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Improving walking conditions for older adults. A three-step method investigation.

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Abstract The benefits of walking are widely recognized. In this regard, the Norwegian government has urged local authorities to develop walking strategies. The aim of such strategies is to influence a local walking culture and framework conditions for pedestrians. Older citizens are an important focus group because what is an accessible environment for them can be attractive for all groups. The primary aim of this study is to improve our understanding of how physical, social and individual factors affect whether older groups perceive that they *need*, *can* and *want* to walk. Second, we show how a mixed-method approach for collecting data gives important input when planning a walking strategy. Combining quantitative and qualitative data gave deeper insights into how elders perceived their walking environment. The three steps (survey, participatory observation and workshop) made it possible to involve elders and practitioners from the municipality and the Norwegian Public Roads Administration directly in the study. This gave first-hand experience about how to facilitate the environment for older pedestrians. The findings suggest that the *need*, *can* and *want* dimensions of walking interact and reinforce each other. We find that measures affecting more than one such *dimension* seem to provide the best response for walking activity. This can be important for practitioners to take into consideration when developing good walking areas in the city.

Keywords: Walking, Older adults, Pedestrians, Urban planning, Mixed method

Introduction

Walking is the most basic and common mode of transportation, and the favourable effects of walking on a variety of physical and psychological outcomes are well-established (Morris et al. 2008). For elders in particular, daily walking has significant health benefits (King et al. 2011; Nelson et al. 2007) and prevents disability (Booth et al. 2000; Borst et al. 2008). Older adults today have a more active lifestyle (i.e. they travel more) than previous generations (Hjorthol et al. 2010; OECD 2001). However, unlike previous generations, the current generation of elders, holds a driving licence and has developed car-related habits. Studies have shown that many prefer to get from place to place by car rather than walk or use public transport (Hjorthol et al. 2010; Golob and Hensher 2007). As a result, they do not have the same benefits of walking as previous generations. The Norwegian Directorate of Health recommends elders to be physically active (with moderate intensity) 150 minutes per week, which can be achieved with a 20 minutes daily walk.

In Norway, a national strategy to promote walking was launched in 2012, aiming to make it easier and more attractive to walk *instead* of choosing other means of transport, i.e. walking for transportation. The main objectives are to make walking attractive to all, and to encourage people to walk more in everyday life. The strategy defines objectives, means and measures for six priority areas. The implementation of local actions and walking strategies to increase walking among different population groups, for example older adults, is one such priority. This research project aims at identifying measures to be included in a local walking strategy in the municipality of Kristiansand, Norway.

The aim of the paper is twofold: First, we wish to deepen the understanding of the conditions that make elders walk, and which measures they think are important to increase their walking activity. An improved understanding of these issues could help municipalities to better facilitate the physical and social environment for elders. Second, we show how a mixed-method approach for collecting data gives important input when planning a walking strategy, involving older adults as well as practitioners. The combination of methods involved a survey, a participatory observation and a workshop, inspired by Ståhl et al. (2008) and Drewes Nielsen et al. (2004).

In tradition of transport research, mobility or travelling is seen primarily as a derived demand (Mokhtarian and Salomon 2001), a manifestation of travel activity derived from people's activity patterns or lifestyle. However, mobility can also be *a goal* in itself. Walking trips often relate to the sphere of leisure, and is an important part of many elders' lives after retirement from paid work. In this regard, it is not easy to distinguish walking for transportation from walking for exercise/leisure. For example, a shopping trip on foot can be regarded both as transportation *and* as exercise. It is thus important to take into account a broad perspective on mobility. Based on sociological and ecological perspectives, we claim that there are three main reasons why people walk: because they *need* to, because they *can* and because they *want* to.

A persons' walking behaviour is influenced by a complex relationship between environmental (physical and social) and individual characteristics. The desire to engage in activities at various locations underlies a major aspect of the demand for travel. The primary purpose of travelling is to satisfy *needs* in what can be called welfare arenas (terminology used in the research tradition of 'level of living' (Ringen 1995)). In this perspective, mobility can be seen as a tool or a resource used to satisfy needs related to three aspects of life – *having*, *loving* and *being* (Allardt 1975). Income, housing standards, employment, health and education are classified as *having*; relations with family, friends and other social relationships as *loving*; and self-esteem, leisure activities, social reputation, political resources as *being.* These components can partly be understood as values and partly as resources (Allardt 1975:37).

