Published in final edited form as:
Prev Med. 2012 ; 54(0): . doi:10.1016/j.ypmed.2012.01.006.

Is Active Travel to Non-school Destinations Associated with Physical Activity in Primary School Children?

Lee Smith, MSc[1,2], **Shannon Sahlqvist, PhD**[1,2], **David Ogilvie, PhD**[1,2], **Andrew Jones, PhD**[3], **Simon J Griffin, MD**[1,2], and **Esther van Sluijs, PhD**[1,2]

[1]MRC Epidemiology Unit, Institute of Metabolic Science, Box 285, Addenbrooke's Hospital, Cambridge, CB2 0QQ, United Kingdom

[2]UKCRC Centre for Diet and Activity Research (CEDAR), Institute of Public Health, Forvie Site, Robinson Way, Cambridge, CB2 0SR, United Kingdom

[3]School of Environmental Sciences, University of East Anglia, Norwich, NR4 7JT, United Kingdom

Abstract

Objective—To examine associations between mode of travel to non-school destinations and physical activity in schoolchildren.

Method—Analyses of data from SPEEDY, an observational study of 9-10 year old British children. In summer 2007, children reported their usual mode of travel to four destinations (to visit family, friends, the park or the shops) and wore accelerometers for at least three days. Time spent in moderate to vigorous physical activity (MVPA) was computed for the following time segments: daily, after school, weekend and out-of-school. Associations between mode of travel and physical activity were assessed using adjusted two-level multiple regression models stratified by sex.

Results—1859 pupils provided valid data. Boys who used active modes of travel spent significantly more time in MVPA in all time segments than boys who used passive modes. The median daily time spent in MVPA was 87 minutes (IQR 68-106) for active travellers and 76 minutes (IQR 60-93) for passive travellers. In girls, median time spent in MVPA after school was significantly higher in the active (34 minutes (IQR 27-44)) than the passive travellers (29 minutes (IQR 22-37)).

Conclusion—Active travel to non-school destinations is associated with higher overall physical activity levels in 9-10 year old schoolchildren.

Keywords

Transport; Active travel; Physical activity; School children

Introduction

In children, regular participation in physical activity is important for healthy growth and development (Strong et al. 2005). Active travel (walking and cycling) is an important domain of physical activity and provides a feasible opportunity for children to incorporate physical activity into their daily lives. Motorised transport contributes to carbon emissions

Address for correspondence: Esther van Sluijs MRC Epidemiology Unit Institute of Metabolic Science Box 285 Addenbrooke's Hospital Hills Road Cambridge CB2 0QQ UK Phone: +44 (0)1223 769189 esther.vansluijs@mrc-epid.cam.ac.uk.

Conflict of interest The authors declare that there are no conflicts of interest.

Europe PMC Funders Author Manuscripts

and other forms of environmental degradation. As well as providing opportunity for physical activity, promoting active transport therefore has broader potential benefits for health and sustainability (Woodcock et al. 2007). However, the percentage of UK children walking to school has been in decline since the 1970's and now stands at less than 50% (DfT 2006).

Two systematic reviews have described the association between mode of travel to school and physical activity in young people (Faulkner et al. 2009; Lee et al. 2008). Both reported evidence that young people who travel to school by active modes spend more time in moderate to vigorous physical activity (MVPA) (5-37 min/day) than those who travel using motorised (passive) modes. This is confirmed by more recent findings using data from the *Sport, Physical Activity and Eating Behaviour: Environmental Determinants in Young People* (SPEEDY) study (Panter et al. 2011). The association between travel mode and physical activity may be moderated by sex: Cooper et al. (2003) and Rosenberg et al. (2006) found stronger associations in boys than in girls, whereas Panter et al. (2011) and Cooper et al. (2006) found stronger associations in girls.

