Original Research

Psychosocial Factors Related to Children's Active School Travel: A Comparison of Two European Regions

DAVID MCMINN†[1], DAVID A. ROW[2]‡, SHEMANE MURTAGH[2]‡, NORAH M. NELSON[3]‡, IVAN ČUK[4]‡, ALMIR ATIKOVIĆ[5]‡, MOJCA PEČEK[6]‡, GAVIN BRESLIN[7]‡, ELAINE M. MURTAGH[8]‡, and MARIE H. MURPHY[7]‡

[1]Rowett Institute of Nutrition and Health, School of Medicine and Dentistry, University of Aberdeen, Aberdeen, SCOTLAND; [2]School of Psychological Sciences and Health, University of Strathclyde, Glasgow, SCOTLAND; [3]School of Culture and Lifestyle, University of Derby, Buxton, ENGLAND; [4]Faculty of Sport, University of Ljubljana, Ljubljana, SLOVENIA; [5]Faculty of Physical Education and Sport, University of Tuzla, Tuzla, BOSNIA and HERZEGOVINA; [6]Faculty of Education, University of Ljubljana, Ljubljana, SLOVENIA; [7]Ulster Sport Academy, University of Ulster, Newtonabbey, NORTHERN IRELAND; [8]Department of Arts Education and Physical Education, University of Limerick, Limerick, REPUBLIC OF IRELAND

†Denotes graduate student author, ‡Denotes professional author

ABSTRACT

International Journal of Exercise Science 7(1) : 75-86, 2014. Inequalities in health-behaviors exist between regions of Europe, along a North West/South East axis. This study investigated whether prevalence of walking to school and associated psychosocial antecedents differed between these two European regions. Participants were 1,263 children aged 7-11 years, from five countries. Children from North West Europe (n = 641) and South East Europe (n = 622) completed a school travel questionnaire that measured demographics, school commuting mode, travel companion, feelings about their local area, and Theory of Planned Behavior (TPB) variables related to walking to school. Multivariate analysis of variance was used to investigate differences in TBP variables between children from the two regions of Europe. More children from South East Europe walked to school (70.8%) compared to those in the North West (47%). For the TPB variables, a significant multivariate main effect for region was found (Wilks' λ=.94, F (4, 1201)=20.55, pp. Inequalities in walking to school exist between European regions. Children from South East Europe walk to school more than their counterparts from the North West. However children from North West Europe display higher scores on TPB variables, suggesting that psychosocial constructs related to walking to school may not explain rates of engagement in this behaviour.

KEY WORDS: School travel, planned behaviour, physical activity, health behaviour inequalities, Europe

INTRODUCTION

In childhood, regular physical activity forms an important foundation for future health status and helps to establish positive health-related

behaviours that track into adulthood (29). Additionally, there are several benefits of physical activity for children including reductions in systolic blood pressure (36), improvements in bone mineral density (39), improved cardio-respiratory functioning (23), and benefits to psychological wellbeing (5, 7). Furthermore, regular physical activity in childhood and adulthood may confer other long-term benefits such as protection against many non-communicable diseases like hypertension, type 2 diabetes, cardiovascular disease, and several cancers (48).

A large proportion of children in Western societies do not meet the daily physical activity (45) recommendation of 60 minutes of moderate to vigorous intensity physical activity per day, and are therefore at risk of forfeiting these many health benefits. For the future health of children, it is important to identify settings in which physical activity can be increased, and to gain a better understanding of factors that promote or inhibit engagement in physical activity (e.g., environmental, social, psychosocial, and political factors).

The school commute has been identified as an important opportunity for increasing physical activity (53). In a typical week, home-school and school-home commutes provide at least 10 distinct time periods during which children can engage in health-enhancing activity (by walking or cycling). Unfortunately, in most developed countries many children travel to school using inactive modes (18), and the prevalence of active travel is in decline (12, 38, 54). The decline in active travel and increased use of motorised modes are likely due to increased car ownership, perceptions of danger on the route to and from school, and changing family dynamics related to parental working patterns (11,22).

