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Walking to school in Scotland: Do perceptions of neighbourhood quality matter?

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ABSTRACT

A decrease in active travel has been observed over the past years in many Western countries including Scotland. A large part of this is likely due to the greater travel distances. However, previous research has suggested that perceptions of one's neighbourhood may also affect walking levels. If parents fear crime or traffic levels, or feel that their neighbourhood is of low quality they may not let their child walk. These perceptions are subjective and may be interlinked to each other. It is important to understand which perceptions matter more than others, in order to design the most suitable policy to promote more active travel behaviour among children. Using the Scottish Household Survey, this study investigates how or whether 48 different perceptions of neighbourhood quality or 11 reasons for having chosen their house affect children walking to school. A variable attrition method was used to reduce the number of variables for modelling. When walking distance, household characteristics, and built environment are included in a binary regression model only two perceptions were found to be significant: *good local shops* and *slow/safe traffic*. Implications of the findings are discussed.

1. Introduction

Like other Western developed countries [1,2], Scotland experienced a significant reduction in the number of children walking to school in the past few decades, from 69% in 1986 to 54% in 2005 [3]. Active travel (such as walking or cycling) to school is important for various reasons, including reduced energy consumption, and it has been associated to greater overall physical activity [4,5]. Further justifying the focus of research on this specific aspect of children's travel, trips for education account for the largest segment of trips (30%) by children in Scotland [3]. Like other trips, distance is a major explanatory factor along with available transportation choices. In addition to those hard factors, soft factors such as parents' opinions and perceptions of different qualities of a neighbourhood will affect whether or not they allow their child(ren) to walk. In this paper, we examine how or if such opinions and perceptions affect children's travel to school in Scotland when a reasonable walking distance is taken into account.

One benefit of walking to school is the intrinsic exercise gained, thus contributing to physical health (for a review see [6]). Using active modes such as walking or cycling incorporates low-impact exercise into a child's daily life [7]. In addition to that, a number of separate studies found that children who use active travel to get to school are also associated with greater levels of physical activity overall for boys in the UK, Denmark, and the USA [4,5,8].

Recently, research on children's travel has begun to move beyond simply the physical health implications of travel mode. Westman et al. [9] found that children who were driven to school were more likely to be less alert (based on an activation scale between alert and sleepy) than other modes. Other authors have discussed the relationship between social interaction and subjective well-being (a global measure of well-being) and how children report that social interaction while they walk to school makes it fun and enjoyable [10]. Potentially increasing social interaction, children who walked to their destination were the most likely to see others that they knew while travelling between their origin and destination in contrast to those who rode in cars, where a strong negative correlation with seeing anyone was found [11]. Thus, walking may provide more than just physical health benefits or reductions in energy consumption and congestion.

A significant amount of research, in particular from the USA, has examined what contributes to or detracts from the likelihood of children walking to school (for a review see [12]). Those studies consistently found that distance was the strongest explanatory factor. In contrast to those findings, Waygood and Kitamura [7] showed that in Osaka,

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Japan children aged 10 and 11 years old walked to local schools regardless of distance, though maximum distances were likely under 3 km as the maximum walking time was 40 min. Therefore, though distance can be a strong explanatory factor, it is necessary to consider other influences.

Considering that there is likely some limit to what a reasonable walking distance is, some papers have used increments of 0.5 miles [13,14], 0.5 km [15], or categories [16]. Other authors have used dummy variables based on the average distance deemed walkable by parents [17]. Some of that research [13,15,17] on why children are driven to school also found that even children who live less than the smallest increments used (0.5 miles or 0.5 km) were chauffeured by car. Thus, taking into consideration that this distance might vary between cultures and that 0.5 miles is not equivalent to 0.5 km (0.5 miles is roughly 0.8 km), there appears to be a gap in knowledge about country-specific "reasonable" walking distance. Such a threshold is likely an important explanatory factor in children walking to school.

Thus, though distance is one of the strongest known explanations of children walking to school, it is not the complete picture. To understand other influences on children's travel some authors have examined the reasons that parents give as to why their children do or do not walk to school. When parents are asked why they drive children to school, frequent answers that do not relate to distance are not only often tied to safety concerns such as fear of child abduction or "stranger danger" [13,2,18] and traffic danger [2,19,18], but also the parent's convenience [13,15,20]. Related to convenience, a parent's usual means of travel might also explain a child's mode as Susilo and Liu [21] found that a parent's habit of routinely travelling by non-motorised modes was positively correlated with children's active travel. In contrast to the study presented in this paper, those studies were based on transportation surveys examining the problem of children not walking to school, so parents would likely be giving responses to justify why their child is not doing the preferred behaviour.

