

Footsteps in the snow

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Abstract

In the project 'Footsteps In The Snow' the former Dutch Project agency for Integral Traffic and Transport Studies (IVVS) aimed to find starting-points for making the urban environment more attractive for walking. One of the biggest problems proved to be a lack of knowledge on why, when, where and how people walk. The aim of the project was to provide such fundamental knowledge. It is to be expected that thus found insights lead to an adequately filled toolbox for town planners, architects, traffic engineers, policy makers and politicians for liveable cities, focussing on walking safely and comfortably.

Based on a literature study a conceptual model on the most influential push and pull factors regarding walking was developed. The influence of the various elements of the conceptual model was studied in four carefully selected neighbourhoods throughout the Netherlands. In these neighbourhoods residents were interviewed, an urban design survey was conducted and street interviews with pedestrians were held.

Several pro- and contra indicators for walking were identified. This knowledge was used for a so called Walking Predictor. There are some indicators concerning the individual's side and some with respect to the physical environment.

Relevant indicators on the individual's side are:

- Destination: within district
- Travel motive: non work related
- Feelings regarding pedestrian safety: no perceived danger
- Perception of efficiency of walking: efficient and reliable mode
- Perceived suitability of other modes for trips within the district: not suitable
- Availability of alternative modes of transport: not available

Relevant indicators concerning the physical environment are:

- Suitability, orientation options and safety
- Availability and spreading of attraction points within the district
- Attractiveness of the environment
- Comfort.

The study also revealed some controversies and eye-openers for policy makers regarding walking and environmental awareness, competition with other modalities, work-related trips, pedestrian friendliness of the physical environment and time budgets.

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Introduction

Imagine you want to enrich a square with a monument. The work of art deserves a central place, but it could also be an obstacle for pedestrians using the square. So you wait till it snows and observe. The prints that people leave in the fresh snow will visualise their use of the square. You look for a site, where one has a perfect view on the monument from the spots where people actually walked.

Footsteps in the snow show how pedestrians walk. One can recognise the patterns of concentrated flows and see criss cross relations as well. One can also observe that people do not always follow the official paths. The footsteps can be seen as a users' suggestion for the making of paths and routes. This confrontation of users with their environment is the central theme of the study Footsteps In The Snow.

Living in cities nowadays receives full attention. In policy making there also seems to be a revaluation of townscapes and living environments. The improvement of liveability of neighbourhoods is high on the political agendas. For the former Dutch project agency, Integral Traffic and Transportation Studies, this was a reason to imply that revaluation of townscapes is also a revaluation of walking. If there is one travelling mode that supports liveability, walking will be it. Walking is the root of our transportation system. Almost every trip begins and end with walking. Approximately one quarter of travel time is taken up by walking. The vast majority of this walking time is spent within cities and towns, within residential and central districts. Images of the built environment are formed mainly from the pedestrian point of view.

The study Footsteps In The Snow was performed by a group of consultants (RIGO Research and OD205 Town and Landscape planners) assisted by a Reference group of experts on pedestrian affairs. The report was published November 2000.

Central question

In the study it is assumed that the actual modal split indicates how agreeable a district or neighbourhood is for walking. The more people in a neighbourhood walk and the less they choose cycling, car driving or public transport, the more agreeable the neighbourhood is for walking. Thus the central question in the study is:

How can we see to it that it becomes attractive for various groups to walk more?

To answer this question one has to know where, when and why people walk. One also has to get insight in common design practise and which bottle-necks arise from this. Furthermore one has to get insight in possible solutions.

Limitations of the study

The study group estimated that a pedestrian friendly design leads to greater involvement of the inhabitants with their district. In these districts more public supervision and less vandalism can be expected. More pedestrians make a district secure, walking will make its inhabitants healthy, the environment more friendly and the road more safe. The study however, is not primarily aimed at proving these assumptions. It is aimed at the daily choices whether to walk or not within the district where one lives. Non-daily choices like moving out of the neighbourhood or getting rid of one's car, which influence one's situation, are important, but do not fall within the scope of this study.