Ecological models stress that physical activity can be explained by the interplay between individual characteristics and the surrounding physical and social environment (Wahl et al. 2012; Cauwenberg et al. 2014). The ability to move is measured as *individual* or *personal* resources such as access to means of transport, health, available time, etc., and *physical environmental characteristics* such as

infrastructural adjustments, traffic situation as well as temporal and spatial organisation of services. The interaction between the individual resources and the physical environment is of special importance when discussing walking conditions for elders. This is the basis for what people *can* or are able to do in a specific context.

A persons' decision (want) to walk is influenced by individual-level characteristics, which include psychological, demographic and biological factors as well as characteristics in the surrounding environment. For example, a person highly motivated to improve her health, may need less facilitation to walk than a person less motivated (Alfonzo 2005:821). Not all have the same need to exercise or participate in activities. Nordbakke (2013) found that some elders see withdrawal from social activity and participation as a natural part of ageing. Other motivating factors linked to the social environment include interpersonal relationships, place attachment and formal community engagement (Cauwenberg et al. 2014).

To summarize, we claim there are three main reasons why people walk: (1) They walk because they *need* to carry out activities. Need is primarily connected to actual travelling, to satisfy needs on the welfare arenas related to the dimensions of having, loving and being. (2) People walk because they *can, they have the ability,* when the combination of individual resources and physical characteristics makes it possible; and (3) they walk because they *want* to, because it is an enjoyable pursuit, and they prefer this activity to other alternatives, for example using other transport modes or not travel at all. These three dimensions will also interact. For example when the *ability* to walk increases, the wish or the *want* to walk can also be stimulated. An increase in the ability to walk implies that people more easily can satisfy their *needs* on the welfare arenas walking to the activity.

Social ecological models have been dominant in much gereontological literature the last decade (Cauwenberg et al. 2011). Adding a welfare/mobility perspective clarifies the purpose of walking for transportation. This is important, as this kind of exercise easily can be integrated into daily routines. Following the three dimensions, we ask: How can elders' fulfil their *needs* on the welfare arenas by walking? What are the conditions that make it *possible* for elders to walk? What are the reasons that make elders *want* to walk?

Factors affecting walking behaviour among older adults in their neighbourhood

The majority of research on how neighbourhood environments affect walking activity among elders has focused on physical factors (Cauwenberg et al. 2011). These studies find that older adults tend to walk more if they live in neighbourhoods where the conditions for walking are good (firm surfaces, appropriate kerb levels, low speed limits etc.) (Ståhl et al. 2008; Sugiyama and Thompson 2007) and interesting target points (shops, catering establishments, routes through parks or the city centre) are within reach (Borst et al. 2008; Frank et al. 2010; King et al. 2011). Other important factors are safety from crime and upkeep of pavements (Wang & Lee 2010). Elders' preferences regarding their walking environment may depend on the target of the walk. Sugiyama and Thompson (2008) found that pleasant open spaces and lack of nuisance are associated with walking for recreation, while good access paths and facilities are important in increasing walking for a purpose.

The study of Ståhl et al. (2008) is one of few examples of user involvement, where elders themselves have provided input into what could be done to increase accessibility and safety in their outdoor environment. Prioritized measures are separate paths for pedestrians/cyclists, low speed limits, good maintenance and specific measures in pedestrian walkways; for example, wider pavements, appropriate kerb levels and firm and even surfaces (Ståhl et al. 2008). As a part of the same study, Ståhl et al. (2013) investigated how participant characteristics such as age, sex, perceived health, use of cane/crutch, rollator walker and mode of transport, influenced elders' appreciation of measures in the outdoor environment. The results show that overall appreciation was higher for women, and that certain sub-groups may benefit more from interventions in the outdoor environment (for example rollator users).

Outdoor environments affect the mobility of older adults more in winter than in summer (Row et al. 2004; Sumukadas et al. 2009), often because of inadequate winter maintenance of roads and

pavements (Hjorthol 2013). Elders perceive snow-cleared, ice-free pavements and gritted surfaces as the most important measures for them out walking in winter (Wennberg et al. 2009).