A better knowledge of the correlates that may influence children's school travel decisions is important for designing effective and sustainable active travel interventions and to inform school travel policy. Previous studies in this area have focused primarily on the physical and social environment and demographic variables associated with active commuting (35, 52). Findings from these studies suggest that the primary factors that influence active school travel are the distance from home to school (44, 50), socio-economic deprivation (21), ethnicity (20), car ownership (10, 26), population density, urbanisation (24), and perceptions of road and traffic danger (6, 8).

Findings from these studies are helpful; however they do not shed light on the psychosocial factors that may influence school travel. Constructs such as self-efficacy (19), pro-social characteristics (9), positive outcome expectations (31), and physical self-perceptions (17) have been associated with general physical activity levels in children. It is logical, therefore, to propose that psychosocial variables may similarly be related to school travel behaviors. Only a few studies have been conducted to investigate the role of such variables in school travel behavior. Mendoza et al. (41) found that parents' self-efficacy for allowing their child to actively commute to school was positively related to the percent of weekly trips made by active modes. Martin et al. (37) found that parental perceptions of barriers were significantly associated with active school travel. Finally, Murtagh et al. (43) demonstrated that theory of planned behaviour (TPB) variables (attitude, subjective norm, and perceived behavioral control) explain 41% of the variance in active commuting intention and 10% of the variance in objectively measured behavior in Scottish school children.

Most school travel studies have been conducted in North America, Australia, and New Zealand. It is not clear, therefore, whether the factors associated with active school travel are different in other countries. This is particularly relevant in Europe, where health behavior inequalities

have been identified between regions. For example, it has been reported that there are clear and consistent patterns of inequality along a North West to South East geographic axis with respect to some key health outcomes, health behaviors, and risk behaviors (55). Specifically, higher levels of satisfaction and lower levels of health complaints have been observed among boys and girls in Northern and Western Europe compared with children from Southern and Eastern Europe. A combination of social, political, and cultural influences likely contributes to these patterns in health inequalities. However, in addition to these generally accepted factors, inequalities may, in part, be explained by differences in psychosocial factors associated with given health behaviors. The aim of the present study therefore, was to determine whether the health behavior of walking to school differs between two European regions, and to investigate differences in psychosocial constructs which may act as antecedents of walking to school.

When studying the psychosocial correlates of health behaviour it is important that there is a theory guiding the investigation. In the present study the TPB (1, 2) was used as the guiding psychological model to understand commuting behavior. The TPB was designed to predict and explain human behavior in specific contexts (4); in relation to the present study this is school commuting behavior. According to this theory, behavior is primarily influenced by the proximal determinant of behaviour i.e., intentions. Intentions have been defined as "indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior" (3, p. 181). Consequently, the greater the intention, the more likely the behavior will be performed. In turn, intention is influenced by three factors: attitude, subjective-norm, and perceived behavioral control. Attitude can be viewed as a person's positive or negative evaluation of participating in the commuting behavior. Subjective-norm refers to the social pressure to perform or not perform the behavior. Finally, perceived behavioral control relates to an individual's perception of the ease or difficulty of actively commuting.

The TPB has been used successfully to predict changes in children's physical activity (30, 47), and has been used to predict objectively measured active commuting in a sample of Scottish school children (43). We have selected this theoretical framework because the underlying cognitions that form the TPB are amenable to change via intervention (51). Therefore, by identifying where differences and similarities in psychosocial constructs exist between European regions, we may gain an important insight as to the most appropriate constructs to target via intervention in these settings.

METHODS

Participants

Participants were from Scotland (n = 165, from 5 schools, mean age 8.7 yrs), Northern Ireland (n = 340, from 5 schools, mean age 10.1 yrs), the Republic of Ireland (n = 136, from 7 schools, mean age 8.7 yrs), Slovenia (n = 232, from 3 schools, mean age 8.7 yrs), and Bosnia and Herzegovina (n = 390, from 3 schools, mean age 9.6 yrs). Participants from these five countries were divided into two groups, representing North West Europe (Scotland, Ireland, and Northern Ireland, n = 641) and South East Europe (Slovenia and Bosnia and Herzegovina, n = 622). The rationale for grouping the countries in such a way was based on evidence indicating inequalities in health behaviors between North Western Europe and South Eastern Europe (55). It is recognised that in addition to the between region variation that we are interested in there will also be within region differences. However, our *a priori* hypothesis is concerned with the between region variation, given the known differences between