The study is aimed at getting insight in the relations between the demand (travel needs) and supply (modalities) within residential districts (the design practise). The sought after insight concerns more or less conscious consideration of pro's and contra's, alternatives and actual made trips. For this, spatial characteristics of the residential environment and personal characteristics of potential pedestrians are studied. Travel needs and the availability of travel modes do not stand alone (see Figure 1). They depend on the activity patterns of the traveller and the design of the district. In a separate paragraph the relations will be identified and a more elaborated model will be presented. Reciprocal relations between personal and spatial characteristics will not be considered here. These higher order relations are not part of the day to day activities, but connected to processes like family forming, choice of working or residential locations.

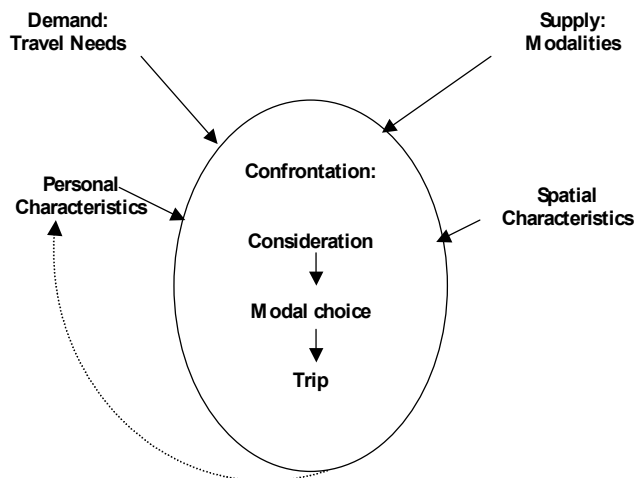


Figure 1 Confrontation of Demand and Supply regarding trips within a district

In this case the research questions are focussed on the relation between walking and the urban transport system. The study is therefore limited to the urban environment where walking is a convenient alternative. The study is directed at 'normal' districts and not at districts that have an unusual high amount of pedestrians where unique circumstances exist and most pedestrians come from outside the district.

Research design

The study group identified two research questions:

1. how do people (especially pedestrians) behave within their own residential district and what do they need in their environment?
2. how does the geography, design and organisation of the transport system influence the needs and expectations of (potential) pedestrians?

To answer these question the first thing to do was a literature study. This study was focussed on the (psychological) needs that can be satisfied by walking, the importance of walking, the characteristics of walking, modal choice and the effects of personal, spatial and technical characteristics on modal choice. Attention was also directed at security, road safety and environmental impact. This research resulted in a conceptual model (see next paragraph). The conceptual model was used as an organiser for survey research: telephone interviews, inspection of the chosen districts and street interviews.

For the survey, four districts in the Netherlands were selected. The districts had to be sufficiently different and at the same time comparable enough to draw general conclusions on the influence of the various circumstances within the districts. Other preconditions were that pedestrian movement, various types of spaces and scale aspects (territory, route, situation and design) could be studied. As stated before, the study is aimed at results that can be used for promoting walking in 'normal' residential districts. Big, busy town centres with a lot of pedestrians, like the city centre of Amsterdam,

do not fit the requirements. On the other hand, to get a fair insight in the effect of spatial characteristics, the districts should not be too common. The following districts have been selected:

- Amsterdam – Rivierenbuurt (pre-war, mixed traffic, shops, parks, RAI exhibition hall, train, tram/bus/light rail)
- Gouda – city centre (historical character, mixed traffic, typical inner city functions like shops, pubs, cultural facilities, train/bus)
- Emmen – Emmerhout (post-war, separated traffic, neighbourhood shopping centre, bus and special needs transport for the elderly)
- Rotterdam – Prinsenland (recently built, in principle no separated traffic, cycle lanes and bus lanes, neighbourhood shopping centre, bus and metro)

Telephone interviews were held in these four districts. The interviews included questions about the motives and destinations of the respondent's last walking trip within the district, perception regarding pedestrian friendliness of the district, infra structure, transportation facilities and road safety. The interviewees were also asked questions about their personal situation and their household. The interviews were taken at different periods of the day and week. The target amount of interviews was at least 1.200, that is 300 per district. The final return was better than aimed: 1.444, of which 352 from Emmen, 392 from Amsterdam, 333 from Rotterdam and 367 from Gouda. In all cases the response was a satisfying two thirds of the approached and reachable households, which was sufficient for valid and representative conclusions.

