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Typologies of adolescent activity related health behaviours

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Abstract

Objectives: To identify typologies of activity-related behaviours and demographic characteristics of these typologies among Australian adolescents.

Design: Cross-sectional study of 473 Secondary School students (41.4% boys, mean age 14.95±1.61 years) conducted in 2014–15.

Method: Active travel to school, sport participation, leisure-time sedentary and demographic variables were self-reported in a survey. Duration of sedentary time and moderate-to-vigorous physical activity (mins/day) were accelerometer-derived. Latent class analysis (LCA) was conducted to identify typologies of activity-related health behaviours. One-way ANOVAs and chi-square tests were used to explore differences by demographic characteristics.

Results: Three typologies were identified: 1) “Physically inactive, highly sedentary” (44%); 2) “Moderately active, high screen-time” (42%); and 3) “Highly active, low sedentary” (14%). Differences between typologies were evident for age, sex, body mass index (BMI), cultural identity, employment status and socioeconomic position (SEP). Those in typology 3 (optimal behaviour pattern) tended to be younger, of higher SEP and lower BMI.

Conclusions: This study found that older adolescents have less active, more sedentary profiles than younger adolescents. The findings support the need for targeted interventions to improve adolescent activity-related behaviour engagement.

Keywords

latent class analysis; clustering; adolescents; demographics; physical activity; sedentary behaviour

Introduction

The health of adolescents worldwide is of growing concern, with increases in lifestyle related diseases that can be attributed to unhealthy patterns of living[1, 2]. Physical activities such as leisure time physical activity, active travel, and organised sport are considered to be

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key modifiable factors contributing to overall health and wellbeing[1, 2]. Conversely, sedentary behaviours such as TV viewing, computer and video gaming, and homework time are known to be associated with poor health outcomes[2]. Several countries (including Australia, the UK, USA and Canada) have established public health guidelines for adolescents' physical activity and sedentary behaviour. Currently, only 20% of adolescents in Australia meet both physical activity and sedentary behaviour recommendations[3]. While the overall picture suggests low physical activity and high sedentary behaviour, this does not necessarily reflect all adolescents. It is possible that physical activity and sedentary behaviours (herein referred to in combination as activity-related behaviours) cluster together differently in different groups of adolescents [4]. Development of strategies to improve adolescents' activity behaviours needs to take into account that they do not occur in isolation[4]. Therefore, understanding how these behaviours cluster is important for developing approaches to promote health and well-being that focus on multiple behaviours.

Researchers have begun to use a variety of data driven grouping methods to identify unique typologies or groups of people that distinguish distinct behavioural patterns [4]. However, many of these studies have identified inconsistent typologies that are unique to each individual sample, making it difficult to determine consistent groups of behaviours and establish trends. Many typology studies have included additional lifestyle behaviours such as work, socialising, extracurricular school-based activities and sleep[4] in addition to activity-related behaviours with very few using objective measures of physical activity and sedentary behaviours among adolescent boys and girls[4].

Consistent behavioural typologies have included groups of adolescents engaging in low levels of physical activity and high sedentary behaviour, high physical activity and high sedentary behaviour, and low engagement in all activity-related behaviours. These typologies are consistent among both boys and girls. However, the types of sedentary pursuits differ between sexes with boys having a higher prevalence of technology-based sedentary options ('technoactives') [5–7] while girls tend to be more frequently engaged in socialising during their sedentary time ('active socialisers') [5, 6].

To our knowledge, only two published studies have assessed groups of adolescents based solely on their participation in activity-related behaviours using a combination of both subjective and objective measures[8, 9]. Dowd et al[8] used a female only UK sample finding 'low', 'moderate' and 'high' activity profiles with significantly higher adiposity among those with low activity compared to high activity. Patnode et al[9] used both self-report and accelerometer data to identify typologies of US adolescent activity-related behaviours and conducted their analysis separately by sex. However, among both boys and girls, comparable typologies were found and were termed 'active', 'sedentary', and 'low media/moderate activity' (boys)/'low media/functional activity' (girls)[9]. Similar to Dowd et al[8], both boys and girls in the 'active' class were significantly less likely to be overweight than those in the 'sedentary' class. While these two studies are consistent in their findings, evidence is needed to determine whether similar patterns are seen among Australian adolescents to enable targeted and tailored strategies to help increase physical activity and reduce sedentary time.