A recent review of active travel health-related fitness (Lubans et al. 2011) highlighted the need to broaden this research to include active travel to non-school destinations (such as to a friend's house or to shops). These journeys may provide an opportunity for children to incorporate additional physical activity into their daily lives. For example, Timperio et al. (2004) found in a study of 10-12 year old children that boys and girls walked or cycled for an average of 10.1 and 8.1 trips per week respectively, but only 3.4 and 2.8 of these trips respectively related to the school journey. To date, however, the association between mode of travel to non-school destinations and overall levels of physical activity is unknown. The aim of this study was to examine the association between mode of travel to non-school destinations and objectively-measured physical activity in the SPEEDY population-based sample of primary school children.

Methods

Full details of participant recruitment and study procedures have been reported (van Sluijs et al. 2008). In brief, the SPEEDY study is a population-based study examining factors associated with physical activity and dietary behaviour in children aged 9-10 years sampled through primary schools in the county of Norfolk, UK. Schools were sampled purposively to achieve heterogeneity in urban-rural status (for more details on sampling procedures, please see van Sluijs et al. 2008). A total of 157 schools were approached of which 92 (59%) were included in the study. All year 5 children in these schools (mostly aged 9-10 years, n=3619) were invited and 2064 (57%) took part. Data were collected in term time between April and July 2007. Participating pupils and parents were asked to complete separate questionnaires about the pupils' dietary and physical activity behaviour and children wore an accelerometer (MTI Actigraph), on a belt positioned above the right hip, for seven consecutive days. Parental consent was obtained prior to data collection and ethical approval was granted by the University of East Anglia research ethics committee.

Exposure measure: travel to non-school destinations

Children were asked how they usually travelled to visit: a) other members of their family, b) friends in the neighbourhood, c) parks, and d) shops. For each item, children were asked to indicate the main travel mode used: a) car, b) bus or train, c) walk, or d) bike. An aggregate measure of travel to non-school destinations was created from the response items. Walking and cycling were combined as 'active' modes of travel and car, bus or train as 'passive' modes of travel. Participants who reported using active modes of travel for at least three of the destinations were categorised as using active modes of travel, and participants who reported using passive modes for at least three of the destinations were categorised as using

Europe PMC Funders Author Manuscripts

passive modes of travel. Participants who gave two ‘passive’ and two ‘active’ responses were categorised as using a combination of travel modes.

Outcome measures: physical activity

The Actigraph (GT1M, Actigraph LCC, Pensacolo, US) accelerometer provided an objective measure of physical activity. The Actigraph has previously been shown to be a valid measure of physical activity in children (DeVries et al. 2009). Accelerometer data were cleaned using a standard program (available at www.mrc-epid.cam.ac.uk). Once processed, data from the first day were removed, as were any data collected between 2300 and 0600 hours and periods of ten minutes of continuous zero counts. Accelerometer data were summarised as time (min/day) spent in MVPA, defined as ≥2000 counts per minute, a cut point applied in previous studies in this age group (Ekelund et al. 2004; van Sluijs et al. 2008). To explore the temporal distribution of any differences in overall physical activity levels, time spent in MVPA was aggregated into the following two summary periods: (i) daily (weekdays between 0600 and 2300) and after school (weekdays between 1500 and 2300) and (ii) at the weekend and out-of-school (weekends plus weekdays between 1500 and 2300). All outcome measures were positively skewed and were therefore log transformed prior to analysis. Only children with three or more valid days (wear time ≥500 min/day) of data were included in the analyses. For analyses examining daily and after-school MVPA, at least three days were required, whereas for analyses of weekend and out-of-school MVPA, at least three days including one weekend day were required.

Covariates

Children were asked ‘how do you usually travel to school?’ Walking and cycling were combined as ‘active’ modes of travel and car, bus or train as ‘passive’ modes. Children also reported their sex and age. The parent or main caregiver of each child reported household car ownership and their own highest educational qualification (in categories). Objective measures of urban/rural status and network distance from home to school (based on home postcode) were estimated (in metres) using a Geographic Information System as previously reported (Panter et al. 2010). Research assistants measured children’s height and weight following standard operating procedures, while children wore light clothing, from which body mass index (BMI) was calculated in kg/m^2. These covariates were included in analyses because they were all hypothesised to be independently associated with both the exposure (travel behaviour) and the outcome (physical activity).