A district inspection and street interviews were organised, supplementary to the telephone interview. The inspections included professional assessment of geography and facilities regarding suitability, attractiveness, comfort, security, road safety and orientation. The inspections were executed according to fixed format: an in the gross exploration, a characterisation of the pedestrian routes and public domains and a step by step imaging, followed by a scoring of the various aspects. The street interviews were held as a check on the telephone interviews and the inspection by professionals. In all districts some 25 street interviews were taken. The interviews also gave some additional information on origins and destinations, familiarity of the route and perceptions of the pedestrians.

Conceptual Model

People do not opt for walking because of ideological arguments like promoting liveability, environmental issues, limiting the space taken up by the motor car and so on. People walk because at that moment and in that situation it seems to be the practical, sensible, logical and convenient thing to do. From literature, factors that influence the choice have been deduced and incorporated in a conceptual model (see Figure 2).

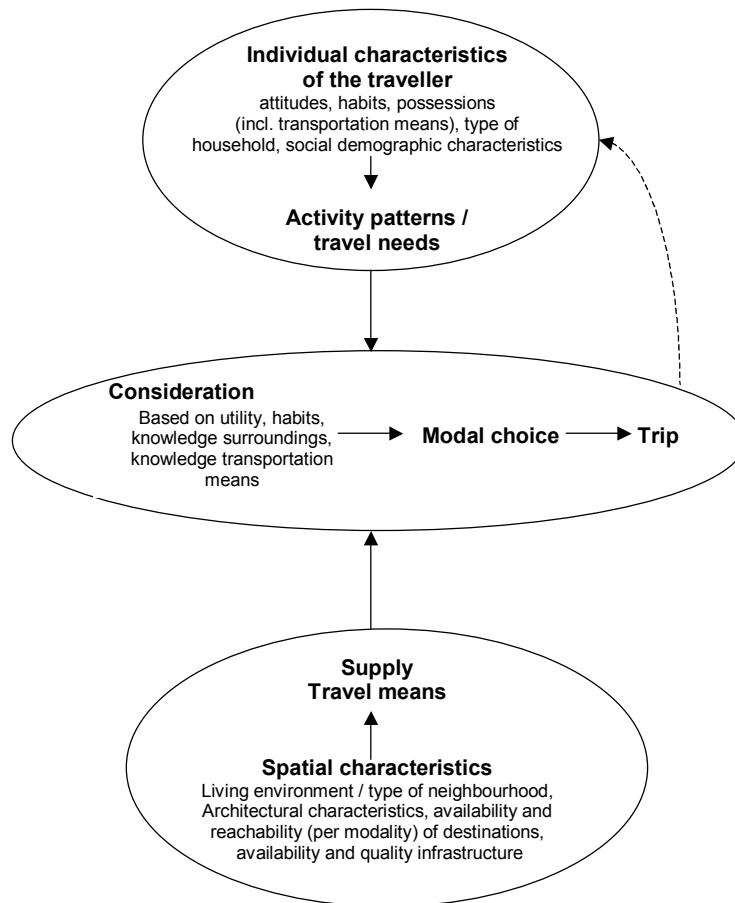


Figure 2 Conceptual Model on pedestrian's considerations

Individual characteristics

Based on the literature study the following characteristics of the individual are assumed to have influence on the modal choice and travel behaviour:

- Physical condition and freedom of movement: depending on age, health, handicaps etc.
- Mental condition: feelings of safety and security, 'having a good day' etc.
- Social economic status: income, education, social position, retired, employed
- Ownership of means of transportation
- Household: type, size, role in the household
- Attitudes and habits regarding to travelling, travel needs and situations.

Travel needs

Most trips stem from a need to realise some goal that the individual could not realise at home or any other place he might be. Material reasons for travelling are for instance working, getting an education, shopping, visiting friends, going out or recreation. Given the circumstances, people have different modal options, including chain trips, where one uses more than one mode.

Some trips indeed are a goal in itself. The question 'do I go on foot, by car or by train?' is hereby irrelevant. In these cases the modal choice is fixed to the motive, i.e. going for a walk. Even here some combinations are thinkable: going for a walk and do some shopping at the same time.

