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Experiences of safe and healthy walking and cycling in urban areas: The benefits of mobile methods for citizen-adapted urban planning

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Abstract

Walking and cycling promotes physical activity and mental health. In many European cities, walking and cycling has increased and is a key part of transport planning. However, many cyclists and pedestrians still perceive themselves as neglected road users, face air pollutants, noise and fear travel injuries. Children are in particular vulnerable. The aim of this study is to present mobile interview methods ("go-/ride-alongs") for promoting safe and healthy cycling/walking in urban transport planning. We present two studies from Berlin (a) and Leipzig (b), Germany. We conducted go-/ride-alongs with cyclists and pedestrians on (a) their commute home from work and (b) children on their way to school. We accompanied them and investigated how they experience commuting, the environment and discover ad-hoc situative behavior. We discuss our findings and transfer our knowledge gained through the mobile method into transport planning strategies. Safety is most often mentioned by all interviewees. Our studies show a high importance of in-situ/ad-hoc experiences for travel behavior, which can be examined with an interviewer accompanying. Our methods encourage interviewees to describe past experiences, how they shape their behavior or factors supporting/hindering active travel. We consider mobile methods important for exploring mobility and successful when complemented by participatory methods and instruments (e.g., participatory mapping, smartphone-apps, group walks). Therefore, the voice of vulnerable road users can be strengthened. In a next step individual local experiences and community knowledge could be incorporated in urban transport planning to improve active travel.

Keywords: active school travel; mobile interview; go-along; ride-along; participatory methods

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1. Introduction

Active modes, such as cycling and walking, have increased in Germany in recent years (Vollmer and Gruschwitz 2019). Active mobility is environmentally friendly and healthy: it is noise abating and pollution free and serves as a space-saving mode of transport in cities. In Germany, around a third of all trips are made by active modes, showing an increase in bicycle usage since 2002 and a constant percentage of walking (about 25% of the share of trips) (Vollmer and Gruschwitz 2019). Among children (<10years) 34% walk and 13% cycle (Vollmer and Gruschwitz 2019).

One third of all trips in Germany are education- and work-related (Vollmer and Gruschwitz 2019). Commuting to work by bicycle or on foot is associated with higher mental wellbeing, increased physical health and higher travel satisfaction (Mouratidis et al., 2019; Mytton et al., 2016; Synek and Koenigstorfer, 2019). As for children, the topic of active school travel (AST) has increasingly been discussed in recent years. Walking and cycling to school is, similar to adults' commute, associated with better fitness, maintenance of healthy body weight and mental health of children (Voss, 2018). Children who walk or cycle to school report positive emotions and perceived well-being (Ramanathan et al., 2014). Children below 17 years of age walk and cycle much more than adolescents above 17-years, whose mobility then often shifts to private car usage (Vollmer and Gruschwitz 2019). As for future life, children who commute actively to school are more likely to use active modes to other destinations (Voss, 2018). Hence, they may choose sustainable modes in the future instead of shifting towards private cars. Consequently, there is a need to increase the attractiveness of active travel to school (Ma et al., 2021).

However, walking and cycling also poses a variety of risks. Firstly, walking/cycling alongside busy roads in urban areas increases the risk of being exposed to harmful air pollutants. Cyclists inhale a higher dose of ultrafine particles along busy roads than on off-street bicycle tracks (Hofman et al., 2018). Especially children with their smaller body size are at higher risk, inhaling higher doses of ultrafine particles (Mazaheri et al., 2014). Secondly, the sound level is comparably high alongside traffic roads (Apparicio and Gelb, 2020). Thirdly, cyclists and pedestrians, especially children, are at risk of traffic injuries (Alonso et al. 2017).

Research about how active mode users are impacted by stressors or at risk of injuries has increased. However, the question arises how cyclists/pedestrians perceive and experience their commute and which external factors influence their wellbeing and behavior. The perceived environment can also differ from the measured environment (Marquart et al., 2021; Ueberham et al., 2019; Verbeek, 2018) and the perception of the environment influences behavior (Alonso et al., 2017; Wilson et al., 2019). For children's commute to school parents are usually the decision-makers (Mah et al., 2017). Their perception of the route has a greater influence than the perception of their children (Wilson et al., 2018). A recent quantitative study slightly points out that perceptions of routes and their environment are relevant factors for travel mode choice (Scheiner et al., 2019). Therefore, acknowledging commuter's, children's and their parent's perceptions of their transport environment is highly important to improve active travel on a daily basis.