To our knowledge, the direct effects of outdoor environment facilitation on increased walking among elders have not yet been demonstrated. In a before and after study, Wennberg et al. (2010) found that elders' satisfaction with their outdoor environment is higher, and that stated difficulties with walking have decreased, since the removal of physical barriers. However, older adults' actual mobility, and how they perceive accessibility remain unchanged.

Previous studies have focused less on the relationship between the perceived social environment and older adults' walking behaviour (Cauwenberg et al. 2014). Elders perceive shopping as an important activity, especially because they can combine it with social activities (Hjorthol 2012). Booth et al. (2000) found that the two main factors associated with physical activity were opportunities to walk locally and the support of family and friends. Having a partner or friends who were physically active was significantly associated with physical activity. Jancey et al. (2008) concluded that the opportunity for elders to be physically active with their neighbours was attractive and motivating, and led to the development of social networks. This was also found by Ståhl et al. (2008), where the elders during research circle discussions recognised the importance of doing things together with others and having a natural meeting place within their district. Similarly, Stathi et al. (2012) conclude that supportive social networks influence older peoples activity level and may reduce the perceived impact of physical barriers. Cauwenberg et al. (2014) found that walking for transportation among elders positively correlates with interpersonal relationships, place attachments and formal community engagement, including frequency of contacts with and social support from neighbours.

Few studies have yet combined physical and social factors in one single study, when looking at the elderly opinion on what makes an attractive walking environment (Hughes et al. 2011). Stathi et al. (2012) and Cauwenberg et al. (2014) call for studies that examine how social and physical environmental factors interact with each other. Our study addresses this shortcoming in the existing literature by considering how such factors affect whether older adults need to, can and want to walk, and how they perceive that this affects their walking activity. This approach can contribute to a broader understanding of what measures can be taken to encourage walking among older adults. Additionally, it can provide a theoretical starting point from which authorities can plan local walking strategies.

Research design and methods

The study was carried out sequentially using a survey (1), a participatory observation (2) and a workshop (3). The survey laid the groundwork for the analysis and the prioritization of measures, because it allowed us to generalize the results to the population of elders living in the selected area. The other methods complemented the survey by offering a deeper and more concrete picture of factors that encourage and discourage walking among elders. This gave the researchers an opportunity to reflect along with users and practitioners regarding actions that could be included in a local walking strategy. These results, although not generalized, enriched the dataset with illustrations and examples, and provided new information that could be tested in further studies.

User involvement among seniors is perceived by participants as positive, empowering and confidence building (Ross et al. 2005; Ståhl et al. 2008), which is especially important when establishing a walking strategy - the overarching goal of this project. Planners and health advisors from the municipality and the Norwegian Public Roads Administration contributed in developing the study and were co-collectors of data in the participatory observation (2).

Study district

As a case, we selected the municipality of Kristiansand, because it is one of the first municipalities in Norway planning to prepare a local walking strategy targeting older citizens. It is situated in the south of Norway and is the fifth largest city in the country with approximately 80,000 inhabitants and about 15,000 in the target group (67+). We differentiated the areas in the municipality into four categories to capture differences in street systems, access to services etc.: a) City centre, b) central neighbourhoods, c) peripheral neighbourhoods and d) rural neighbourhoods.

Study design

In order to get a more complete understanding of the barriers elders meet during their walks, as well as to engage the elders in the project, qualitative and quantitative data were combined. The different methods were valuable to get a complete picture of how physical and social factors contribute to older adults' level of walking.

In light of the conceptual framework described initially, the different methods have given valuable inputs into the need, can and want dimension. The survey was important to identify issues concerning choice of transportation mode to target points (need), health conditions, as well as factors in the physical environment (can) and factors in the social environment (want). In the participatory observation, the physical and social factors were localized, photographed and described. Such concrete examples, and the fact that the elders themselves freely could describe their walking habits, deepened our understanding of the results revealed in the survey. Important aspects were how elders were able to participate in welfare arenas, and why this was important for their walking habits (need). Other factors were related to the physical environment (can), how social factors can be motivating (want), and how these dimensions interact. The workshop gave important inputs for actions that can increase walking, and valuable reflection among users, planners and researchers.