these regions for other health-related behaviours. As such, our analyses are conducted to focus on these between rather than within-region differences. Ethical approval was granted by the University of (Blinded) Ethics Committee to collect data in Scotland, the Republic of Ireland, and Northern Ireland. The University of (Blinded) granted ethical approval to collect data in Slovenia and Bosnia and Herzegovina. Informed consent was obtained from all participants prior to data collection.

Protocol

A previously validated child travel questionnaire (40) was used to obtain information on age, gender, travel mode, travel companion(s), feelings about living in the local area, and commuting behavior in relation to the four TPB constructs (intention, attitude, subjective norm, and perceived behavioral control).

Travel mode was established via a self-report questionnaire item that was formatted to reflect the five 'stages of change' related to walking to school (i.e., pre-contemplation, contemplation, action, maintenance, and relapse) (46). Participants who categorized themselves as being in the action or maintenance stages were classified as walkers, while participants in the pre-contemplation, contemplation, or relapse stages were classified as non-walkers.

To establish whether children travelled alone or with companions, they were asked: 'On a normal day, who do you usually travel to school with?'. Possible check-box responses included: An Adult, An Adult and Other Children, On my own, Friends, and Brother/Sister. Responses were re-coded to reflect two possible options (i.e., alone or with travel companions).

Regarding feelings about living in their local area, children were asked, 'How do you feel about living in your local area?'. Participants responded using a three-point Likert-scale (unhappy, undecided, happy).

All TPB constructs were measured using a 4-point Likert-scale (1 = Disagree in a big way, 2 = Disagree, 3 = Agree, 4 = Agree in a big way). Intention to actively commute was measured using the following items: 'I plan to walk to school every day' and 'I intend to walk to school every day'. The mean score of these items represented participants' intention. Attitude towards walking to school was measured using the following four items: 'Walking to school every day would be fun', 'Walking to school every day would be enjoyable', 'Walking to school every day would be good for me', and 'Walking to school every day would be important for me'. The first two items relate to the affective (e.g., enjoyable/not enjoyable) component of attitude, and the second two items are concerned with the instrumental (e.g., beneficial/harmful) component (4). The mean score of these items represented participants' attitude. Six items were used to measure subjective norm. Three of these measured the injunctive component of subjective norm (i.e., whether one believes the social network/people surrounding them wants them to perform the behavior). These were: 'My family wants me to walk to school every day', 'My friends want me to walk to school every day', and 'My teachers want me to walk to school every day'. Three items measured the descriptive component (i.e., whether one's social network performs the behavior): 'My family will walk to school or work every day', 'My friends will walk to school every day', and 'My teachers will walk to school

every day'. As with the other constructs, the mean of these items served as the measure of subjective norm. Finally, the following three items were used to measure perceived behavioral control: 'I could walk to school every day if I wanted to', 'I have the time to walk to school every day if I wanted to', and 'I live in a place which allows me to walk to school every day if I wanted to'. The mean of these three items was used as the final measure of perceived behavioral control.

Questionnaires were translated into the relevant languages for children in Slovenia and Bosnia and Herzegovina by individuals fluent in both English and the native language. Questionnaires were completed by each child in the classroom setting, taking approximately one hour. A researcher was present to answer queries related to questionnaire wording. Data were collected between August 2009 and December 2011.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (version 19.0.0; IBM Corp., Armonk, NY). Range checks were conducted to identify outliers. Outlying data points (i.e., responses to questionnaire items that were beyond the possible range of scores) were deemed to be caused by inputting error and were deleted. Only three such data points were found. Missing data for the TPB variables were replaced using an Individual Information Centred (IIC) approach (28). The following percentages of missing TPB data were replaced for each country: Scotland = 1.3%; Northern Ireland = 7.5%; Republic of Ireland = 10.4%; Slovenia = 21.2%; and Bosnia and Herzegovina = 0.1%. A high proportion of data was replaced for Slovenia. Although not ideal, we are confident that the replacement technique we used provides accurate estimates of the true values. This replacement technique has been shown to be accurate where as much as 24% of data were missing (28).