Urban and transport planning decisions, however, rely mostly on accident statistics, pollution measurements and infrastructure data when planning for active transport (Broberg and Sarjala, 2015; Helbich et al., 2016). Moreover, the view of decision-makers about what cyclists need is not always in line with the reported needs by cyclists (Marquart et al., 2020). Traditionally, cyclist's/pedestrian's behavior and mobility experiences (incl. safety) is researched using quantitative methods, e.g. surveys or transport databases (Alonso et al. 2017). Recently, smartphone questionnaires are applied for individual and en-route questionnaires (Ueberham et al. 2019). We argue that qualitative methods, which provide space to report perceptions in-depths, should receive greater attention in transport planning. Sketch maps or sedentary interviews are used often in qualitative cycling/walking studies (Marquart et al. 2020; Moran et al. 2017). For examining route perceptions on-the-move, mobile qualitative interviews (i.e. face-to-face interviews while walking/cycling) make it possible to participate in the interviewee's activities and experience their environment in situ. This gives new insights into urban commute. This study presents two go-/ride-along approaches for exploring cyclists and pedestrians – both adults and children – experiences and perceptions while commuting to work/school. Mobile methods are not commonly applied in transport planning. Hence, our study will present and discuss its approach based on adult's commute and children's AST and discuss possible implementations for urban transport planning.

2. Methods

Mobile interview methods, such as go- and ride-alongs, are rooted in ethnography and social science research. They function as qualitative interviews in which the "research subject and researcher are in motion in the field" (Hein et al., 2008). They are relevant to investigate environmental perception, spatial practices, biographies, social architecture and social realms (Kusenbach, 2003). The interviewer can experience, observe and document the environment of the interviewee while moving through it and the interviewee can describe spontaneously how he/she perceives, evaluates or behaves in that environment (Evans and Jones, 2011; Kusenbach, 2003). Go-/Ride-alongs can comprise semi-structured interview questions, photographic/video documentations and field notes. They are appropriate for interdisciplinary research and link geographical, health and social science research (King and Woodroffe, 2017; Kusenbach, 2003).

In order to discuss the possibilities of mobile methods for urban transport planning, we draw on relevant insights based on two field studies. Firstly, (1) a study from Berlin, Germany, conducting ride-alongs with cyclists on their commute home from work (Marquart et al., 2021). Secondly, (2) a study from Leipzig, Germany, in which school children were accompanied on their commute to school [*manuscript, Schicketanz et al. 2021*]. Berlin (3,6 million inhabitants) has an increasing share of cyclists (SenUVK 2021) and Leipzig (580,000 inhabitants) is currently implementing measures for cycling safety and attractiveness (City of Leipzig, 2021). Both cities are located in the east of Germany, have a flat topography and continental climate. Our case studies focus on inevitable, daily routes.

2.1 Study 1: commuting cyclists in Berlin

Our first study insights are based on the interview data of a sub-sample of a broader study: we investigate 16 cyclists (male and female, aged above 18-years) working and living in Berlin, Germany, and commuting by bicycle on a daily basis. The interviewer accompanied the cyclists on their way home from work, usually during rush hour times. The ride-alongs took place from August – November 2020. We started with a short introductory interview before cycling together to make the interviewees familiar with the topics and interview situation. The interviewee and the interviewer received a recorder and microphone attached to their collar. During the ride-along, a semi-structured interview guideline was applied, including ad-hoc questions during sudden traffic incidents or environmental stimuli (for information on the methodological approach see Marquart et al. (2021)). The interviewer cycled next to the interviewee, discussed incidents or environmental situations. Meanwhile, the interviewer took photographs, recorded observations and GPS. The interviews and field notes were analyzed with MAXQDA and QGIS, comparing the external environment with the perceptions, experiences and behavior.

2.2 Study 2: children on their way to school in Leipzig

Our insights from study 2 are based on a study, which was carried out with children from public primary schools (age of 8-10 years) from February to July 2020 in Leipzig, Germany. Schools from three different neighborhoods were selected to cover heterogeneous route environments, sociodemographic and socioeconomic characteristics and possible travel modes. 14 children were accompanied and interviewed while walking or driving along their routes to or from school, together with their parents. Besides investigating the decision of AST itself this study focusses on the route perception of parents and children. The journey was tracked using GPS and children were asked to take photographs of important points along their routes. For each route to school we have a mixed data set comprising a recorded interview with GPS tracks and geocoded photographs, which was analyzed in MAXQDA and QGIS comparing the spatial perceptions of children and parents.