(1) Survey – mapping out the situation

The purpose of the survey was to derive information about travel activities, how older adults in Kristiansand perceive their walking environment, what motivates them, and to get their views on what could be improved. The questionnaire charted living areas, activities, travel habits, walking habits and measures in the traffic environment, altogether 25 questions on eight pages.

The questionnaire was sent out in the autumn of 2012 to 3,500 persons, aged 67 years or older, living in their own homes. A letter signed by the municipality provided information about the project. The sample was drawn from the database of TNS Gallup[1]. We oversampled the oldest group (80+) to get a good representation of those who usually have more problems walking. The data were stratified with 41 percent in the age group 67-79 years and 59 percent in the age group 80+. The response rate was higher than expected, about 52 per cent (1,761) of the elders responded after a reminder.

Due to the oversampling, the data were weighed according to the official statistics of the municipality of Kristiansand for relevant age groups and gender. For more details about the questionnaire and the sampling, see Hjorthol et al. (2013).

Table 1 in about here

Table 1 shows the distribution of the sample by gender, age, place of residence and use of remedies for walking. Women are in majority, which is typical for older age groups. The average age of the sample is 76.1 years. We categorized the elders into five age groups. The first group represents the newly retired (<70 years). From the age of 70 to 85, the differentiation follows a four-year interval. The remaining elders (>85) represent the last group. This classification provides good information about the age distribution. The four categories of living area gave a rough indication of accessibility to services (shops, medical services) and social meeting points. Accessibility generally decreases with increasing distance from the city centre. A large majority of the group walked without aids, Table 1. The most frequent aids reported were walking sticks (14 per cent) and rollator walkers (7 per cent).

The data-analytic procedure is mostly descriptive using group comparisons based on chi-square tests. All the differences commented in the text are significant on at least a 95 per cent level when logistic regression is used.

[1] Norwegian supplier of interview-based data collection

(2) Participatory observation and interview to gain deeper insights

The participatory observation was carried out in February and March 2013 and included 44 people above 67 years recruited among those responding positively in the survey to further project involvement (about 500 persons[2]). Three lists were put up with randomly selected names, including the same distribution of age, gender and living area as in the survey. The lists were distributed among the municipality, the Norwegian Public Roads Administration and the researchers, so that the interviewers could make direct appointments with the elders. Not all of the elders we made contact with were able to participate after all. This is why there are some differences compared to the distribution of respondents in the survey, see Table 2. Older elders, men, and citizens in central parts of the city were slightly higher represented than other groups. The majority were aged 76-84 years. Although the results from the participatory observation are not generalizable, it was important to represent elders from all groups.

Table 2 in about here

The guidelines for the participatory observation were developed primarily based on the survey results, but also on the experiences and information from local planners. The main purpose was to conduct explanatory analyses as well as to examine *in detail* the local factors that motivate seniors to go out walking, e.g. what they perceive as barriers to walking and what qualities of the physical environment contribute to their experience of the surroundings as more or less navigable, pleasant or safe. Most of the participants had no physical problems while walking; several walked a lot and knew their city. Seven used walking sticks or rollators and one a wheelchair.

In the participatory observation, elders were directly involved in defining the framework for data collection, i.e. choosing the walking routes for observation. The only criterion was that the route selected had to be one that was used daily or at least frequently by the informants, preferably starting near their homes. During the 30-45 minutes' walk, the elders decided what data to collect by pointing out streets they enjoyed walking in or barriers they met along the route. The researchers/planners accompanied them, took notes and pictures of challenging or encouraging issues, and plotted the walked path on a map. During an open interview lasting about an hour after the walk, the interviewer asked questions about the informants' walking habits, their motivation, barriers they came up against and what social activities they attend. The results from these semi-structured interviews were written out as thematic "stories" and used to illustrate and detail the results from the survey. The raw material including pictures and maps from the participatory observation was submitted to the municipality and the Norwegian Public Roads Administration for internal use and follow-up shortly after the study terminated.

