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Exploring independent and active mobility in primary school children in Vienna

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ABSTRACT

Declining active and independent mobility in primary school children poses a threat to the development of the children's psycho-motoric and cognitive abilities. Increasing accompaniment of children, which is often carried out as car transportation, creates more motorized traffic, thus leading to lower likelihood of other children traveling independently and actively. Against this background, a two-step survey was conducted to analyse the active and independent mobility (AIM) of primary school children. In a first step, mobility licenses and mobility data were collected with the help of travel diaries including specific information on travel accompaniment. In the second step, in-depth interviews with parents were conducted. Although the data can only provide a snapshot of the independent mobility of primary school children, this study confirms that active and independent mobility is the result of a variety of factors. The results indicate that – besides trip distance and age –the type of school (all-day/half-day primary school) is likewise relevant. Based on the parents' assessments, significant sharing of trips takes place in case travel accompaniment is unnecessary. Depending on the parents' attitudes towards AIM, we identified three "profiles" (Promoters, Pragmatists and Protectors). Linking these profiles to indicators of AIM reveals that different attitudes manifest themselves in children's travel patterns. The results are limited as only two schools served as sources of data and it was not possible to decouple the parental profiles from children's ages. Overall, it can be concluded that there is potential for improved active and independent mobility in children. To be effective, future campaigns need to consider parental attitudes.

1. Introduction

Primary-school age, which refers to the ages of 6 to 10, constitutes a particularly important time for the development of the perception of dangers and spatial cognition in public space for children. At this age, decisions on mobility – which mode of transportation to choose and which route to take – are mainly made by children's parents. Parents' concerns regarding low traffic and social safety lead to higher frequency of accompanied travel which is often carried out as car transportation. In this process, more motorized traffic is created, leading to a lower probability of other children traveling independently (without supervision by adult chaperones) and actively (walking and cycling). Mobility characteristics on the part of primary school children have changed over the last decades. Trends of declining active and independent mobility (AIM) contribute negatively to overall child development and children's future mobility preferences. To work against this worrying development, it is of great importance to identify specific barriers imposed by parents in pursuit of fostering children's independent and active mobility.

This paper reports on a multi-level approach of data collection and analysis from two primary schools in Vienna, Austria. The overall objective was to gain insight into the travel behaviour of primary school children, in particular into the characteristics of AIM which can be linked to the parents' attitudes, since considerably less research exists from Austria compared to the number of studies in the U.S. and other European countries. The research is guided by the question of in what sense parental attitudes influence the extent of their children's independent and active mobility. In particular, this paper wants to contribute to research in this area by:

(1) Examining comparable trip characteristics, mobility licenses[1] and travel accompaniment for children in two Austrian primary schools

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[1] Mobility licenses refer to permission parents give to their children to conduct specific activities in the mobility context. Such licenses are used for example by Hillman et al. (1990) to operationalize children's independent mobility.

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of different types and settings, based on trip diaries which were specifically designed to obtain in-depth information about independent mobility.
(2) Analysing parents' attitudes qualitatively by means of in-depth interviews in pursuit of better understanding of the background behind mobility decisions and linking these parental attitudes to their children's mobility licenses and other indicators of AIM.

The paper is structured as follows: Section 2 gives an overview of findings from existing studies in the field of the independent mobility of children. The survey approach and instruments are described in Section 3. This section also includes a presentation on the school settings and sample characteristics. The results are presented in Section 4, starting with an overview of indicators of children's active and independent mobility given consideration of the two school locations (Section 4.1). The results on parents' attitudes and their interrelation with their children's mobility behaviour are subsequently shown (Section 4.2). In the conclusion section (Section 5), the determinants of children's independent and active mobility are discussed and recommendations for future research are derived accordingly.

2. Literature review

An international study of the Policy Studies Institute on children's independent mobility throughout 16 countries (Austria did not take part) found that children's independent mobility varies widely (Shaw et al., 2015). Where comparable data are available, studies show that the independent mobility of school children has actually declined over time (e.g. Hillman et al., 1990; Shaw et al., 2013; Frauendienst and Redecker, 2011; Funk, 2008). Independent mobility is a complex phenomenon resulting from various influences. According to the behavioural model of school transportation (BMST) (Mitra, 2013), key factors are the physical environment, external influences such as the surrounding social-political context, but also child, parent (or guardian) and household characteristics. According to the conceptual framework of BMST, all of these factors directly or indirectly affect the child's travel patterns and show complex interconnections. What's more, independent mobility and mode choice affect each other, since car use leads inevitably to escorted travel. From a legal perspective, this is also the case for cycling up to the age of 12 or 10, respectively (after positive cycling proficiency test) in Austria. Meanwhile using public transport unaccompanied is allowed from the age of 6.

