRI, California, 2010) with Ordnance Survey MasterMap Integrated Transport Network (Europa Technologies, UK) data for the English sample, and Vicmap Address and Vicmap Transport 2010 databases (State Government of Victoria 2010) for the Australian sample. Distance to school has been identified as a key barrier to walking/cycling to school (Davison, Werder, and Lawson 2008). For the Australian sample the exact distance from the child's home to school was measured using the most direct route along the pedestrian road network. This was possible because Australian parents had provided their home address when providing active consent for their child to participate. In England, however, where only opt-out consent was required for child participation, parents provided their postcode rather than their complete address. The 'distance to school' variable generated for English children was an estimate of the distance along roads and footpaths from the middle of the child's postcode area (which included, on average, 15 addresses) to the school. Due to this discrepancy in measurement of distance to school, distance data were analysed descriptively, but were not entered into regression analyses.

Independent journeys to other neighbourhood destinations

Parents were asked about accompaniment of their child on journeys to destinations other than school that were within walking distance of home. They were asked if their child (1) usually

travelled alone, (2) was usually taken (i.e. accompanied by parent or other adult) or (3) if this varied. In addition they were asked to report the number of such round trips they made each week to accompany their child; and their usual mode of travel.

Urban or rural location

Study areas were collapsed into two categories: 'Urban' and 'Rural'. In this paper, 'Urban' refers to those areas originally categorized as 'Inner City', 'Urban' or 'Suburban', while 'Rural' refers to those originally categorized as 'Small Town' or 'Rural'.

Household regular access to a car(s)

Parents were asked to report whether their household had regular access to a car. Response options were 'no'; 'yes, 1 car' and 'yes, 2 or more cars'.

Data analyses

Descriptive analyses examined distributions of mobility licences, travel mode to school and independent mobility on the school journey, according to urban/rural locality and primary/secondary school in England and Australia. Chi-squared tests of significance were performed to examine differences by country in the numbers of mobility licences granted to primary and secondary schoolchildren, as well as differences in mode of travel to school and independent mobility on the school journey, within country by urban/rural location and differences within urban/rural location by country. Further Chi-squared tests of significance were performed to examine differences in the numbers of mobility licences granted to boys, compared with girls in each country. Distributions of mobility licences by age of child were also examined. Logistic regression analyses were conducted to examine associations between the total number of mobility licences granted and the odds of a child travelling independently to school (using active transport). Linear regression analyses were conducted to examine associations between the total number of mobility licences and the number of round trips within walking distance made with parental accompaniment.

Results

English and Australian data were combined and analysed for 784 primary schoolchildren (50% boys; 63% urban) and 455 secondary schoolchildren (45% boys; 52% urban) with mean ages of 10.4 (SD 1.2) years and 13.7 (SD 1.0) years, respectively. Parent Questionnaires were completed mainly by mothers or female carers (88%). Most parents who completed the questionnaire had a partner (79%), around 69% were aged less than 45 years and most were employed full time (27%) or part time (49%). Overall, household access to cars was greater in Australia compared with England. Only 1% of Australian households did not have regular use of a car while this was true for 18% of English households. Proportions of households with access to one car were: England, 42%; Australia, 27%; and with access to two or more cars were: England, 40%; Australia, 72%.

In our study the mean age of primary schoolchildren was 8.9 (SD 1.2) years in England and 10.4 (SD 1.2) years in Australia, and the mean age of secondary schoolchildren was 12.4 (SD 1.1) years in England and 13.7 (SD 1.0) years in Australia. Even though the school years targeted by this study corresponded in each country, Australian children were, on average, around 1 year older than English schoolchildren at each school stage. Several factors may have contributed to this,

Table 2. Mobility licences granted by parents to primary and secondary schoolchildren.

	Primary		Secondary	
	Eng $n = 354$ (%)	Aus $n = 430$ (%)	Eng $n = 197$ (%)	Aus $n = 258$ (%)
Cross main roads alone	36	55***	95	97
Go on their own to places other than school	6	15***	42	39
Come home from school alone	25	40***	88	80***
Go out alone after dark	2	2	24	12
Travel on local buses alone	4	11**	59	62
Cycle on main roads alone[a]	10	19***	49	65**

Notes: Eng, England; Aus, Australia.
[a]For this item only, those who owned a bicycle were included (ENG primary, 94%; secondary, 84%. AUS primary, 97%; secondary, 88%).
**$p < .01$, ***$p < .001$ – chi-square test of significance.

such as variations by country in the distribution of the sample across individual school years. It is also noteworthy that although Australian children may start school at 5 years, it is not compulsory until 6 years of age (State Government of Victoria 2011). Another factor was that children reported their age as a whole number of years. Because their date of birth was not recorded their exact age on the day of the survey could not be computed (a limitation of the study).