Descriptive statistics were calculated for age, gender, travel mode and companion, and feelings about the local area. These results were stratified by country and by region. The predictive value of the TPB variables in relation to commuting behavior have been previously demonstrated (43). Therefore, instead of investigating the predictive value of TPB variables on commuting behavior in each country, a one-way MANOVA was used to investigate differences in TPB variables between the two European regions (i.e., North West and South East). Relevant assumptions for MANOVA were satisfied, including normally distributed dependent variables (skewness and kurtosis values $< \left| 2.0 \right|$) and correlation among dependent variables (r ranged from .43 to .64, $p < .01$).

RESULTS

For the full sample (n = 1,263), 49.6% were male and the mean age was 9.36 years (SD = 0.99). 59% of children walked to school, 13.5% travelled to school alone, and 84.5% were happy about living in their local area. Bosnia & Herzegovina had the highest proportion of walkers (81.3%) and Northern Ireland had the lowest (37.9%). Slovenia had the highest percentage of children who travelled to school alone (19.1%) compared to the Republic of Ireland which had the lowest percentage (5.9%). Descriptive statistics stratified by country are displayed in Table 1.

Descriptive statistics stratified by region are displayed in Table 2. The North West and South East were similarly matched with regards to sample size, age, and gender. Considerably more children reported walking to school in the South East, and more children reported travelling to school alone in this region.

Table 1. Descriptive statistics stratified by country

Country	n	Age	Male (%)	Walker (%)	TA (%)	LA
Scotland	165	8.7 (0.5)	60.6	71.4	13.0	86.7
NI	340	10.1(0.7)	51.8	37.9	12.9	77.9
ROI	136	8.7 (0.6)	30.1	42.0	5.9	81.3
Slovenia	232	8.7 (0.6)	52.6	53.1	19.1	86.2
BH	390	9.6 (1.1)	48.2	81.3	13.3	89.5

Notes. NI = Northern Ireland, ROI = Republic of Ireland, BH = Bosnia and Herzegovina, Age= mean age (sd), TA= travel alone, LA= local area (%happy)

Table 2. Descriptive statistics stratified by region

Region	n	Age	Male (%)	Walker (%)	TA (%)	LA
NW	641	9.4(0.93)	49.1	47.0	11.4	80.8
SE	622	9.3(1.04)	49.8	70.8	15.5	88.3

Notes. NW= North West, SE= South East, Age= mean age (sd), TA= travel alone, LA= local area (%happy)

Descriptive statistics for the TPB variables are displayed in Table 3. On average, children from the North West of Europe scored higher on each of the four TPB constructs.

57 participants were omitted from the MANOVA analysis due to missing TPB data that were unable to be replaced using the IIC data replacement technique because they were missing all data for one or more of the constructs. The one-way MANOVA revealed a small significant multivariate main effect for region (Wilks' $\lambda = .94$, F (4, 1201) = 20.55, $p < .01$, partial eta squared = .06). Power to detect the effect was 1.00. Box's test of equality of covariance matrices indicated that there were significant differences among the regions in the covariance matrices (Box's $M = 92.12$, $p < .01$). This was not deemed to be problematic given the large, equal groups, and high power. Given the significance of the multivariate test, the univariate main effects were examined. The alpha level was set at $p = .0125$ to account for multiple tests (i.e., 0.05/4). Significant small univariate main effects for region were obtained for attitude (F (1, 1201) = 50.84, $p < .01$, partial eta squared = .04); subjective norm (F (1, 1201) = 33.81, $p < .01$, partial eta squared = .03); and perceived behavioral control (F (1, 1201) = 31.06, $p < .01$, partial eta squared = .03). The achieved power for these tests was 1.00. Pairwise comparisons using a Bonferroni adjustment for multiple comparisons indicated significant mean differences between regions for attitude (mean difference = .30, $p < .01$), subjective norm (mean difference = .20, $p < .01$), and perceived behavioral control (mean difference = .27, $p < .01$). For each construct, scores for the North West region were higher than the South East (see Figure 1).