The propensity of children to walk to school may also depend on the quality of the physical environment. Related to traffic safety, parents in Australia were concerned about safe crossings and large roads [22]. A UK study on attitudes towards walking and cycling [23] found that car culture dominates consideration of mode choice, which was built off fear and poor perceptions of the physical environment. For Scotland, the perceived quality of walking was found to be related to deprivation levels[1] of the neighbourhood [24]. That research found that the measures that influenced walking for adults in deprived areas made less difference in non-deprived areas. However, how neighbourhood deprivation impacts the propensity of children to travel to school is still largely unknown.

When a wider consideration of the physical environment is taken, two relevant studies have been conducted in the UK. The first was conducted in Bristol [25] and examined 23 different parental perceptions related to aesthetics, nuisance, safety, and access to local destinations. In that study, distance was again the strongest explanatory variable for active travel (AT) to school, but ease of access to local destinations was positively associated for boys' AT, while nuisance (based on three components: crime, noise, and bullying) was negatively associated for girls.

The second study was conducted in Norfolk, UK [16]. In this study, parental attitudes and safety concerns, as well as the presence of social support from parents and friends were associated with AT to school. However, that study's measures were mostly limited to those related to traffic or stranger danger, with the exception of the sense of community which was positively associated with walking for trips under 1 km. Thus, apart from Page et al. [25], the potential for parental perceptions of general neighbourhood quality has not been well studied.

Other studies have included parental perceptions such as neighbourhood safety or risk. Perceptions of neighbourhood safety were not significant in explaining children walking to school in the USA [26], while Wen et al. [15] found that the perceptions of neighbourhood and road safety were different between parents of children who themselves walked and those who did not. Also in Australia, Carver et al. [27] found that parents' perceptions of risks in their neighbourhood were linked to defensive behaviour, which was then linked to reduced active travel. However, these studies did not consider other aspects of the neighbourhood such as the overall rating of the neighbourhood or perceptions of anti-social behaviour that may affect the general sense of security.

As shown by the discussion above, while parents' perceptions might influence whether children would be allowed to walk to school, it is largely unknown which perceptions or preferences matter most. It is important to understand which matter the most in order to design the most suitable policy intervention.

Using data from the 2006 Scottish Household Survey, this paper explores whether perceptions of the neighbourhood are related to a child walking to school. Unlike the previous studies cited above that examined parent justifications for not driving children to school, which primarily focused on traffic safety and personal security, this research uses data from a general household survey that, while it includes questions related to traffic, children's security, and general safety, it also includes many other questions such as the quality of local shops and facilities and community measures such as friendly people, good neighbours, and community spirit. Thus, it not only examines the safety component, but also removes the "justification" element in responses, and expands the research consideration to other qualities of a neighbourhood and reasons for their household location choice.

The next section will discuss the dataset and methods used in this paper. The first section of the analysis lays down basic findings on modal share and establishes what the "reasonable" walking distance to school is for children in Scotland. Fifty-nine subjective values by the parents are considered, and those that are significantly correlated with children walking to school are then considered in a binary logit model that includes parents' commitments, their perceive quality of the built environment and the traditional characteristics of the built environment. The paper closes with Section 4 Discussion and Section 5 Conclusions.

2. Material and methods

Data for this research comes from the geographically representative 2005/2006 Scottish Household Survey[2] (SHS). It is a continuous cross-sectional survey with roughly 31,000 households participating over a two-year period. The survey considers three main policy areas: Housing, Social Justice and Transport. The survey was designed to provide information about the characteristics, attitudes and behaviour of Scottish households and individuals on a range of issues including transport. Within the survey, a few questions pertain to one child's mode to school.

For this study, responses from household surveys where the random child was between the ages of 10 and 11 years were used. Children aged 10 and 11 years old were used for two reasons. The first is that this corresponds with the age where parents in the UK expect their children to be able to travel to school independently [28]. Secondly, a considerable amount of the research on children's travel focuses on children aged 10 and 11, thus this age allows for comparison. The relevant descriptive variables for the children, their households, and their neighbourhoods can be seen in Table 1. Unfortunately, variables such as the number of cars within the household, population density and shop density were unavailable. Because of the protection of personal identity, geographical identification is not possible, so proxy measures for those are also not possible. However, information on car availability, the parent's mode

[1] Scottish deprivation levels relate to an index score based on a range of social, economic, and housing issues (Scottish Government, 2009).

[2] http://discover.ukdataservice.ac.uk/catalogue?sn=5608.