A third possibility is that walking is a necessity, whereby one does not have other options. Examples of this are: learning to walk, revalidation, walking up and down during a presentation, the commitment of a marathon runner.

The study 'Footsteps in the snow' is limited to the first and the second types of travel needs.

Spatial characteristics

In several studies the influence of environmental characteristics are highlighted. Most authors state that specific designs or the provision of certain facilities can be used to advance walking. On the size and the degree of the effects, however, opinions differ.

Some effects of environmental characteristics are convincingly documented, as the relation between building density and mobility for instance. In this study the differences between the four districts are too small to be able to substantiate the influence.

An other relevant characteristic is the dispersal of attraction points like shops, medical facilities, children's play grounds, parks and so on. On this issue the four districts actually differ. The same goes for building period and qualities of the infrastructure and transportation system. Other relevant variables seem to be the suitability of the structure (streets lay out), comfort, attractiveness, safety measures and orientation possibilities (sight lines, landmarks, road signs).

Consideration process

The actual modal choice differs from person to person. Per motive different individuals make different choices. Spatial factors like scale (around the home, within the neighbourhood, inter local), and attainableness have an unmistakable influence. However, most people rarely deal with these considerations on a conscious level. Generally it is assumed that people choose rationally and that benefit maximalisation is the principal mechanism. How this happens is not entirely clear. When dealing with day to day choices, habits will dominate. The best predictor of future behaviour seem to be present behaviour. The differences between rational considerations and habits will not be great. Cultural aspects can also be relevant. From the ADONIS it is known that in Spain a well thinking individual does not ride a bicycle for material travel needs. That is 'not done'. Riding a bike for sports and recreation however is OK. On the other hand in the Netherlands it is unthinkable to use a taxi for shopping purposes.

The Walking Predictor

One of the most tangible results of the project is the so-called Walking Predictor. The Walking Predictor is based on the extensive results of the questionnaire surveys. Only the significant discriminative variables were included. In the Walking Predictor two kinds of indicators were identified: personal identity factors and environmental factors. With respect to the interviewees in the four chosen districts the predictor proved to be fairly effective. The decision not to walk was predicted in 87% of the cases. Walking could be predicted in 77% of the cases.

The most important personal identity factors appeared to be:

- destination: when a destination is situated within the boundaries of the district people are more inclined to walk
- travel motive: non-work related trips are more prone to be walked than work related trips
- attitudes on pedestrian safety: a strong feeling of danger and vulnerability makes walking less probable. That is especially the case with women, the elderly and everyone that has a bigger chance of getting hit by traffic
- attitudes on efficiency of walking: people that perceive walking to be an effective and reliable travelling mode walk more than those who don't
- perceived suitability for trips within the district of other modes: the more one perceives walking unsuitable, the less a chance one may actually walk. Main factors are the quality of the bicycle- and car infrastructure. Bicycle infrastructure has the biggest effect.
- availability of alternative modes of transport: if alternatives for walking are available, they tend to be used.

The study also showed that there are also some distinctive environmental factors that influence the residents' behaviour:

- Suitability, orientation and safety: a suitable geography is an important condition for walking. Routes should be predictable and dependable. One does not want to be surprised and one does not like the feeling that one is forced to make a detour. Orientation and safety seem to be connected factors. If a person can orientate himself, he feels safe.
- Availability of attraction points: the availability of shops, services and other attraction points and the distance to these destinations influence the amount of walking within a district. If there are no attraction points or when these are located at a rather great distance, walking in the district will be

limited to a walk around the block. Destination and suitability strengthen each other; but even without attractions in a suitable geography people walk more.

- Attractiveness of the environment: the decision whether to walk or not is not highly influenced by the attractiveness of the environment. Up to a point an extremely attractive environment can compensate for a lack of suitability, but when suitability lacks altogether there is not much walking done.
- Comfort: even when walking is perceived as an efficient travelling mode, due to a convenient geography, the foresight of lack of comfort can shift the balance to other modes. This argument seems to be rather group related (i.e. the elderly, the handicapped).