Analysis

Characteristics of the study population were summarised using descriptive statistics. The association between travel mode to non-school destinations and physical activity was examined using two-level linear regression models, with children at level 1 and school at level 2, adjusted for pre-specified covariates. Due to documented sex differences in physical activity and active travel (Lee et al. 2008; Reilly et al. 2008), analyses were also stratified by sex. The average number of minutes spent in MVPA during each hourly weekday period was computed for children in each of the three summary categories of travel mode. Statistical significance was set at a p-value of 0.05.

Results

Of the 2064 children who took part in the study, 1859 provided valid data on physical activity and travel mode and were included in the daily and after-school analyses. These participants had a mean age of 10 years (SD±0.3), 819 (44%) were boys and 1693 (91%) were white. Compared to those included in the analyses the 205 children excluded were significantly more likely to be boys (51% versus 44%; p=0.013) but did not differ by

ethnicity, parental education or BMI. A total of 459 (25%) participants predominantly reported a passive mode of travel, 895 (48%) an active mode and 505 (27%) a combination of modes. The majority of children travelled to visit other members of their family and the shops by car, but travelled to visit friends in the neighbourhood and the park on foot (Table 1). Slightly fewer participants (n=1677) met the inclusion criteria when analyses were limited to weekend and out-of-school MVPA outcomes. Characteristics for this group did not differ from those included in the daily-and-after-school group.

Active travel to school and non-school destinations were significantly associated (χ^2=279.98, p<0.001). 592 (66%) children who predominantly used active modes of travel to non-school destinations also used active modes to school, and 896 (81%) children who predominantly used passive modes to non-school destinations also used passive modes to school.

Compared with the other travel groups, boys and girls who were classified as predominantly using active modes of travel spent more time in MVPA during each time segment, except for girls at the weekend (Table 2).

Statistically significant linear trends were found for all outcomes across travel groups, with the exception of weekend MVPA for girls.

After excluding cases with missing data for potential confounders (predominantly parental education), final adjusted models for daily and after-school MVPA, and for weekend and out-of-school MVPA, included 1689 and 1529 participants respectively. No significant differences were found between the characteristics of participants included or excluded at this stage. In the final adjusted models, children who predominantly used active modes of travel were significantly more physically active than those who predominantly used passive modes, except at the weekend (Table 3).

In the stratified final adjusted models, boys who predominantly used active travel modes participated in significantly more MVPA in all time segments than boys who predominantly used passive modes, whereas in girls, only after-school MVPA differed significantly between those who predominantly used active and passive travel modes (Table 4).

In both sexes the highest weekday peaks in MVPA occurred between 0800 and 0900, between 1300 and 1400, and between 1500 and 2000. The greatest differences in MVPA between travel groups were found between 0800 and 0900 and between 1500 and 2000 (Figures 1 and 2).

Discussion

We have previously shown that active travel to school can contribute to overall physical activity levels among children (van Sluijs et al. 2009). The results of this study suggest that active travel (walking and cycling) to non-school destinations is associated with higher overall levels of physical activity, independent of travel mode to school, with the greatest difference in MVPA being observed after school (between 1500 and 2000).

For all outcome measures, boys who reported predominantly using active modes of travel accumulated significantly more MVPA than boys who predominantly used passive modes. After adjustment for potential important confounders, this difference equated to an additional 8 min/day (56 min/week) of MPVA. Lee et al. (2008) have suggested that these differences could reflect the physically active content of the journeys themselves; alternatively, they could be due to active travel providing an opportunity for spontaneous play or encouragement of active behaviour in other areas of children's lives. For example, a

child who walks to a friend's house (either alone or accompanied) may stop and play at a playground on the way, whereas a child who is driven misses the opportunity to be active en route.

It is also possible that the difference in MVPA reflects differences in preferences for travel modes; in other words, that active boys may choose to travel by active means. However, on weekdays between 1200 and 1300 (lunch time) all boys show a peak in minutes spent in MVPA (Figure 1) irrespective of travel mode. It may therefore not be the case that active boys use active modes of travel and that boys who predominantly used active modes of travel accumulated additional MVPA through other means such as those suggested by Lee et al. (2008). Further investigation of the nature of active travel and the mechanisms by which it may be associated with overall physical activity is warranted. The combination of accelerometry with data from Global Positioning System receivers may add to our understanding of these relationships.