Therefore, this study aimed to identify behavioural typologies, sociodemographic characteristics and weight status of Australian adolescents based on participation in subjective and objective measures of physical activities and sedentary behaviours.

Methods

Data for this study were part of The NEighbourhood Activity in Youth (NEArbY) study. The study was approved by Deakin University's Human Ethics Advisory Group (Health) (HEAG-H 152_2013) and relevant education authorities prior to commencement of the project. Administrative units (Statistical Area Level 1 (SA1), areas of approximately 400 persons on average[10]) in Melbourne, Australia, were classified as high walkable/high income; high walkable/low income; low walkable/high income; and low walkable/low income, based on median split of walkability and area-level income. The walkability score was created using geographical information system (GIS) and included street connectivity, dwelling density and land use mix, an established index of walkability used in many studies[11]. Area-level income was obtained from 2011 Census data [12]. Schools located in SA1s within each of the four walkability/income classifications were approached to participate in the study. Once school principal consent was obtained (n=18 schools), a 15-minute presentation was given to all students (12–18 years of age) in classes selected by the schools. Plain language statements and consent forms were distributed to all interested students and 528 provided both written student assent and parent consent to participate. Due to participant withdrawal or absence from school on the day of data collection (n=55), the final sample included 473 participants with survey or ActiGraph data.

To objectively measure physical activity levels, participants were asked to wear an ActiGraph (model GT3X+) accelerometer on an elastic belt around their waist during waking hours for eight consecutive days. The ActiGraph accelerometer is a valid and reliable [13] small matchboxsized device used to measure time spent engaging in different intensities of activity. Data were excluded if non-wear time consisted of 60 minutes of consecutive zeroes. Additionally, participants were required to wear their monitors for a minimum of 8 hours on at least 3 out of 5 weekdays, and 7 hours on at least 1 weekend day to be considered valid[14] (n=372). Average minutes per day in sedentary time (SED; defined as minutes spent between 0–100 accelerometer counts per minute), and in moderate-to-vigorous physical activity (MVPA, defined as ≥4METs) were calculated based on age-specific cut-points[14]. Freedson adult cutpoints[15] were applied if aged ≥18 years (n=2). These variables were dichotomized based on median values, with '0' indicating lower and '1' indicating equal to or higher than the median value (see Table 1).

Participants were asked to complete an online survey about activity-related behaviours using iPads during school class time. Participants self-reported their physical activity and sedentary behaviours using reliable survey items adapted from the Active Where Survey[16]. Participants reported the:

1) number of sport teams or physical activities that they had participated in out of school hours during the previous year (ICC = 0.374[16]);

2) frequency of active travel (e.g., walking and cycling) to and from school in a typical week (ICC = 0.51–0.84[16]); and

3) time spent engaging in sedentary behaviours in a typical week (e.g. watching TV/DVDs/videos, playing video games and using electronic media, and completing homework) were reported separately for weekdays and weekends (ICC = 0.45–0.71[16]).

Six dichotomous subjective activity-related behaviour measures were created from these items, as detailed in Table 1.

Participants self-reported socio-demographic characteristics that may be associated with activity-related behaviour engagement; e.g., birth date (to compute age), sex (male, female), cultural identity (from a list of 12 different cultures, and an 'other' option), school grade average (Mostly A, B, C, D, E, or F's), dog ownership (yes, no) and employment status (yes, no). Arealevel socio-economic position (SEP) was assigned based on residential postcode using the 2011 ABS SEIFA advantage score [17]. Height and weight were assessed by trained research staff to measure body mass index (BMI). BMI was collapsed into acceptable weight vs overweight or obese based on internationally accepted BMI cut-points for youth[18].

Latent Class Analysis (LCA) was conducted in Mplus statistical software (version 7.31) to identify groups of adolescents who share similar activity-related behaviour patterns. The LCA was originally conducted using the continuous accelerometer and self-reported data because dichotomising activity-related behaviours can lead to loss in richness of the data. However, this resulted in classes that were too small (<5 people) to be interpretable, so the dichotomised variables were used instead. LCA conducted in Mplus handles missing data using maximum likelihood estimation. Given the high number of participants without valid accelerometer data, the LCA was repeated with the complete accelerometer case sample (n=372). The two LCA solutions were descriptively comparable and there was high agreement in class membership between the two solutions (kappa=0.91; 94% agreement). Therefore, the LCA based on the full sample was used for all further analyses. The optimal number of classes were identified by analysing 2-class through to 5-class models of the dichotomous variable inputs. The LoMendell-Rubin likelihood ratio test, Bayesian Information Criteria, Akaike Information Criteria, Entropy and class size were then assessed for each to determine the model of best fit (i.e. LCA statistical indicators).