(3) Workshop – discussion and future measures

During the participatory observation, the respondents were invited to take part in a workshop. The goal was to discuss the results from the two first parts of the study and suggest measures to make walking in Kristiansand more attractive and feasible. This type of workshop is partly inspired by the future workshop methodology, here in a simplified version (Drewes Nielsen et al. 2004).

The research team purposefully selected the individuals attending the workshop based on their affiliation and interest in the project. Twenty-nine attended, including three researchers from planning and social science; seventeen elders from the participatory observations; one representative from the council of elders; four from the municipal park and health authorities; one from the county and three from the Norwegian Public Roads Administration. A researcher from the project group headed the workshop, which started with presentations of the preliminary results from the survey and the participatory observation. In the workshop, the researchers used these results as the basis for discussions among scientists, planners and older adults. Participants shared their reflections on the results and suggested possible measures. This allowed for reflection among the participants contributing another set of experiences and knowledge to the interpretation (Reed et al. 2004).

[2] This response was greater than expected, and we did not manage to involve all. The municipality sent a letter explaining that we were able to involve only a few, and thanking them for their interest.

For the discussion, we divided the workshop participants from different backgrounds into five groups. The planners and scientists who had been involved in the survey or in the participatory observation led each group. The groups discussed some of the main questions relating to the preliminary findings: Which are the most important issues regarding motivation and qualities of the physical environment? Which measures should the municipality implement?

Results

The conceptual framework in which we have carried out this study includes the three dimensions related to walking - the *need*, *can* and *want* dimension. These are differentiated below, while the insights the different methods have given are highlighted.

Walking to satisfy needs in welfare arenas – the need dimension

The need-dimension implies that elders walk to satisfy their *needs* in welfare arenas, i.e. to carry out shopping or leisure activities.

Among elders in Kristiansand, the survey showed that the need to walk for transportation is greater among older population groups (85-92), as only 39 per cent have a car and 38 percent have a driving license. About 30 percent of the respondents walk in their neighbourhood every day, ranging from 45 percent in the city centre to 24 percent in the rural areas. To control for the effect of age and gender, we did a logistic regression, Table 3. The results indicate that irrespective of age and gender, older adults in the city centre are the most frequent walkers. Men walk more frequent than women do, also when controlled for age and living area.

Table 3 in about here

In Kristiansand, more than one third visit the shop daily. In the city centre, the share is 50 per cent, in the rural areas 24 percent. Elders who live in the city centre are significantly more likely to walk when shopping for groceries compared to elders living in other areas, 58 percent in the city centre and only 18 percent in rural areas. The survey also showed that elders in the city centre are more likely to walk when taking part in organised activities (58 percent in the city centre and 18 percent in rural areas), which about 30 percent of the elders do at least once a week. This is also true for other activities like medical visits (39 percent in the city centre, and only 2 percent in rural areas).

The participatory observation confirmed the findings in the survey; many elders do perceive the grocery store as an important target point. However, the interviews showed that in addition to satisfying the basic need for groceries (having), the need for social relationships is also stimulated (loving): One informant highlights the fact that she always meets acquaintances at the grocer: '*It is nice that the staff has put up tables and chairs where I can sit and chat to friends*'. Others explain that they make up errands to motivate themselves to get out walking, or portion out errands beyond week to have to go out every day. Shopping for groceries can also be added into existing walking habits, as one informant said '*I use to finish my two daily walks by stopping at the grocer. In the morning to buy food and in the afternoon to get the newspaper*'. As determined by the survey, taking part in organised activities is important among elders. The participatory observation showed how such activities are important for self-esteem (being) and social life (loving), especially for those who have lost some of their network and become passive or lonely. One explains that: '*The activities offered by the municipality gave me my life back when I lost my husband some years previously*'.

The workshop allowed for shared reflection around the results. Aiming to increase walking among elders, a proposal came up to establish an activity calendar with information about existing events and arrangements, preferably giving the degree of difficulty. In addition, some suggested that the municipality should establish a system to register ideas from the citizens that could contribute to raising awareness and improve existing activities.

Walking in the physical environment – the can dimension

The ability to walk is fundamental for increasing walking among elders. Both poor access to the physical environment and poor health may prevent elders from walking.