In contrast to boys, there was no significant difference in total daily MVPA for girls by the predominant travel mode. There was however, a significant difference in the amount of physical activity accrued between 1500 and 2000. It may be that between these hours, girls make a greater number of trips to non-school destinations (either alone or with a parent or guardian) and that these trips contribute to their physical activity. Given that there were no overall differences in MVPA, however, it seems that girls who use active modes of travel may compensate for this additional physical activity in other areas of their daily lives. Our findings are in contrast to previous work, which found that between the hours of 1500 and 2000 girls who predominantly used an active mode of travel to school were not more physically active than those who predominantly used a passive mode (Cooper et al. 2003). These differences may reflect differences in statistical power between the studies (n=953 versus n=55); or they could be related to the different behaviours being examined (i.e. travel to school versus travel to non-school destinations). However, in the present analysis 66% of children who predominantly used an active mode of travel to non-school destinations also used an active mode to school.

There was no significant difference in physical activity levels between children who used a combination of travel modes and those who predominantly used active modes. This suggests that the habitual use of active modes to reach non-school destinations may not be necessary in order to promote physical activity. However, these results should be interpreted with caution as the time spent in MVPA by those who used a combination of travel modes was more similar to the time spent in MVPA by those who predominantly used passive modes than by those who predominantly used active modes. Nevertheless, we found statistically significant linear trends for all outcomes across travel groups, with the exception of weekend MVPA for girls.

Strengths and limitations

To our knowledge, this is the first study to specifically assess the association between active travel to non-school destinations and overall levels of physical activity. Furthermore, a new exposure measure was created (travel to non-school destinations), which enabled a more detailed examination of travel behaviour. However, because of the cross-sectional design the causal direction of the observed associations cannot be inferred. It is unclear whether children use active modes of travel because they are physically active, or are physically active because they use active modes of travel. Further investigation using a prospective study design is needed. The self-report measure used to assess travel behaviour in this study did not allow multi-modal trips or the frequency of trips to be ascertained, and is subject to error and bias. Furthermore, because few (1-3%) students reported travelling to non-school destinations by public transport, travel mode choice was categorised simply as either active

Europe PMC Funders Author Manuscripts

or passive. However, interventions targeting this broad categorisation of travel mode maybe ineffective, because of differences (e.g. correlates) between individual travel modes within the active and passive groups. Therefore, further research using a more precise categorisation of travel mode is required. A further limitation concerns the use of accelerometers, which are calibrated to record ambulatory activity (hip movement) and may therefore underestimate physical activity undertaken during cycling. The SPEEDY study was population-based, however in comparison to the Norfolk population a smaller proportion of obese children took part, thus reducing the representativeness of the study sample. Furthermore, while children from rural and urban locations participated, the sample is not representative of the UK for environmental, socio-economic and other characteristics. Cooper et al. (2010) found that children's outdoor physical activity was higher in summer than in winter. In the present study, data were collected during the spring and early summer; whether or not similar associations would be seen during colder months, less conducive to active travel and outdoor play, is unknown.

Conclusion

The results suggest that active travel (walking and cycling) to non-school destinations is associated with higher overall physical activity in primary school children, independent of travel mode to school. Promoting active travel to non-school destinations as well as to school may therefore contribute to achieving higher physical activity levels in this age group.