The resulting classes were imported in STATA (version 14) to analyse associations with sociodemographic attributes and weight status. One-way ANOVAs were conducted to determine whether there were any differences in age, SEP, MVPA and sedentary time across the classes. Differences according to sex, cultural identity, school grade average, dog ownership, weight status and employment status, as well as differences in self-reported activity-related behaviours, were assessed using chi-square tests. Significance was assessed at the level of $p<0.05$.

Results

The socio-demographic characteristics of the final sample (n=473) are presented in Table 2. On average, there were more girls, and most participants were of a healthy weight, and lived in neighbourhoods of average SEP. Over three-quarters of the adolescents identified as being of Australian cultural identity, half self-reported school grades consisting of mostly As and Bs, just under half owned a dog, and one-third were employed in regular paid work. As measured by the accelerometers, the average time spent per day in MVPA was less than three quarters of an hour, and time spent sedentary was over nine hours per day.

Across each of the LCA models (ie., 2 to 5 classes), the Lo-Mendell-Rubin test was only significant for the three class solution (p=0.03). The AIC value was lowest for the four class solution (4575.42), however only marginally so compared to three classes (4575.56). The two class solution was found to have the lowest BIC value (4673.31), again only slightly lower than for three classes (4683.69). The three class solution (ie., three typologies) was chosen as the optimal LCA solution based on these considerations, as well as for ease of class interpretability. Figure 1 shows the item-response probability plot as a visual representation of each activity-related behaviour contributing towards each of the three classes.

The typologies characterised as being physically inactive and highly sedentary (Typology 1, as shown in Figure 1, 44%) and as being moderately active and high screen-time (Typology 2, 42%) comprised the majority of adolescents in this sample. The smallest proportion (14%) were characterised as engaging in the most optimal combination of activity-related behaviours – highly active and low sedentary (Typology 3).

Table 2 compares socio-demographic characteristics between the three typologies. Adolescents in Typology 2 (low levels of all physical activities and high overall sedentary time) were significantly older than the other typologies and had a higher proportion of girls than Typology 1 (moderate levels of activity and high screen time). Typology 2 also had a larger proportion in paid employment and lower proportion who identify as Australian compared to Typology 3, and lived in neighbourhoods of lower SEP when compared to both the other typologies. Adolescents classed within Typology 3 were significantly younger, and a lower proportion were overweight or obese or in paid employment compared to both other typologies.

Discussion

This study identified adolescent typologies of activity-related behaviours based on both self-reported and objective measures. Three typologies were identified which included a “moderately active, high screen-time” group, a “physically inactive, highly sedentary” group, and a “highly active, low sedentary” group. Differences between the typologies were seen in age, sex, weight status, cultural identity, employment status and SEP. These findings are generally consistent with previous research[4].

We found an even distribution of males and females in two typologies defined by “moderate activity, high screen-time”, and “high activity, low sedentary time”. Yet previous research

has consistently identified sporty/active classes[4], and those defined by high levels of gaming and technology based sedentary behaviour to be predominantly male dominated[4]. Moreover, in this sample, the typology "physically inactive, highly sedentary" had a larger proportion of females (66.5%) than males. Previous studies that have identified typologies defined predominantly by low to moderate involvement in both physical activity and sedentary behaviours were largely dominated by females also [19–21], with few exceptions [22, 23]. Previous research suggests that females are more social in their sedentary time than males [5, 6]. This might explain why these adolescents self-reported low to moderate levels of all sedentary behaviours (TV viewing, video gaming, electronic media and homework) even though their accelerometer data reflect high levels of overall sedentary time. Future research should further explore social forms of sedentary behaviour and the factors that influence these.

Compared with the other two typologies, adolescents within the "highly active, low sedentary" typology were the youngest and engaged in the most MVPA, active travel trips to and from school, and leisure-time sport and physical activity compared with all other typologies. This group of adolescents also had the lowest proportion of overweight or obesity and employment, and were from areas of higher than average SEP.