Mobility licences

The mobility licences granted to primary and secondary schoolchildren in England and Australia are presented in Table 2. Significantly higher proportions ($p < .01$) of Australian primary schoolchildren were granted each licence (other than being allowed to go out after dark), when compared with their English peers. Over half (54%) of the English primary schoolchildren were granted no licences (median value 0, range 0–5) and 36% of Australian primary schoolchildren were granted no licences (median 1, range 0–6). In contrast to these skewed distributions for primary schoolchildren, the total number of licences was distributed normally for secondary schoolchildren in each country. There were no significant differences between the mean number of licences granted to secondary schoolchildren in England (3.5 (SD 1.4)) and Australia (3.4 (SD 1.3)).

Due to the mean differences in age between English and Australian schoolchildren, mobility licences were examined further by age of the child in years (Table 3). The main differences by country in mobility licences granted were identified among 10–12-year-old children: there were higher percentage rates for each mobility licence among English children compared with Australian children and these differences were significant ($p < .05$) for almost all licences. It is important, however, to also consider the differences by country in the distributions of 11- and 12-year-olds attending primary and secondary school (not shown in Table 3). Exactly half of the 11-year-old English children were attending secondary school, while all 11-year-olds among the Australian sample were still attending primary school. All of the 12-year-olds among the English sample were attending secondary school, but among the Australian sample 77% (81/105) of the 12-year-olds were still attending primary school.

Mobility licences granted according to sex of child

Chi-squared tests of significance revealed no significant differences in the numbers of mobility licences granted to primary-school-aged boys compared with girls in each country (data not

Table 3. Mobility licences granted by parents according to age of child.

	8 years		9 years		10 years		11 years		12 years		13 years		14 years		15 years	
	Eng $n =$ 89 (%)	Aus $n =$ 22 (%)	Eng $n =$ 94 (%)	Aus $n =$ 22 (%)	Eng $n =$ 77 (%)	Aus $n =$ 109 (%)	Eng $n =$ 78 (%)	Aus $n =$ 113 (%)	Eng $n =$ 77 (%)	Aus $n =$ 105 (%)	Eng $n =$ 39 (%)	Aus $n =$ 100 (%)	Eng $n =$ 29 (%)	Aus $n =$ 85 (%)	Eng $n = 8$ (%)	Aus $n =$ 37 (%)
Cross main roads alone	15	4	33	31	**57**	**52**	**85**	**64**	**96**	**88**	97	98	100	98	100	95
Go on their own to places other than school	**1**	**9**	3	4	**12**	**7**	**27**	**14**	40	36	38	33	59	43	50	41
Come home from school alone	7	14	20	23	**54**	**34**	**78**	**43**	**83**	**71**	87	83	**100**	**74**	62	86
Go out alone after dark	1	0	2	2	**4**	**0**	**12**	**2**	**21**	**7**	**20**	**6**	**38**	**7**	38	30
Travel on local buses alone	1	0	1	4	**8**	**6**	**33**	**5**	48	38	69	53	79	68	88	71
Cycle on main roads alone[a]	6	15	9	4	16	15	25	15	45	44	51	56	81	75	75	71

Notes: Eng, England; Aus, Australia. Bold values indicate significant differences at $p < .05$ between countries (chi-square test of significance).
[a]For this item only, those who owned a bicycle were included.

tabulated). This was true also for English secondary schoolchildren. However among Australian secondary schoolchildren, girls were granted significantly fewer mobility licences ($p = .002$) than were boys. For example, 87% of boys had at least three licences, while this was true for 69% of girls.

Mode of travel on school journey

Participation rates in each travel mode to school are presented in Figure 1. Overall rates for each mode on the journey home from school are not shown as these varied little compared with the journey to school. (Most children (79%) travelled by the same mode in each direction and variations in travel modes had little effect on overall rates when comparing journeys to and from school. For example, 71 children who walked to school travelled home by car, while 93 children who travelled by car to school walked home.)