Acknowledgments

We thank the schools, pupils and parents for their participation in the SPEEDY study. We also thank everyone who helped with the data collection and Norfolk Children's Services for their invaluable input and support. The SPEEDY study is funded by the National Prevention Research Initiative (http://www.npri.org.uk), consisting of the following Funding Partners: British Heart Foundation; Cancer Research UK; Department of Health; Diabetes UK; Economic and Social Research Council; Medical Research Council; Health and Social Care Research and Development Office for the Northern Ireland; Chief Scientist Office, Scottish Government Health Directorates; Welsh Assembly Government and World Cancer Research Fund. LS and SS are supported by the Engineering and Physical Sciences Research Council (grant reference EP/G00059X/1). DO, AJ, SG and EvS are supported by the Centre for Diet and Activity Research (CEDAR), a UKCRC Public Health Research Centre of Excellence. Funding from the British Heart Foundation, Economic and Social Research Council, Medical Research Council, National Institute of Health Research and the Wellcome Trust, under the auspices of the UK Clinical Research Collaboration, is gratefully acknowledged. www.esrc.ac.uk/publichealthresearchcentres. The views expressed in this publication are those of the authors and not necessarily those of the Department of Health or other funders.

References

Cooper AR, Page AS, Foster LJ, Qahwaji D. Commuting to school: are children who walk more physically active? Am J Prev Med. 2003; 25(4):273–276. [PubMed: 14580626]

Cooper AR, Wedderkopp N, Wang H, Andersen LB, Froberg K, Page AS. Active travel to school and cardiovascular fitness in Danish children and adolescents. Med Sci Sports Exerc. 2006; 38(10): 1724–1731. [PubMed: 17019293]

Cooper AR, Page AS, Bendict WW, Hilsdon M, Griew P, Jago R. Patterns of GPS measured time outdoors after school and objective physical activity in English children: the PEACH project. Int J Behav Nutr Phys Act. 2010; 7:3. [PubMed: 20157440]

DeVries S, Van Hirtum H, Barkker I, Hopman-Rock M, Hirasing R, Van Mexhelen W. Validity and Reproducibility of Motion Sensors in Youth: A Systematic Update. Medicine and Science in Sports and Exercise. 2009; 41(4):818–827. [PubMed: 19276851]

DfT. Transport Trends. London: 2006.

Ekelund U, Sardinha LB, Anderssen SA, Harro M, Franks PW, Brage S, Cooper AR, Andersen LB, Riddoch C, Froberg K. Associations between objectively assessed physical activity and indicators of body fatness in 9- to 10-y-old European children: a population-based study from 4 distinct

regions in Europe (the European Youth Heart Study). American Journal of Clinical Nutrition. 2004; 80(3):584–590. [PubMed: 15321796]

Faulkner GE, Buliung RN, Flora PK, Fusco C. Active school transport, physical activity levels and body weight of children and youth: a systematic review. Prev Med. 2009; 48(1):3–8. [PubMed: 19014963]

Lee MC, Orenstein MR, Richardson MJ. Systematic review of active commuting to school and childrens physical activity and weight. J Phys Act Health. 2008; 5(6):930–949. [PubMed: 19164826]

Lubans DR, Boreham CA, Kelly P, Foster CE. The relationship between active travel to school and health-related fitness in children and adolescents: a systematic review. Int J Behav Nutr Phys Act. 2011; 8(1):5. [PubMed: 21269514]

Panter J, Jones A, Van Sluijs E, Griffin S. The Influence of Distance to School on the Associations Between Active Commuting and Physical Activity. Pediatric Exercise Science. 2011; 23(1):72–86. [PubMed: 21467592]

Panter JR, Jones AP, Van Sluijs EM, Griffin SJ. Neighborhood, route, and school environments and children's active commuting. Am J Prev Med. 2010; 38(3):268–278. [PubMed: 20171528]

Reilly JJ, Penpraze V, Hislop J, Davies G, Grant S, Paton JY. Objective measurement of physical activity and sedentary behaviour: review with new data. Arch Dis Child. 2008; 93(7):614–619. [PubMed: 18305072]

Rosenberg DE, Sallis JF, Conway TL, Cain KL, McKenzie TL. Active transportation to school over 2 years in relation to weight status and physical activity. Obesity (Silver Spring). 2006; 14(10): 1771–1776. [PubMed: 17062807]

Strong WB, Malina RM, Blimkie CJR, Daniels SR, Dishman RK, Gutin B, Hergenroeder AC, Must A, Nixon PA, Pivarnik JM, Rowland T, Trost S, Trudeau FO. Evidence based physical activity for school-age youth. Journal of Pediatrics. 2005; 146(6):732–737. [PubMed: 15973308]