The finding that the "highly active, low sedentary" typology included the lowest proportion of adolescents who were overweight or obese is as expected and consistent with previous research[8, 9, 21]. The lower prevalence of overweight or obesity may reiterate the optimal nature of this typology and the importance of the combination of these activity-related behaviours for healthy weight status. For example, Lee[21] also found that the adolescent cluster defined by low physical activity/high screen-time had significantly higher mean BMI and BMI z-scores than those in the high physical activity/low screen-time cluster [21]. Furthermore, notwithstanding the cross-sectional nature of these data, the similar proportions of overweight or obese adolescents in both the "physically inactive, highly sedentary" and "moderate activity, high screen-time" typologies suggests that moderate levels of physical activity may not be enough to counteract the time spent engaging in sedentary, particularly screen-based[24], behaviours. However, the differences may in part reflect age-related differences in the proportion of overweight or obese adolescents aged 12–15 years compared to 16–17 years in Australia[25] or reverse causality, with overweight or obese adolescents choosing to engage in more screen-based and sedentary behaviours.

Growing older may also reflect transitions into employment and other commitments. Compared with the "highly active, low sedentary" typology, a significantly higher proportion of those with low-moderate physical activity and high sedentary time were employed. This may partly reflect their older age (minimum age requirement for employment in Australia is 14.9 years). However, their lower levels of physical activity could also be explained by them being more time-poor due to school and work commitments. Previous research has reported that older adolescents who have employment are less likely to engage in sufficient levels of physical activity or sports [26]. Future research should look longitudinally at those defined by high physical activity and low sedentary behaviour during early adolescent years (such as typology 3) to determine whether future employment as they reach legal working age impacts on their activity-related behaviours.

Interventions should focus on strategies to integrate more physical activity into daily life (e.g. habitual or incidental physical activity) without impacting on or reducing time spent focusing on homework and/or work. The low-moderate engagement in active travel among these typologies may indicate a potential target for intervention. Additionally, more emphasis could be placed on integrating movement into schools and workplaces.

The current study revealed that those who were “highly active, low sedentary” were from notably higher SEP neighbourhoods and more likely to be of Australian cultural identity than those who were “physically inactive and highly sedentary”. Few physical activity and sedentary behaviour typology studies have examined neighbourhood level SEP [27, 28] or cultural identity [29], with those that have reporting no significant difference between the typologies. Further research is required to determine whether there are other additional aspects of the neighbourhood (e.g. built environment) that may also influence typology membership.

Our findings also re-emphasise that it is important to intervene at a young age to establish healthy habits early. It is well known that physical activity declines with increasing age [30], which highlights the need to intervene at an age before the drop off in sport and physical activity occurs. Identifying a broad range of individual, social and environmental factors in addition to socio-demographics associated with this optimal combination of activity-related behaviours may help to identify ways to help other adolescents achieve an optimal combination of activity-related behaviours.

This study used LCA to identify adolescent typologies of activity-related behaviours using a combination of subjective and objective measures. With self-report data being subject to potential social-desirability and recall bias, the use of accelerometers helps to increase the validity of the findings. As the study was of cross-sectional design, causal direction cannot be determined. Future research needs to explore change or stability in typology membership over time and the factors that can help predict optimal activity-related behaviour compositions throughout adolescence and into adulthood.

Conclusion

Identification and understanding of unique adolescent activity-related behaviour typologies is paramount in understanding how combinations of activity-related health behaviours may have more beneficial or detrimental impacts on health. It is clear that engagement in physical activities and sedentary behaviours co-exist in daily life and the current study extended on existing knowledge around the combinations of behaviours that are most common to different subgroups of adolescents. The low prevalence of the highly active, low sedentary typology and the high prevalence of overweight and obesity among those in the other two less active typologies emphasise the need for intervention. While this study identified some key sociodemographic factors that differ between unique adolescent activity-related behavioural typologies, it is not clear why adolescents engage in these different combinations of physical activities and sedentary behaviours. Future research should identify modifiable correlates of engaging in different combinations of these activity-related

behaviours, both optimal and suboptimal, to inform feasible and sustainable interventions that target multiple behaviours.