Table 3. Descriptive statistics for TPB constructs

Region	Construct	n	Mean	SD	Skew	KT
Northwest						
	Attitude	635	3.18	0.58	-0.71	1.0
	SN	628	2.40	0.59	0.27	0.02
	PBC	623	2.94	0.81	-0.53	-0.26
	Intention	620	2.68	0.92	-0.05	-1.0
Southeast						
	Attitude	607	2.88	0.83	-0.53	-0.45
	SN	603	2.20	0.63	0.44	0.14
	PBC	599	2.67	0.90	-0.16	-0.87
	Intention	596	2.58	0.98	-0.03	-1.11

Notes. Skew= Skewness, KT= Kurtosis, SN= subjective norm, PBC= perceived behavioral control

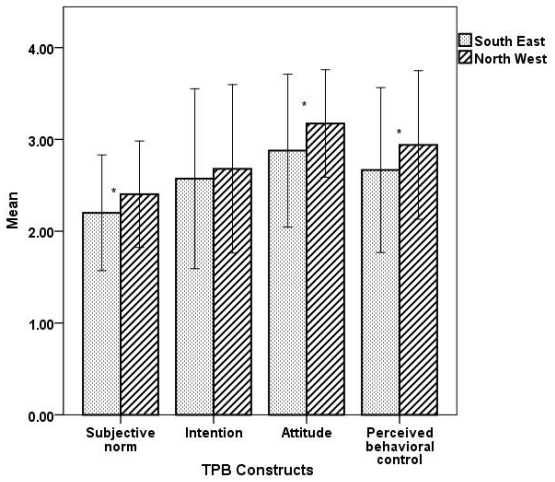

Figure 1. Regional differences in the TPB constructs. Error bars represent ± SD, * denotes significant differences.

DISCUSSION

In this study we investigated differences in prevalence of walking to school and levels of related psychosocial variables between regions of Europe. More children walked to school in South East Europe than North West Europe. This was true when countries were grouped according to region. However, it is important to note that there was large between-country variability in walking prevalence. This variability appears to have been diluted by the aggregation of results by region. As a result, some of the detail gained at the individual country level is lost by grouping the countries into regions. Despite this, we provided a strong evidence-based rationale as to why we grouped the countries by region, rather than treating them individually. In future, researchers should consider the strengths and weaknesses of these two approaches when designing studies.

With regard to the TPB variables, we found a small significant multivariate main effect for region, indicating that on average scores on the TPB variables differed between regions. Subsequent pairwise comparisons found significantly higher scores among children from North West Europe for three of the four TPB constructs (i.e., attitude, subjective norm, and perceived behavioral control). There was no difference between regions for walking intention. Although the differences between regions were small for attitude, subjective norm, and perceived behavioural control, it should be noted that they may still have important implications in relation to commuting behaviour. Furthermore, the trend of difference was consistent among the constructs, suggesting robust findings.

Previous research indicates that there are health inequalities in Europe along a North West/South East axis, whereby more advantageous health outcomes and behaviours are typically reported in the North West (55). Our findings are inconsistent with these reports, in that walking to school (i.e., positive health behavior) was higher in the South East of Europe compared to the North West. Interestingly, scores for all of the TPB constructs were higher among the North West, yet fewer children walked to school. This seems counter intuitive; because one would expect those who scored more highly on the TPB constructs to also walk to school more (43). These unexpected findings may, in part, be explained by regional differences in socio-economic circumstances, perhaps caused by historical differences in relation to the political and economic systems of each region. For example, in countries in the present study, Gross Domestic Product (GDP) is considerably higher for those in the North West of Europe compared to those in the South East (33). These inequalities in wealth may contribute to differences in factors such as car ownership, which may in turn influence how children travel to school.