Timperio A, Crawford D, Telford A, Salmon J. Perceptions about the local neighborhood and walking and cycling among children. Prev Med. 2004; 38(1):39–47. [PubMed: 14672640]

van Sluijs EM, Fearne VA, Mattocks C, Riddoch C, Griffin SJ, Ness A. The contribution of active travel to children's physical activity levels: cross-sectional results from the ALSPAC study. Prev Med. 2009; 48(6):519–524. [PubMed: 19272404]

van Sluijs EM, Skidmore PM, Mwanza K, Jones AP, Callaghan AM, Ekelund U, Harrison F, Harvey I, Panter J, Wareham NJ, Cassidy A, Griffin SJ. Physical activity and dietary behaviour in a population-based sample of British 10-year old children: the SPEEDY study (Sport, Physical activity and Eating behaviour: environmental Determinants in Young people). BMC Public Health. 2008; 8:388. [PubMed: 19014571]

Woodcock J, Banister D, Edwards P, Perentice A, Roberts I. Energy and Transport. The Lancet. 2007; 370(9592):1078–1088.

Europe PMC Funders Author Manuscripts

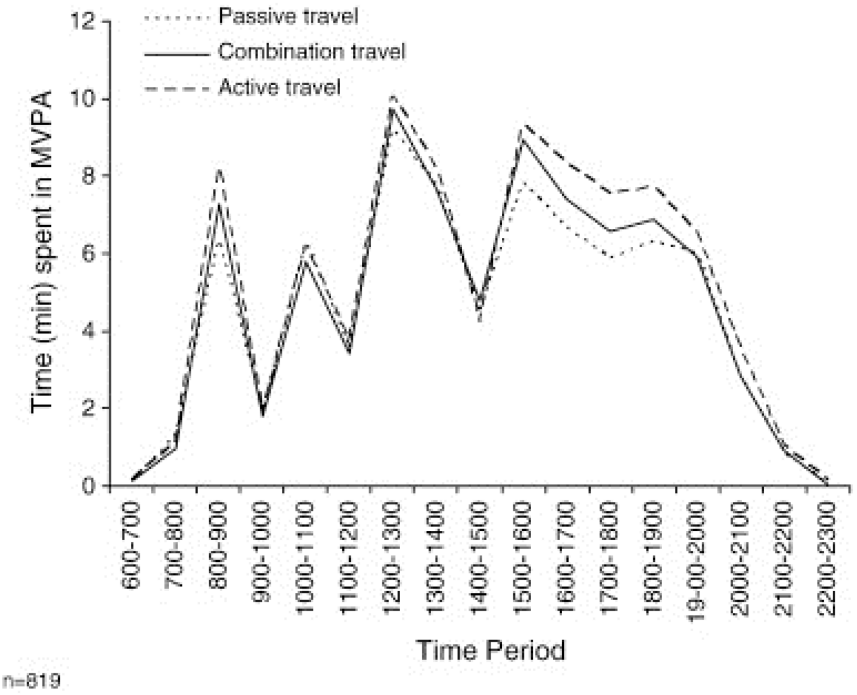

Figure 1.
Mean weekday time (min) spent in MVPA by hourly epoch and travel group for boys from the SPEEDY study living in Norfolk, UK in 2007.