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References

1. Granger E, Di Nardo F, Harrison A, et al., A systematic review of the relationship of physical activity and health status in adolescents. Eur J Pub Health, 2017 27: p. 100–106. [PubMed: 28340201]
2. Carson V, Hunter S, Kuzik N, et al., Systematic review of sedentary behaviour and health indicators in school-aged children and youth: an update. Appl Physiol Nutr Metab, 2016 41: p. S240–S265. [PubMed: 27306432]
3. Australian Bureau of Statistics, 4364.0.55.004 - Australian Health Survey: Physical Activity, 2011–12. 2013: Canberra, Australia.
4. Ferrar K, Chang C, Li M, et al., Adolescent Time Use Clusters: A Systematic Review. J Adolesc Health, 2013 52(3): p. 259–270. [PubMed: 23299015]
5. Marshall SJ, Biddle SJH, Sallis JF, et al., Clustering of sedentary behaviors and physical activity among youth: a cross-national study. Pediatr Exerc Sci, 2002 14(4): p. 401–417.
6. Wang CKJ, Chia YHM, Quek JJ, et al., Patterns of physical activity, sedentary behaviors, and psychological determinants of physical activity among Singaporean school children. J Sport Exerc Psychol, 2006 4(3): p. 227–249.
7. Ferrar K, Olds T, and Maher C, More than just physical activity: Time use clusters and profiles of Australian youth. J Sci Med Sport, 2013 16(5): p. 427–432. [PubMed: 23273684]
8. Dowd K, Harrington D, Hannigan A, et al., The Development of Activity Profiles in Adolescent Females and their Association with Adiposity. Pediatr Exerc Sci, 2016 28(1): p. 109–116. [PubMed: 26252370]
9. Patnode CD, Lytle LA, Erickson DJ, et al., Physical Activity and Sedentary Activity Patterns Among Children and Adolescents: A Latent Class Analysis Approach. J Phys Act Health, 2011 8(4): p. 457–467. [PubMed: 21597117]
10. Australian Bureau of Statistics, The Australian Statistical Geography Standard (ASGS). 2013: Canberra, Australia.
11. Giles-Corti B, Macaulay G, Middleton N, et al., Developing a research and practice tool to measure walkability: a demonstration project. Health Promot J Austr, 2014 25(3): p. 160–166. [PubMed: 25481614]
12. Australian Bureau of Statistics, Basic Community Profile Release 1: SA1, data pack. 2011.
13. Romanzini M, Petroski EL, and Fossati Reichert F, Accelerometers thresholds to estimate physical activity intensity in children and adolescents: a systematic review. Braz J Kinathrop Hum Perform, 2012 14(1): p. 101–113.
14. Trost SG, Pate RR, Sallis JF, et al., Age and gender differences in objectively measured physical activity in youth. Medicine And Science In Sports And Exercise, 2002 34(2): p. 350–355. [PubMed: 11828247]
15. Freedson PS, Melanson E, and Sirard J, Calibration of the Computer Science and Applications, Inc. accelerometer. Medicine & Science in Sports & Exercise, 1998 30(5): p. 777–781. [PubMed: 9588623]
16. Joe L, Carlson J, and Sallis J, Active Where? Individual item reliability statistics adolescent survey. 2008.
17. Statistics ABO. Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia Available at: http://www.abs.gov.au/websitedbs/censushome.nsf/home/seifa2011?opendocument&nav pos=2601 May