The survey showed that problems related to walking increase with age. About 16 per cent of the newly retired (67-69 years old) reported that they had difficulties walking, while this was true for 62 per cent of the oldest elders above 85 years. In the survey, we asked the respondents which measures are very important for increasing their walking activity. In Figure 1, the ten most important measures are presented.

Figure 1 in about here

There are few differences between residential districts when it comes to rating measures. The respondents mentioned winter maintenance as the most important measure, including frequent sanding of pavements and better snow clearance. There are only small differences between age groups for winter maintenance, along with separated lanes for pedestrians and cyclists, wider pavements and reduction in car traffic. Age differences are significant for benches, recessed curbs and longer green intervals: People in higher age groups assess these measures as more important than younger groups do, see Table 4.

Table 4 in about here

The participatory observation gave deeper insights into poor winter maintenance issues. Wintertime is especially challenging for elders, due to the combination of physical barriers and difficulties in moving. Several of the informants felt insecure in slippery conditions and at risk of falling. As there are few people in the streets in winter, elders are afraid of falling and injuring themselves with no one around to help. Elders who use aids have particular challenges. One rollator user explained that the path from the senior citizens' housing to the pavement was often poorly cleared. In addition, lumps of ice made the pavement bumpy and uneven, so that using a rollator walker was more difficult. Some elders adapt by not going out at all: '*On the worst days I prefer to go up and down the stairs in my block rather than go outside*'. Individual preferences is another barrier for walking in winter, because many perceive it as less pleasant. One informant found it tiresome because she had to keep looking at the ground to see where to put her feet. In addition, bad weather also curtails outdoor walking in winter for many elders: '*I enjoy being outdoors in summer, however in winter I feel like a prisoner in my own home, because it is cold and dark outside*'.

Separated lanes for pedestrians and cyclists as well as benches were other highly rated measures in the survey. There are only small differences across age groups concerning separated lanes, while older elders assess benches as more important. In the participatory observation, many elders pointed out areas where they would want separated lanes. Many older pedestrians feel unsafe when fast-going cyclists are passing too closely. Benches are a measure that can be helpful for elders with reduced motor skills and balance. During the participatory observation, many suggested places where they would want a bench situated, usually close to steep gradients and especially in areas outside the city centre. One explains that: '*My back and legs are declining and I walk as much as I can. In the summer I like to sit on a bench nearby the retirement home where I live, I wish they could put out more benches nearby*'.

In the workshop, limited accessibility during winter in particular came up as an issue. The participants argued that there is a need for comprehensive planning of walking routes especially in winter to remove 'missing links'. Such 'missing links' can be about paths without snow clearing or snow banks that are difficult to cross in walking routes. The participants suggested taking a holistic perspective on maintaining walking routes during winter, preferably with retirement homes as starting points. The elders expressed the importance of accessibility and that opportunities to rest along the way are predictable.

Walking behaviour and social factors – the want dimension

The want to walk is influenced by individual characteristics as well as the opportunities for interpersonal relationships, place attachment and formal community engagement.

The survey revealed what elders perceive as the most important motivating factors for walking (Table 5). They rated the health dimension as the most important (61 percent), while getting outdoors (52 percent), getting good exercise (50 percent) and well-being (46 percent) were other highly rated measures. Men have significant lower scores on all the main reasons for walking compared to

women. Women are more concerned with the health dimension of walking and walk more than men when fulfilling errands or meeting with others. This is true also for respondents in central areas. The age dimension is also important. The oldest elders rate the practical dimension of walking higher than younger; while it is the other way round when it comes to the health dimension, see Table 5.

Table 5 in about here

The informants in the participatory observation also stressed health as an important motivation. One informant explained that the health aspect had become more important as he got older: '*If you just keep sitting in a chair, you will probably not live long*'. The joy of getting outdoors and a breath of fresh air is motivating. Areas with trees and flowers are particularly attractive, and urban outdoor spaces are popular areas in which to walk. In good health, the inner motivation of older adults is probably what keeps them walking, and this may be linked to mental health, well-being and coping.