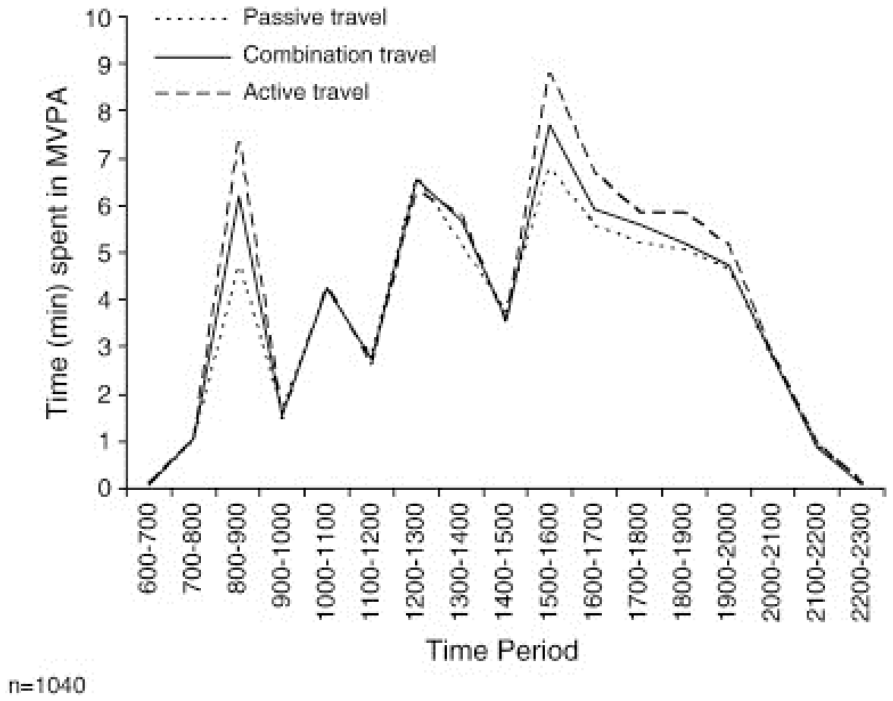

Figure 2.
Mean weekday time (min) spent in MVPA by hourly epoch and travel group for girls from the SPEEDY study living in Norfolk, UK in 2007.

Europe PMC Funders Author Manuscripts

Table 1

Frequency of usual travel mode to different types of destinations in children from the SPEEDY study living in Norfolk, UK in 2007

Usual travel mode	Travel to family n (%)	Travel to friends n (%)	Travel to parks n (%)	Travel to shops n (%)
Boys n=819 included in the daily and after-school analyses				
Cycling	54 (7)	187 (24)	288 (37)	182 (23)
Walking	125 (16)	379 (49)	342 (45)	239 (31)
Public transport	20 (2)	14 (2)	14 (2)	12 (1)
Car	589 (75)	197 (25)	122 (16)	350 (45)
Girls n=1040 included in the daily and after-school analyses				
Cycling	52 (5)	145 (15)	233 (24)	158 (16)
Walking	174 (17)	586 (58)	594 (61)	365 (37)
Public transport	31 (3)	3 (1)	13 (1)	10 (1)
Car	754 (75)	255 (26)	134 (14)	457 (46)

Europe PMC Funders Author Manuscripts

Table 2

Time (min/day) spent in MVPA by travel mode in children from the SPEEDY study living in Norfolk, UK in 2007

	Boys			Girls		
	Active travel	**Combination travel**	**Passive travel**	**Active travel**	**Combination travel**	**Passive travel**
Daily and after-school time segments	n=400	n=210	n=209	n=495	n=295	n=250
Median (IQR) daily MVPA	87 (68-106)	78 (66-102)	76 (60-93)	66 (52-81)	64 (51-79)	61 (48-74)
Median (IQR) after-school MVPA	42 (32-54)	37 (29-49)	33 (26-44)	34 (27-44)	30 (24-42)	29 (22-37)
Weekend and out-of-school time segments	n=370	n=195	n=192	n=439	n=263	n=218
Median (IQR) weekend MVPA	83 (58-118)	78 (58-113)	76 (52-98)	64 (47-83)	65 (43-85)	61 (44-84)
Median (IQR) out-of-school MVPA	115 (78-154)	101 (76-144)	98 (66-127)	87 (61-111)	84 (55-110)	80 (50-105)

Daily MVPA and after-school MVPA n=1859, weekend MVPA and out-of-school MVPA n= 1677, MVPA: moderate to vigorous physical activity. IQR: inter quartile range

Europe PMC Funders Author Manuscripts

Table 3

Two-level multiple linear regression models of log mean daily time (min) spent in MVPA in different time segments for children from the SPEEDY study living in Norfolk, UK in 2007