Chi-square tests of significance showed no significant differences by urban/rural location in mode of travel to school among English primary schoolchildren, but there were highly significant differences ($p < .001$) in travel mode by urban/rural location among English secondary schoolchildren and among primary and secondary schoolchildren in Australia. For primary and secondary schoolchildren there were significant differences ($p < .001$) by country in mode of travel to school for both urban and rural locations. Compared with Australia, rates of walking to school were higher in England where this was the dominant mode of transport for all school types by location groupings. By contrast, in Australia, motorized forms of travel to school were most prevalent. Car travel was the dominant mode on the school journey among Australian primary schoolchildren while equal proportions of secondary schoolchildren in urban areas reported

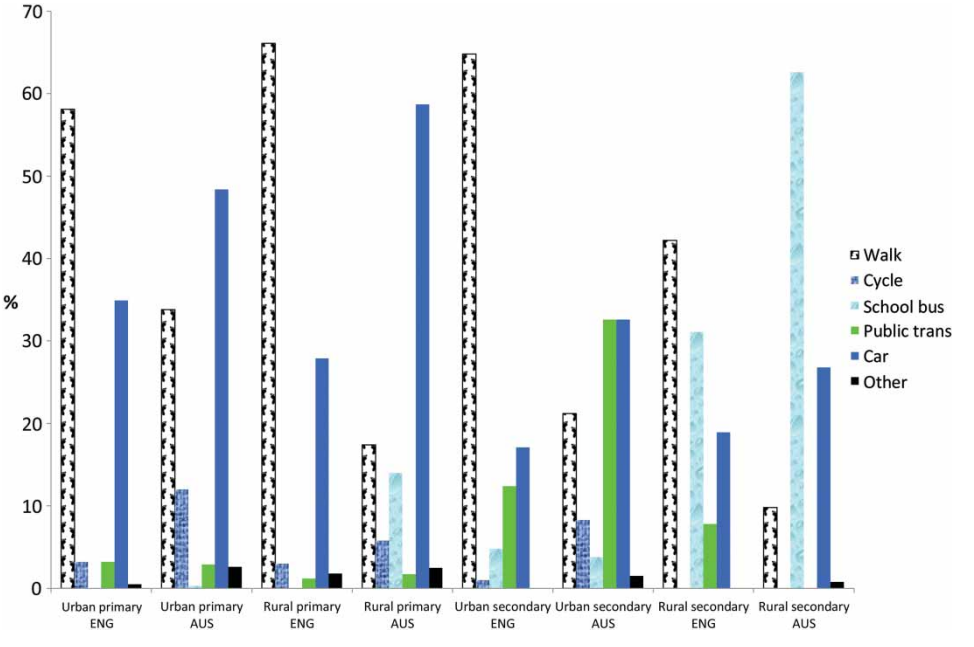

Figure 1. Mode of travel to school among primary and secondary schoolchildren in England and Australia by urban/rural location. The graph shows the proportions (%) of children (according to school stage, urban/rural location and country) who travelled to school by walking, cycling, school bus, public transport, car or 'other' modes.

using car travel and public transport. However in rural areas of Australia, most secondary schoolchildren travelled by school bus.

Distance to school

The median (and range of values) for distance between home and school are presented here for descriptive purposes only, considering the discrepancies in measurement described earlier. Among primary schoolchildren in England, the median distances travelled were 0.94 (0.14–9.84) km in urban areas and 0.90 (0.01–10.20) km in rural areas; while those in Australia travelled median distances of 1.32 (0.05–18.21) km in urban areas and 2.65 (0.32–44.59) km in rural areas. Disparities in distance to school were greater among secondary schoolchildren: in England the median distances travelled were 1.58 (0.14–5.34) km in urban areas and 3.00 (0.32–36.53) km in rural areas; while the corresponding median distances in Australia were 3.49 (0.32–24.50) km in urban areas and 10.84 (0.17–37.81) km in rural areas. These values suggest that, in general, Australian children were travelling greater distances to school than their English peers, more so in rural areas.