The (unplanned) social aspect of walking became clearer in the participatory observation than in the survey, and provided additional information about this motivating factor. The interviews showed that the motivation to go out is stronger when there is a target. Target points can be about shopping and leisure activities, however it can also be places where the surroundings change, such as construction sites or graffiti that changes regularly. Other target points are benches, which are appreciated as places to pass the time of day, and watch people or the view. One of the informants often sits on a bench outside a school, where the children come and talk to her. Several highlight meeting people as the most enjoyable aspect of walking. One describes the walk as "boring" when he has not met anyone; another explains he often chooses routes where he might meet someone. The social aspect can also be about watching people in the street. Having friends and/or a spouse is an important driving force for some elders. One explains that: '*My friend across the street drag me out, even if I think today I cannot bear to walk*'.

During the workshop, the participants emphasized that elders comprise a heterogeneous group, especially in relation to health. This implies that activities need to be arranged with different intensity levels to suit everyone. One proposal was regular "low threshold" local walks in the neighbourhood, especially on weekdays. Some elders lack a walking companion and missed information about ongoing activities, to get in touch with others in a similar situation.

Discussion

The aim of this study was to come to a better understanding of the conditions that motivate elders to walk more. The purpose of the whole project was to provide a basis for a walking strategy targeting older citizens, to make it more attractive for them to walk in Kristiansand. This is one of few studies where the elders themselves are involved in the project. The methods were primarily inspired by Ståhl et al. (2008) and partly by the action research perspective of Drewes Nielsen et al. (2004). By adding a welfare/mobility perspective to the social ecological models, we look at three dimensions of walking – the need, the can and the want.

Benefits and limitations of the three-step mixed method approach

While the quantitative data allowed for statistical generalizations of the findings, the participatory observations and interviews gave opportunities for more explanatory analyses. The data allowed for analytical generalization (Yin 2003), concerning how and why individual, physical and social factors affect the need, can and want dimensions of walking. It also offered a deeper understanding of how the various dimensions affect and reinforce each other. The workshop contributed with individuals' holistic reflections on how their walking activity would be affected by specific measures, as well as new ideas for implementation (see Reed et al. 2004).

Involving elders and practitioners has several benefits when providing a knowledge base for a walking strategy. Developing the study in cooperation with the municipality was advantageous because the practitioners contributed with their own insights and priorities, which implied looking at walking from a broad perspective. Involvement of the elders throughout the project has generated interest and commitment among the participants as well as among the public actors. Increased commitment is a finding also reported in other studies of user involvement (Ross et al. 2005; Ståhl

et al. 2008). The participatory observation allowed for first-hand experience with users walking with aids or struggling with constraints, and provided a better understanding of how the environment can be facilitated for them, as highlighted in Ståhl et al. (2008). Planners could observe users in a holistic perspective, which differed from traditional inspections, gained by deliberately walking a complete route chosen by the elders themselves.

Although the mixed method approach has several strengths, it also has some limitations. Even though the survey sample is representative for seniors living in their own homes in Kristiansand, the least mobile groups living in institutions are not represented. As the society works towards facilitating so that seniors live at home as long as possible, it was important to focus on groups that are mobile in their local environment. It is important to recognize that the elders taking part in the participatory observation and the workshop probably have a special interest in both the city and the possibility for making changes, which may have biased the results. Although this type of recruitment cannot represent older adults in general, the engagement of both the elders and authorities was important to discover barriers and challenges in the local environment. Another potential bias is the fact that the elders themselves chose the walking routes for observation. Again, the aim was not to obtain a representative sample of walking routes, but to get elders' views and experiences on walking routes they used frequently.

Including authorities in the workshop can be disadvantageous if the goal is to isolate the elders' opinions of measures in their environment. It was however beneficial in raising the issues to a more general level. Another risk is that they dominate the discussion with their disciplines and expert knowledge. We did not experience this as a problem during the workshop discussions.

Last, the mixed-method approach does not provide answers in order to let us know whether the proposed measures will actually increase walking among elders. Before and after studies could be a goal for future research looking at how physical and social measures actually affect the walking activity of older adults. We believe the combination of methods has been fruitful for the purpose of this project, to develop a walking strategy. A meta-analysis of studies on the relations physical environment and activities in older adults concludes with a recommendation of multidisciplinary mixed-methods (Moran et al. 2014).