Although literature reviews show that studies in this field offer a variety of (partly inconsistent) findings which are not generalizable (Potoglou and Arslangulova, 2017), they are unanimous in their assessment that parents and their perception of the urban environment are a relevant factor for independent mobility (Shaw et al., 2015). This is obvious, as the mobility of children – especially at a young age – is to a large extent an outcome of choices made by parents. Parental concern about the danger caused by road traffic is specifically identified as a motivation for frequent shuttling by car (e.g. Limbourg, 2010; Funk and Fassmann, 2002; DiGuiseppi et al., 1998; Wittenberg et al., 1987; Waygood and Susilo, 2015; Wen et al., 2008). This connection reveals a vicious cycle. Parents' risk perception prevents them from granting active and independent mobility (AIM) to their children. As a consequence, motorized traffic then increases and leads to subsequent higher risk perception, also for parents of children who walk or cycle. In addition, household interactions such as parents' work travel patterns likewise play an important role (e.g. McDonald, 2008).

Parents however often do not take into account that these changes in children's mobility may result in a negative impact on the child's personal development (Hüttenmoser, 2004, 2006). Moreover, the experiences which children and youth gain on their trips hardly affect only their future travel behaviour (Limbourg et al., 2000; Hurrelmann, 1998; Moczek and Rambow, 2004). That is, less AIM influences a child's development of becoming a cognitively, physically and socially healthy human being (BMLFUW, 2005; Hillman, 2006). AIM is crucial for the development of psychomotor and cognitive abilities, such as spatial orientation, perception and estimation of distances, time and speed (Limbourg, 2006). Children with car-dependent lives can also suffer from a learning deficiency, a slower development of social behaviour, missing balance or spatial awareness (Zimmer, 2003; Limbourg, 2010). Schützhofer et al. (2015) state that a child with sufficient physical activity in his/her daily life will subsequently have well-trained balanced senses, and will thus be able to deal with critical situations when, for example, he/she is cycling on the road. Furthermore, a child with good motor skills can rely on a higher level of awareness of road traffic. Both may ultimately lead to a lower risk of children being injured in a traffic accident.

As mentioned above, actual and representative studies on the independent mobility of children are lacking in Austria. In particular, no comparable studies exist on mobility licenses as conducted by Shaw et al. (2015) or Hillman et al. (1990). The nationwide household travel survey of 2013/2014 (Tomschy et al., 2016) includes an unweighted sample of 444 trips (one reporting day) on the part of 163 6-to-9 year-old children living in Vienna. Although the survey does not offer any information about accompaniment on trip level, key mobility figures can nevertheless be derived. Modal split data on school trips of Austrian primary school children were collected between 2013 and 2017 in the context of a consulting programme for educational institutions (Klimaaktiv homepage, 2017). As only those schools were involved which were interested in the mobility management program, the data might well be biased. In an individual study on children's mobility in 2000, data on parents were collected at nine primary schools in different Austrian provinces (three schools in Vienna, N = 220) (Sigl and Weber, 2002). The results show that children from Vienna are less mobile than children from small towns or rural areas. Most of them (80%) travel less than 1 km to their primary school. A high share of children is escorted by car due to the fact that parents judge the traffic situation to be too dangerous for independent travel. On trips to school, every second child is always accompanied. The results reveal that unsupervised play in the vicinity of the residential environment is not possible because play areas are difficult to access or displaced by car traffic. Although the study offers useful information about independent mobility, some aspects remain unclear from a methodological perspective, as the questionnaire has not been published. For example, how accompaniment is defined or how reasons for accompaniment are collected. No trip diaries were used; mobility licenses were not surveyed. Overall, comparability with the present study is therefore limited.

Further individual studies focus on children of kindergarten (e.g. Ausserer et al., 2010) or older age groups (e.g. Stark et al., 2014, 2015; Füssl et al., 2012).

This study explores characteristics of children's AIM in their everyday mobility and the attendant underlying reasons. In this context, children's behavioral characteristics are linked to parent's attitudes. Two primary schools in Vienna are used as an example. Although our two-step survey does not claim representativeness, the methodological approach and results presented in this paper are expected to be useful for transport researchers, urban planners, as well as municipal authorities when planning campaigns to strategically promote physical activity amongst this important target group.

3. Methods

3.1. Approach and survey instruments

We conducted a two-stage survey in two primary schools in the city of Vienna. To measure and examine characteristics of AIM, the first stage contained a paper-and-pencil survey investigating the children's mobility behaviour on two days (one weekday, one weekend day). In the second stage, parents were invited to take part in an in-depth face-

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