Independent mobility on the school journey

The proportions of schoolchildren who travelled independently to or from school using active transport are presented in Table 4. Amongst primary schoolchildren, significantly more travelled independently to school in urban areas of Australia compared with those in urban areas of England. However, less than a third of all primary schoolchildren travelled independently to school using active transport. Overall, secondary schoolchildren in urban areas of England had the highest rate of travelling independently to school using active transport, and this was twice the rate of their Australian peers. In contrast, secondary schoolchildren in rural Australia had the lowest rates of independent active travel to school.

Logistic regression analyses were performed to examine associations between the total number of mobility licences granted and the odds of making at least one independent active journey to/from school on the day of the survey. In these analyses we controlled for the age and sex of the child, household car access and for clustering by school attended. We did not control for urban/rural location as this was highly correlated with the school attended. The results of these analyses are presented in Table 5.

The number of mobility licences granted was significantly associated with increased odds of primary schoolchildren in both countries walking/cycling independently to school. In particular for English primary schoolchildren each additional mobility licence was associated with an increase by a factor of two in the odds of their walking/cycling independently to school. The

Table 4. Proportions of schoolchildren who made active independent school journeys[a] by country and urban/rural location.

	Primary (%)	Secondary (%)
Urban England	25.5	73.3
Urban Australia	36.7†	36.1†††
Rural England	26.1	46.2***
Rural Australia	28.7	16.8***,†††

[a]Proportions include those who made at least one active independent journey to/from school.
$^{\dagger}p < .05$, $^{\dagger\dagger\dagger}p < .001$ – significant differences within urban/rural location by country.
$^{***}p < .001$ – significant differences within country by urban/rural location.

Table 5. Odds[a] of child travelling independently by active transport on school journey according to number of mobility licences.

	Primary		Secondary	
	OR	95% CI	OR	95% CI
England				
Mobility licences (*n*)	2.04	(1.75, 2.39)***	1.14	(0.79, 1.65)
Australia				
Mobility licences (*n*)	1.71	(1.41, 2.07)***	1.09	(0.87, 1.35)

Notes: OR, odds ratio; CI, confidence interval.
[a]In these analyses, we controlled for age and sex of the child, household car access and for clustering by school attended.
***$p < .001$.

association for Australian primary schoolchildren was similar although the increase in odds was slightly less than that for English schoolchildren. The number of mobility licences granted was not significantly associated with the odds of secondary schoolchildren walking or cycling independently to school in either country.

Independent journeys to other neighbourhood destinations

Low levels of independent mobility were observed for journeys to destinations other than school, within walking distance of home. Only around a fifth (England, 20%; Australia, 23%) of children made these trips without adult accompaniment, while almost half (England, 49%; Australia, 42%) were usually taken by parents (the remainder were accompanied by parents on some but not all of the journeys). Of those who were usually taken by parents on these trips, most (England, 87%; Australia, 81%) were attending primary school, and most of their parents (England, 73%; Australia, 92%) reported using the car for these trips, despite the destinations being within walking distance of home. In both countries, on average, parents who accompanied their children made 3.5 round trips within walking distance per week.

Linear regression analyses were performed to examine associations between the total number of mobility licences and the number of trips within walking distance that were made with parental accompaniment. In these analyses we controlled for age and sex of the child, household car access and for clustering by school attended. The results are presented in Table 6. For children in both countries, the number of mobility licences was significantly inversely associated with the number

Table 6. Associations[a] between number of mobility licences and number of accompanied trips to destinations within walking distance.

	Primary		Secondary	
	B	95% CI	B	95% CI
England				
Mobility licences (*n*)	−0.66	(−0.98, −0.34)**	−0.65	(−0.76, −0.54) ***
Australia				
Mobility licences (*n*)	−0.59	(−0.74, −0.45)***	−0.78	(−1.10, −0.46) **

Note: B, regression coefficient.
[a]In these analyses, we controlled for age and sex of the child, household car access and for clustering by school attended.
**$p < .01$.
***$p < .001$.

of accompanied trips. Therefore, those children who were granted more mobility licences had higher levels of independent mobility on non-school journeys.