Outcome and travel group	Unadjusted model			Adjusted model [b]		
	Coefficient	95% CI	P	Coefficient	95% CI	P
Daily MVPA (reference: active travel)						
Combination travel	−.049	−.087 to −.012	.009	−.012	−.049 to .024	.503
Passive travel	−.099	−.138 to −.061	.001	−.058	−.099 to −.017	.005
Weekend MVPA (reference: active travel)						
Combination travel	−.030	−.088 to .027	.300	−.004	−.065 to .056	.885
Passive travel	−.072	−.132 to −.012	.018	−.065	−.132 to .001	.056
Daily MVPA after-school (reference: active travel)						
Combination travel	−.104	−.151 to −.057	.001	−.056	−.104 to −.007	.023
Passive travel	−.177	−.226 to −.129	.001	−.113	−.167 to −.060	.001
Out-of-school MVPA (reference: active travel)						
Combination travel	−.219	−.496 to .057	.120	−.102	−.388 to .184	.484
Passive travel	−.525	−.812 to −.239	.001	−.495	−.812 to −.177	.002

[a] Adjusted for age, sex, parental education, children's BMI, urban/rural status, network distance from home to school (metres), household car ownership, and usual mode of travel to school.

[b] 95% CI: 95% confidence interval. MVPA: moderate to vigorous physical activity. Daily MVPA (adjusted n=1689), weekend MVPA (adjusted n=1529), daily MVPA after-school (adjusted n=1689), out-of-school MVPA (adjusted n= 1529).

Europe PMC Funders Author Manuscripts

Table 4

Two-level multiple linear regression models of log mean time (min/day) spent in MVPA for boys and girls from the SPEEDY study living in Norfolk, UK in 2007

Variable	Boys: unadjusted model			Boys: adjusted model [a]			Girls: unadjusted model			Girls: adjusted model [a]		
	Coefficient	95% CI	P	Coefficient	95% CI	P	Coefficient	95% CI	P	Coefficient	95% CI	P
Daily MVPA (reference: active travel)												
Combination travel	−.063	−.116 to −.009	.021	−.042	−.098 to .013	.136	−.028	−.074 to .017	.228	.010	−.038 to .059	.679
Passive travel	−.130	−.841 to −.077	.001	−.097	−.157 to −.037	.001	−.077	−.125 to −.028	.002	−.021	−.077 to .035	.458
Weekend MVPA (reference: active travel)												
Combination travel	−.043	−.130 to .043	.325	−.042	−.136 to .052	.381	−.014	−.087 to .059	.709	.019	−.060 to .099	.640
Passive travel	−.109	−.197 to −.022	.014	−.123	−.223 to −.022	.016	−.045	−.123 to .033	.260	−.010	−.103 to .081	.816
Daily MVPA after school (reference: active travel)												
Combination travel	−.101	−.717 to −.032	.004	−.054	−.127 to .018	.142	−.096	−.157 to −.036	.002	−.051	−.116 to .012	.117
Passive travel	−.211	−.281 to −.141	.001	−.125	−.202 to −.047	.002	−.151	−.216 to −.087	.001	−.094	−.168 to −.020	.013
Out-of-school MVPA (reference: active travel)												
Combination travel	−.323	−.751 to .103	.138	−.376	−.827 to .075	.102	−.081	−.422 to .258	.637	.125	−.244 to .495	.507
Passive travel	−.789	−1.21 to −.357	.001	−.874	−1.35 to −.391	.001	−.338	−.699 to .022	.066	−.146	−.570 to .277	.498

[a] Adjusted for age, parental education, children's BMI, urban/rural status, network distance from home to school (metres), car ownership, and usual mode of travel to school.

[b] 95% CI: 95% confidence interval. MVPA: moderate to vigorous physical activity. Boys' daily MVPA (adjusted n=736), boys' weekend MVPA (adjusted n=682), boys' after-school MVPA (adjusted n=736), boys' out-of-school MVPA (adjusted n=682). Girls' daily MVPA (adjusted n=953), girls' weekend MVPA (adjusted n=847), girls' after-school MVPA (adjusted n=953), girls' out-of-school MVPA (adjusted n=847)