3. Results

In the go-/ride-alongs the interviewees can directly point out or discuss ad-hoc situations or traffic incidents. The interviewer takes part in the commute and documents important situations herself. Table 1 provides an overview of important aspects influencing perceived safety and route perceptions in general while cycling/walking home from work or to/from school. The aspects are derived from the mobile interviews (go-/ride-alongs).

Table 1. Overview of important aspects influencing perceived safety and route perceptions. Retrieved from the go-/ride-along interviews.

	Cyclist commuters in Berlin	Children's AST in Leipzig
En-route aspects influencing perceived safety	• High traffic volume • Traffic lights / intersections • Past-experiences (nearly-crashes) • Visibility (intersections) • Overtaking maneuvers • High tensions/ concentration • Sudden doors opening	• Large intersections • Waiting at traffic lights • Short green phases • Limited visibility of children • Narrow sidewalks • Cobbled streets • Stranger danger
En-route aspects influencing route perceptions	• Vegetation (e.g. allotment gardens) • Water • Seeing animals • Seasons changing • Smell of water/nature • Interesting sites (e.g. aesthetic, shops, people)	• Bakeries/supermarkets • "Secret paths" • Interesting sites (e.g. bridge, construction site) • Frozen puddles/streams • Trees

3.1 Safety

Among the adult cyclists, fear of traffic injuries was a widespread experience. Most statements were in areas with high traffic volume, at traffic lights and intersections. Cyclists stated that past experiences, e.g. a nearly-crash at a traffic light with a car who had not seen the cyclist, result in an unsafe feeling at this spot. Overtaking maneuvers were influencing cyclists perceived safety and could be experienced during the ride-along. Some cyclists took the sidewalk at some point, because they feel too unsafe at the main road. Most of the time the cyclists had a high tension and were highly concentrated at busy roads and intersections. Sudden doors opening from parking cars were perceived risks. Being seen by motorized traffic at intersections was important, which could be revealed by asking at intersections why cyclists cycled on- or off-road or by sudden incidents happening (e.g. cars crossing fast at intersections).

As for children's active school travel (AST), traffic safety concerns were the most frequently mentioned barrier of AST, mainly mentioned by parents. Traffic safety seemed to be perceived differently among the parents. As a result, their decision on travel mode and avoidance strategies varied. For example, larger intersections without safe pedestrian crossings were for some parents perceived as an unpassable barrier (e.g. one parent therefore decided to bring their child by car). For another parent, however, it was only a reason to take a detour and not change their mode of transport. Other traffic related aspects were described negatively by children and their parents during the go-along: long waiting time at traffic lights (child), too short green phases (child), limited visibility of children between parking cars (parent), too narrow sidewalks to walk side by side (child), cobbled streets unsuitable for cycling (parent), safer perception of a route when used by other children (parent), stranger danger (parent) (table 1).

3.2 Route perceptions and experiences

During the ride-along the cyclists described and evaluated their environment. Vegetation and water were positively mentioned most of the time. Cyclists even took hidden-paths to integrate greenery in their route. Trees or greenery along the street, allotment gardens or parks positively influenced their commute. Listening to birds or seeing animals, seeing the seasons changing, colors of nature or smelling the water/nature were important aspects of their route (Fig. 1). Greenery/vegetation was associated with a healthy feeling and increased wellbeing. Most cyclists described the importance of shortcuts, using pedestrian areas. These were important to integrate less dangerous, less stressful and more enjoyable route sections. Similar to interesting sites stated by the children, cyclists also stated sites of interests along their route, emphasizing their importance for a pleasant and interesting commute. For example: historic sites, aesthetic urban form, agriculture, shops or other people (Fig. 1).

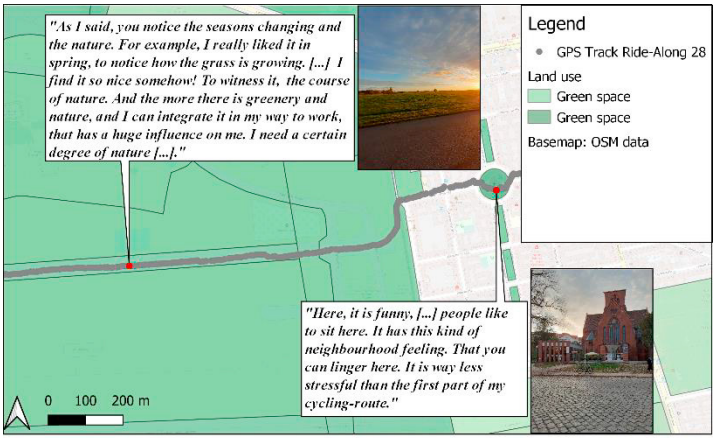

Fig. 1. Example for the importance of perceiving nature and greenery along the route and neighborhood feeling, which improves wellbeing in contrast to stressful route sections (Land use data taken from Geoportal Berlin/FNP, https://fbinter.stadt-berlin.de/fb/index.jsp, dl-de/by-2-0)