Discussion

This study is among the first to compare children's independent mobility in England and Australia, two nations with close cultural and historical links but located at almost antipodean latitudes. Among the strengths of this study are the inclusion of a large sample of boys and girls residing in urban and rural locations in each country, and survey data gathered from children and their parents. At first sight it appeared that most mobility licences were granted to proportionally more Australian primary schoolchildren, compared with their English peers. However, when our data were stratified by age of the child, having identified that Australian children at each school stage were around 1 year older than English children at the same stage, the most significant differences were found among 10–12-year-olds. Among this age group, English children had significantly higher rates for licence-holding. Our findings emphasize that age and school stage, *together*, are important correlates of children's independent mobility. While several studies have demonstrated that children's independent mobility increases with age (Hillman, Adams, and Whitelegg 1990; Matthews 1992; Prezza et al. 2001), there is also evidence that the most major change in children's autonomy coincides with the transition from primary to secondary school when school location and peer groups may alter (Valentine 1997). Therefore, the inclusion of data from both primary and secondary schoolchildren is an important strength of our study.

Walking to school was the most pervasive travel mode in England, while in Australia most children travelled by motorized transport. Over half (51%) of primary schoolchildren in Australia and almost a third (32%) of primary schoolchildren in England were driven to school by car, despite distances to primary school, in general, being relatively short compared with distances to secondary school. Greater household access to two or more cars in Australia compared with England may have contributed to the higher prevalence of parental chauffeuring to primary school. In rural areas of Australia, most secondary schoolchildren travelled by school bus. Although the absence of identical measures of distance from home to school for children in each country is a limitation of the comparative aspect of our study, our measures suggest that Australian children and, in particular, those attending secondary school, travelled further to school than their English peers. Our findings concur with international evidence that has identified distance to school as a major barrier to active transport to school (Davison, Werder, and Lawson 2008). As a consequence distance to school is also a barrier to independent mobility on active journeys to school and our findings agree with this. Compared with Australian secondary schoolchildren (who generally travelled further to school), higher proportions of English secondary schoolchildren walked or cycled independently to school.

Our findings regarding the school journey have important implications for urban planners and for public policy. Schools should be located within residential areas with appropriate physical infrastructure (such as walking tracks and bike paths) that encourages active transport. However, parents in England and Australia may exercise freedom of choice among state schools if they perceive higher standards in teaching and/or facilities. Hillman (2006) argues that parents' ability to choose which school their child attends has resulted in many children travelling longer distances to school. The proportions of English and Australian children who were enrolled at the nearest school they could attend were 69% and 56%, respectively. By contrast, in Switzerland, almost all (95%) children attend the state school in the municipality in which they reside (Sauter 2008). Among Swiss primary schoolchildren two-thirds travel less than 1 km to school; most (70%) walk to school and less than 10% of children are driven to school (Sauter 2008).

In both England and Australia rates of independent mobility were low for trips to neighbourhood destinations that were within walking distance from home. It is of public health concern that almost all parents who accompanied their children on such trips reported travelling by car. Our findings highlight the importance of targeting interventions to promote active transport and independent mobility within local neighbourhoods. Freedom to walk or cycle independently around the neighbourhood is beneficial to all children, especially those children who live too far away from school to walk or cycle there. To date, many active transport interventions for children such as the Walking School Bus and 'walk to school' days/weeks have focused on the school journey rather than on journeys to other neighbourhood destinations (Carver, Timperio, and Crawford 2008b). Hillman (2006) argues that this is an overly simplistic approach because children's lives are not centred on school (only just over half the days in the year are in fact school days) and that there is a need to encourage independence during their leisure time.

This is one of the first studies to examine whether being granted mobility licences is related to *actual* independent mobility. This was true on the school journey for primary schoolchildren, but by secondary school age, children were travelling greater distances to school and this may have precluded their independent active travel in some cases, regardless of mobility licences (i.e. the long distances to school necessitated travel by car or school bus). Our findings were, however, more conclusive for journeys to other neighbourhood destinations as the total number of mobility licences was inversely associated with parental accompaniment on these trips. Future research regarding children's independent mobility on journeys to non-school destinations should include objective measurement of amenities within walking/cycling distance of home, as the availability/accessibility of appropriate destinations (e.g. shops, playgrounds, sports facilities) may influence children's independent mobility.

This research is important for health promotion officers, urban planners and policy-makers as it identifies a need for intervention and programmes that aim to increase active transport and independent mobility among school-aged children. In order to inform such programmes, further research is required to examine social factors that may influence parental restriction of these behaviours, to objectively measure the physical environments in children's neighbourhoods, and to identify what further steps can be taken so that children may once again experience similar levels of independent mobility granted to previous generations.

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