18. Flegal K, Cole T, and Flegal K, Establishing a standard definition for child overweight and obesity worldwide: international survey. BMJ, 2000 320(7244): p. 1240–1243. [PubMed: 10797032]
19. Kim Y, Barreira TV, and Kang M, Concurrent associations of physical activity and screen-based sedentary behavior on obesity among US adolescents: a latent class analysis. J Epidemiol, 2016 26(3): p. 137–144. [PubMed: 26477996]
20. Nelson MC, Gordon-Larsen P, Adair LS, et al., Adolescent Physical Activity and Sedentary Behavior: Patterning and Long-Term Maintenance. Am J Prev Med, 2005 28(3): p. 259–266. [PubMed: 15766613]
21. Lee PH, Association between Adolescents' Physical Activity and Sedentary Behaviors with Change in BMI and Risk of Type 2 Diabetes. PLoS One, 2014 9(10): p. 1–8.
22. Linver MR, Roth JL, and Brooks-Gunn J, Patterns of Adolescents' Participation in Organized Activities: Are Sports Best When Combined With Other Activities? Dev. Psychol, 2009 45(2): p. 354–367. [PubMed: 19271824]
23. Bartko W and Eccles J, Adolescent participation in structured and unstructured activities: A person-oriented analysis. J Youth Adolesc, 2003 32(4): p. 233–241.
24. Rey-López JP, Ruiz JR, Vicente-Rodríguez G, et al., Physical activity does not attenuate the obesity risk of TV viewing in youth. Pediatr Obes, 2012 7(3): p. 240–250. [PubMed: 22434777]
25. Australian Bureau of Statistics, 4364.0.55.001 - National Health Survey: First Results, 2014–15 2015: Canberra, Australia.
26. Pruitt SL and Springer AE, The Association of Employment and Physical Activity among Black and White 10th and 12th Grade Students in the United States. J Phys Act Health, 2010 7(1): p. 26–36. [PubMed: 20231752]
27. Casey M, Harvey J, Telford A, et al., Patterns of time use among regional and rural adolescent girls: Associations with correlates of physical activity and health-related quality of life. J Sci Med Sport, 2016 19(11): p. 931–935. [PubMed: 26996947]
28. Jago R, Fox KR, Page AS, et al., Physical activity and sedentary behaviour typologies of 10–11 year olds. Int J Behav Nutr Phys Act, 2010 7: p. 59–68. [PubMed: 20663226]
29. Ferrar K, Olds T, Maher C, et al., Time use clusters of New Zealand adolescents are associated with weight status, diet and ethnicity. Aust N Z J Public Health, 2013 37(1): p. 39–46. [PubMed: 23379804]
30. Wiium N, Breivik K, and Wold B, Growth Trajectories of Health Behaviors from Adolescence through Young Adulthood. Int J Environ Res Publ Health, 2015 12(11): p. 13711.

Practical Implications

- Interventions should be tailored to suit adolescents with particular combinations of physical activities and sedentary behaviours
- Older adolescents have less active, more sedentary profiles than younger adolescents
- Sedentary, screen-based, behaviours appear to have detrimental effects on BMI regardless of physical activity participation