Regarding children's AST, we found only low impact of the natural environment on the perception of the routes to school. In particular group walking children described numerous positively perceived places such as bakeries or supermarkets where children regularly buy snacks, secret paths or shortcuts (e.g. behind bushes), a railway bridge or construction site to observe or frozen puddles or streams where children stopped in winter. During one interview of a partly walking child (the other part child was brought by car), climbing on trees and playing at a small stream was a regular activity along the route. This parent put emphasis on walking at least the last part to school to not contribute to the traffic jam in front of the school, be physically active and enjoy exclusive 'parent-child time' (without siblings).

3.3 Methodological results: statements en-route

Accompanying urban dwellers on inevitable routes to school/work supports a better understanding of how daily commute is experienced, what shapes people's travel behavior and what aspects adults and children perceive during the journey. Behavior, traffic concerns and the perceived environment could be investigated on-the-move. Accompanying children and parents was beneficial to catch both views simultaneously.

Even though the study with cyclists applied a semi-structured questionnaire, many topics appeared during the ride-along, which were not intended by the interviewer. Accompanying the interviewee and talking about perceptions and behavior stimulated a narrative. At critical spots cyclists remembered past experiences and stated how they influence their trip today. This was similar with children, whose past experiences influenced their momentary route perception (e.g. a barking dog was described three times, even though the dog was not there during the interview; frozen puddles were mentioned, even though winter was already over). Sometimes incidents happened during the cyclists' ride-alongs (e.g. motorcycle overtaking, cars exceeding speed limits), which motivated the interviewees to state their opinions and describe necessary improvements. The interviewees evaluated their momentary perceptions spontaneously. Positive and negative aspects of the route and the traffic situation could directly be captured.

4. Discussion

In this study we provided insights into two mobile interview methods, so called go-/ride-alongs, regarding cyclist's commute home from work and children's active school travel. By applying mobile interview methods, we can discover people's subjectively perceived environment, discuss past experiences en route as well as travel behavior and route choices. We now discuss our methodological approaches, focusing on its benefits for urban transport planning.

4.1. Benefits of mobile methods for transport planning

Mobile interview methods are valuable to gather information on how urban dwellers experience and perceive their daily commute. Positive and negative places and situations along the route could be pointed out by the interviewee and could even further be discussed, e.g. interviewees talked about how their surrounding impact their wellbeing, resulting behavior or possible solutions (Carpiano, 2009). The spatial transcripts produced through mobile methods are especially beneficial for urban planning to understand urban dweller's needs (Evans and Jones, 2011).

As the insights of our two studies show, mobile interview methods help to reveal necessary improvements for daily school travel and cyclists' commute. In our school-related study, already a non-representative number of interviews reveal dangerous spots in school surroundings (e.g. certain crossings, missing sidewalks). Sometimes slight changes could make the difference (e.g. removing garbage cans from the sidewalk to let children pass easily). Moreover, positive route aspects as perceived by children could receive greater attention in planning for AST. As for the adult cyclists, spots to improve traffic light situations for cyclists at intersections could be discovered. Moreover, the great number of hidden paths, which even violated traffic rules, point out spots where cyclists feel unsafe or neglected as road users. Consequently, these spots could receive greater attention in transport infrastructure planning.

Transport measures developed by involving people's needs are better accepted by urban dwellers and more likely to result in a successful transport plan (Nared, 2020; Sagaris, 2018). Especially children's perceptive should receive greater attention, as they are vulnerable road users. Their mere body size is a risk factor itself: they are hardly visible between parking cars. The need to focus on children's traffic risks and the different views of parents and children regarding risk factors on school travel, as shown in this study, should be included.