The relatively high positive intentions to walk to school should also be noted (i.e., mean intention scores were higher than the mid-point on the scale). Despite these high intentions in the North West, less than half of children in this region walked to school. This supports the position that

positive intentions are seldom translated into action (16, 25). This finding suggests that children know walking to school is a beneficial or positive behavior, but do not translate this knowledge into the desired action. A better understanding of how to close this 'intention-behavior gap' (49) may bring about increases in walking to school.

Another possible explanation as to why higher values on the TBP constructs were observed among participants from the North West yet fewer walked to school is that walking to school may in itself alter responses to some of the TPB items. For example, children in the South East who walked to school more, on average, may not view this activity as being enjoyable, fun, or important and therefore return lower scores for these attitude items. Similarly, they may not feel that they have much control over this behaviour if it is the default travel option, again resulting in lower scores for the perceived behaviour control construct. Finally, if walking to school is indeed the default travel mode for many of these children then discussions with teachers, friends, or family may not occur, which would be reflected in lower values for the subjective norm construct. This may help to explain why children from the South East walked to school more yet reported lower scores for the TPB variables.

In terms of intervening in order to increase walking to school, our findings suggest that efforts should be focused on children in the North West of Europe, who walk to school less than their counterparts in the South East. Given that relatively high values were found for each of the TPB constructs, it appears that a) there is generally positive attitudes towards walking to school, b) children feel that they are able to do so, and c) there is an expectation from friends, family, and teachers that they should walk to school. Additionally, there is high intention to walk to school. Given this evidence it may be suggested that there are certain barriers preventing children from walking to school that are not related to the TPB model. Efforts to promote walking to school should therefore identify modifiable barriers and aim to change them. For example, if heavy traffic around the school grounds prevents parents allowing their child to walk to and from school then a car exclusion zone around the school may help to disperse traffic to other areas. Alternatively, walking to school could somehow be incentivised for those who live within walking distance but currently travel using motorised transport. Such approaches may help to circumvent existing barriers, whilst reducing the need for individual behavioural control, and therefore bring about an increase in walking to school. It is already known that the TPB model explains some of the variation in school travel behaviour (43). However, given the well-documented difficulties in changing health behaviours in general (42), and travel behaviour in particular (15), it is unlikely that intervening on these variables alone will bring about substantial behaviour change in relation to active school travel. Furthermore in this regard, implicit in the TPB is the assumption that the behaviour in question is controlled by the individual, with a degree of autonomy (14). In relation to school travel behaviours however, this may not be the case. Parents will likely be the ultimate decision maker regarding how their child travels to school, dictated by work commitments, perceptions of safety, and other family commitments. Thus the influence of the TPB constructs may be limited by the overriding influence of the parent. Perhaps a more successful approach to increasing walking to school would be a multi-pronged intervention targeting the TPB constructs of children, informing parents of the benefits of walking to school, and altering some of the environmental barriers to walking to school.

The main strength of this study is that it is the first to provide a comparison of commuting behaviors and associated psychosocial factors

between European regions. A large sample was used, and data were collected using a validated questionnaire. Few school travel studies have investigated psychosocial factors related to walking to school, and so this study adds to the knowledge base in this area.

Despite these strengths, the study has limitations. Responses to the self-report questionnaires may have been affected by bias, such as social-desirability bias, the misinterpretation of question meaning, or cultural differences in the interpretation of items (32). Additionally, error may have been introduced via questionnaire translation (13). For example, even the most competent translator may have difficulty conveying the nuances of certain terminology. This, in turn, could lead to inaccurate responding, or missing data. An additional limitation to this study was the restricted range of possible scores for the TPB constructs (i.e., a 4-point Likert scale), reducing potential variability in these data. Finally, although the sample was relatively large, only a small number of countries were used to represent the two European regions. Recruiting a larger number of countries would provide more representative results.

Children from South East Europe walk to school more than their counterparts from the North West. Children in North West Europe score higher on walking-related TPB variables. However, high intentions to walk to school do not appear to translate into actions, certainly with regards to aggregated region-level data. School travel researchers should endeavour to understand this intention-behavior gap, with a view to designing tailored interventions to increase school travel-related physical activity.

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