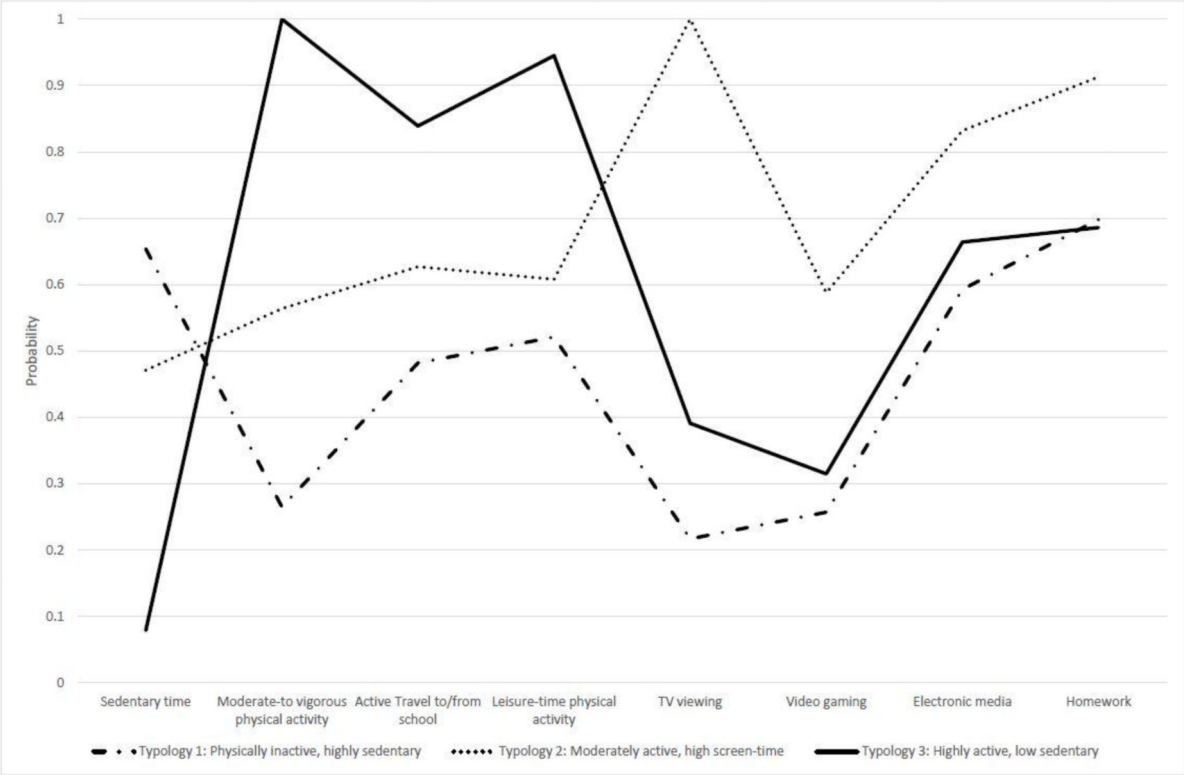

Figure 1.
Probability of typology (class membership) according to activity-related behaviours

Table 1.

Summary of activity-related behaviours

Data source	Variables	Dichotomisation (0/1)	%
Self-report survey	Active travel to/from school	1 = ≥ once / week	59.15
	Leisure-time sport or physical activity	1 = ≥ 1 leisure sport teams/physical activities	61.91
	Watching TV	1 = ≥ 2 hours/day	53.62
	Electronic media	1 = ≥ 1 hour/day	69.36
	Video games	1 = ≥ 1 hour/day	38.94
	Homework	1 = ≥ 1 hour/day	77.66
Accelerometer	MVPA	1 = ≥ 37 mins	49.33
	SED	1 = ≥ 535 mins	49.46

MVPA: Moderate-to Vigorous-Physical Activity; SED: Sedentary Time

Table 2.

Differences between activity-related behaviour typologies

	N whole sample	Whole sample	Typoioyy 1 (44%) (Physically inactive, highly sedentary)	Typoioyy 2 (42%) (Moderately active, high screen-time)	Typology 3 (14%) (Highly active, low sedentary)	P-value
Overall (n)	473		209	198	66	
Age *(mean, sd)*	468	14.95 ±1.61	15.33 ± 1.59[a]	14.83 ± 1.60[a]	14.11 ± 1.34[a]	**<0.01**
Gender *(% female)*	452	58.6%	66.5%[a]	50.5%[a]	56.9%	**<0.01**
Weight status *(% overweight/obese)*	309	25.9%	29.9%	27.2%	10.9%	**<0.01**
Cultural identity *(% Australian)*	457	76.8%	72.3%[a]	78.0%	87.7%[a]	**<0.05**
School grades *(% mostly A/Bs)*	456	50.9%	52.2%	46.8%	58.5%	0.24
Dog ownership *(% yes)*	455	40.7%	39.7%	38.2%	50.8%	0.19
Employment status *(% yes)*	452	31.4%	36.0%[b]	32.6%[a]	13.9%[ab]	**<0.01**
Socioeconomic position *(mean, sd)*	472	1002.51±66 .22	987.42 ± 69.91[ab]	1010.21 ± 60.94[a]	1027.59 ± 58.21[b]	**<0.01**
MVPA mins/day *(mean, sd)*	371	40.52±24.6 6	33.45 ± 27.91[a]	41.28 ± 20.39[a]	56.65 ± 16.43[a]	**<0.01**
SED mins/day *(mean, sd)*	372	545.97±90. 65	573.59 ± 92.73[a]	545.04 ± 88.27[a]	477.89 ± 43.29[a]	**<0.01**
Active travel *(% >1 trip p/w)*	470	59.2%	48.1%[a]	62.9%[a]	83.1%[a]	**<0.01**
Leisure-time sport or physical activity *(% > 1 sport)*	470	61.9%	51.0%[a]	60.9%[a]	100% [a]	**<0.01**
TV viewing *(% >2 hrs/day)*	470	53.6%	13.9%[a]	100% [a]	40%[a]	**<0.01**
Video gaming (% > 1 hr/day)	470	38.9%	23.6%[a]	60.4%[ab]	23.1%[b]	**<0.01**
Electronic media *(% > 1 hr/day)*	470	69.4%	55.8%[a]	84.8%[ab]	66.2%[b]	**<0.01**
Homework *(% > 1 hr/day)*	470	77.7%	66.4%[a]	92.9%[ab]	67.7%[b]	**<0.01**

Note: Superscript letters denote significant differences between typologies; mvpa: moderate to-vigorous physical activity; SED: sedentary time