How measures relate to the three dimensions of walking

Walking is influenced by a complex relationship between physical and social environmental and individual characteristics, in this study conceptualized in three dimensions: need, can and want. Below we show how these dimensions interact and reinforce each other, when discussing concrete measures that can be included in a walking strategy aiming to make elders walk more.

The presence of reachable target points, such as grocery stores and various leisure activities are perceived as important measures for elders to satisfy their *needs* on the welfare arena (also found in Borst et al. (2008); Frank et al. (2010); King et al. (2011) and Wang and Lee (2010)). The presence of reachable target points and activities can also stimulate the *want* dimension of walking, because it motivates elders to go out and meet acquaintances or even a nice client manager. In our survey, we see that many elders in central areas do their grocery shopping on foot. Furthermore, leisure activities and target points can contribute to establishing social networks, so that elders find others that they can walk with. This increases the *want* to walk, and may stimulate the *can* dimension for elders who feel unsafe or uncomfortable walking alone, especially in wintertime (as found in the participatory observation). This shows the importance of maintaining grocery stores and offering activities in walking distance from where elders live (highlighted in Brownson et al. (2005)).

Elders perceived good winter maintenance as the most important measure to increase their walking activity, documented also in other studies (Sumukadas et al. 2009; Wennberg et al. 2009; Hjorthol 2013). Winter maintenance is mainly related to the *can* dimension of walking, because poor winter maintenance represents a barrier to go out walking for many elders. This is especially true for elders that have physical mobility challenges, or feel less safe on slippery surfaces. However, the perception of winter as dark, cold and unpleasant with few people in the streets and less opportunities for socializing, reduce elders' *want* to go out walking. The study also shows that some people choose not to go out if winter maintenance is not good enough, even if they *need* to, meaning that they

supress their needs to shop or socialize, reducing their level of welfare. Hence, improved winter maintenance affect both the *can* and *want* dimensions of walking, which help elders to fulfil their *needs*. However, at this time of year, even stronger motivating factors such as participation in leisure activities and other social networks can be of great importance for elders to walk more.

Separated lanes for pedestrians and cyclists is a highly prioritized measure that can make it safer for elders when walking. In the participatory observation, elders pointed out areas where they would want separated lanes (also found in several other studies, summarized in Levin et al. 2012). Separated lanes can both increase the *ability* to walk by doing it safer for elders, which contributes to the *desire* to walk.

Another highly rated measure especially among the oldest groups is the presence of benches. Benches are related to the *can* dimension of walking because they are important resting places, especially for older elders. In the survey, we found a clearly significant correlation between more benches and increasing age (cf Table 4). Benches also affect the *want* dimension, because benches are places to watch people and take in the physical environment. We also saw that benches were places to meet people, and hence contributed to fulfilling the *need* to socialize. Hence, benches stimulate all three dimensions, and can contribute to especially older elders walking more.

Both in the participatory observation and especially in the workshop, information about local activities for elders were highlighted. Information about public activities can be an important measure to increase walking among elders (also found in Jancey et al. (2008)) because it may reduce barriers related to the lack of a walking companion (Stathi et al. 2012). Some elders highlight that exercise is about mental health, which can be related to well-being and elders' welfare, hence stimulating the *need* dimension. Information channels and activity calendars can be important for elders to know what is going on in their neighbourhood; this can stimulate the *want* to be active. Information about activities with different intensity levels, stimulates the *can* dimension by making it possible for various groups of elders to participate.

Conclusion

The purpose of local walking strategies is to influence towards a walking culture and framework conditions for pedestrians. A broad perspective on walking is required, and three reasons why people do it are: because they *need* to, because they *can* and because they *want* to. This paper has shown how a mixed-method design in three steps involving the elders themselves can provide a knowledge base for a local walking strategy. The study has also shown the importance of differentiating between age groups. Some measures appreciated vary by age, such as more benches, recessed curbs and longer green light intervals. Few studies so far have combined physical, social and individual factors within one single study. The results show that the need, can and want dimensions of walking interact, and will to a different extent reinforce each other as reasons why older adults walk. This can be important for planners to take into account when developing good walking areas in the city.

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