However, interviewing on-the-move has its limitations. Go-/ride-alongs are complex interview situations. For walking/cycling while talking, devices such as audio-recordings, cameras or GPS-tracker are needed. Moreover, due to sometimes difficult traffic situations, not all statements can be recorded easily and the interview flow can be disrupted. Cycling/walking together poses risks, e.g. traffic injuries. Physical comfort and safety of the interviewees should be ensured (Finlay and Bowman, 2017). The interviewer has to be trained and alerted. Especially with children – but also with adults – interviewees in mobile interview situations can have a perceived imbalance of 'power' (King and Woodroffe, 2017). It is important to encourage the interviewee (children even more than adults) to understand themselves as technical experts of their own route (Marquart et al., 2021). As in any in-person interview, the interviewer may influence the perceptions by his/her presence or by asking questions (Hein et al., 2008). Results of mobile interviews have to be understood in light of this interviewer-interviewee interaction. They do not necessarily represent the interviewees' authentic behavior (Kowalewski and Bartłomiejski, 2020). When conducting go-alongs with a group, group dynamics can also result in interviewing difficulties because interviewees may feel uncomfortable to express opinions (Carpiano, 2009). These limitations and obstacles, when conducting mobile interview techniques, have to be considered, however, their benefits of investigating, experiencing and documenting the interviewees' commute on-site and on-the-move are a worthwhile approach for citizen-adapted urban and transport planning.

4.2. Related instruments for planning

Mobile interviews with single persons or a group can be an interesting participatory method for transport planning. Participatory planning approaches have been lacking in transport planning in the last decades, however, they are gaining importance (Nared, 2020). They provide planners with knowledge on collectively important places by giving individuals a voice in transport planning issues. This is important, because transport users do not always decide rationally but base their transport behavior on subjective decisions (Nared, 2020).

Community group walks can be implemented in transport planning. It is a form of mobile interviewing with a group. People can collectively discuss and point out on site how they want their urban environment to be designed, which places need improvements and what aspects are perceived as good (Carpiano, 2009). As in our mobile methods, people are stimulated by the environment they walk through. Unfortunately, the problem with accompanied (group) walks/ride-alongs is the need for time and human resources. Thus, mobile (group) interviews should be included in a wider planning process design, which additionally implements other participatory planning approaches.

One of these participatory planning approaches is the usage of smartphone apps combined with GPS tracking. With participatory planning apps, people can tag or be tracked and describe certain obstacles they face in the city (e.g. report how they experienced their trip and give suggestions) (Bahillo et al., 2015; Ertiö, 2015; Jones et al., 2015). Since most of the people own a smartphone nowadays, planners can take advantage of this collectively available information and

people themselves can support urban planning decisions. Some cities, e.g. Copenhagen, already apply collaborative planning processes: urban dwellers send their transport planning suggestions electronically to planning authorities (Nielsen et al., 2013). These approaches are valuable for integrating adults' opinions. Children, however, cannot easily make use of these apps due to data security or usability.

Participatory mapping exercises can be beneficial for integrating school children's perceptions. Mapping exercises with children, e.g. sketch mapping the home to school route, are beneficial to understand children's needs (Moran et al., 2017). Moreover, children-based focus groups can help to understand how to support AST successfully, e.g. by construction safer crossings (Witten and Field, 2019). There are already measures taken for promoting AST: The "walking school-bus" (walking as a group led by an adult) provides a safer trip (Carlson et al., 2020). Otherwise, maps with safe routes to school can be provided for the parents to secure safe AST. For long-term improvements of AST, however, our studies showed the importance of changing the route environment towards an attractive, enjoyable and safe route for children: removing barriers (e.g. waiting at traffic lights) or including 'highlights' (e.g. bushes or trees, water pods) can motivate AST. Mobile interviews draw attention to these subjectively perceived 'highlights'.

5. Conclusion and future research

Improving health and wellbeing of daily commute to school or work is crucial. Cycling and walking increase health and wellbeing. As for children, supporting AST can even affect mode choices in future life, as children get to know walking/cycling as an activity on its own and become local experts of their city. As presented in our paper, mobile interview methods are an interesting approach to understand subjectively perceived problems or place-specific obstacles on routes. Moreover, positive aspects of route environments as well as route 'highlights', which may not be revealed by surveys or questionnaires, can be examined. This is especially interesting for transport planning and can enrich our understanding of what urban dwellers – including vulnerable groups such as children – actually need for their daily commute. However, mobile (group) interviews, as most participatory planning tools, are rather time-consuming and human resource intensive (Nared, 2020). They should be complemented by other participatory methods. As for successful transport planning in cities, designing transport plans with input from urban dwellers support a livable city as well as an enjoyable and safe commute adapted to people's needs.

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