The modal choice for trips within a district depends mostly on perceived qualities of orientation and suitability and the available attraction points. Walking is promoted by the availability of dispersed attraction points and a logical structure of the walking routes. For trips without a special motive the decision on walking is influenced by the expected level of comfort and the attractiveness of the district. In a district which hardly has any attraction points, apart from safety and suitability, a comfortable and attractive design is of extra importance. The weather is not an important factor. Bad weather does not influence the modal choice negatively. Fine weather, however, can in some cases be a reason to walk instead of cycling or car use. In short: people walk when they perceive this as fast and convenient, or when they have no real alternative. They find walking relaxing.

Controversies and eye-openers

Environmental awareness

One expects an environmentally aware individual likely to choose environmentally friendly travel modes. This proved to be false. There are several reasons for this. Most environmentally aware individuals belong to specific groups, especially high income groups. In these groups the level of car ownership is above average, they have fewer trips within the district and a larger share of their trips are work related. All the more reasons for taking the car and not to walk.

It became very clear that the choice for walking in most cases is a matter of convenience. The awareness that walking is good for the environment does more bad than good. Promoting environmental awareness does not seem to support the aim of enticing the various groups to walk more.

Competition between travel modes

Within the district people choose individual modes of travel. Collective modes are not taken into account. In the choice between these modes environmental reasons are not an issue. Health is not an issue either. However, comfort, safety, status and speed do matter. This offers starting points for promoting walking. What's needed is a shift in balance to a feeling of priority in attention and, with that reliability, in favour of the pedestrian. For instance: priority for pedestrians at traffic lights, exclusive pedestrian domains, and rewarding claims for more space. So no bicyclists, skaters or parked cars on pedestrians domain. Safety and comfort for the pedestrian can also be optimised.

Work related trips

Work related trips are seldom made on foot, even within a district, even if one can and even if one walks a lot. There are many arguments for this, some of which are practical (i.e. the car is needed for business trips or travel chains that in sum are too long to walk). There are also arguments relating to the geography and facilities provided. The amount of combination trips for bringing children to and from school can be lowered when those trips can be made more safe and reliable or even shorter (i.e. more schools in a district) so that children can go by themselves. For employees the surroundings of work locations can also be improved since pedestrian facilities near most office locations are rather poor. It is imaginable that improving the status of walking leads to more walking to work. Such cultural changes will take a long time.

Pedestrian friendliness

Whether or not the inhabitants perceive their district pedestrian as friendly, does not influence their decisions on walking. A district is marked as pedestrian friendly when it has an attractive and effective design: much space, green and tranquillity combined with clear footpaths and without disturbance of other modalities. In the minds of residents the availability of attraction points does not seem to be an issue. So, pedestrian friendliness is mainly a theoretical question. It does not influence the amount of

walking. A pedestrian friendly design makes up for an attractive residential area, but it does not stimulate walking.

Time budget

People attach time budgets to various trips within a district: it may take so and so long to get there. Every mode that fits within these margins is a viable alternative. People accept that shopping trips take a quarter of an hour, walking the dog may take 10 minutes and getting to a busstop or train station may take 5 minutes. In many of these cases walking is a fitting alternative. It does not matter that other modes are a bit faster. Comfort and reliability put in the most weight. Sometimes walking is reliable, safe and comfortable or relaxed while other modes have difficulties in fitting the expectations. For shopping sometimes people rather walk for 10 minutes than ride a bike for three minutes and struggle with their locks or drive by car for one minute and have a troubling five minutes finding a parking space.

What's important is that decisions are taken based on the perceived cumulated time effects of certain activities. Waiting for a pedestrian traffic light is perceived to take as much as 5 minutes. When there are two traffic lights within a route, walking tends to be no longer a reasonable alternative. Giving priority to the pedestrian and taking out time consuming obstacles may prove to be very effective. Of course, changing the priority must be supplemented by effective communication. Without knowledge of the changes, the effects on the individual's behaviour will be null.

Towards a Toolkit

One of the aims of the study was offer policy makers and designers a kind of toolkit for improving attractiveness of the walking option. In the appendices of the report a first impulse is given, but not much more than that. simply because there was no time to work further on this. For the Netherlands there are some useful guides, such as the 'Wegwijzer voetgangersvoorzieningen (pedestrian facilities guide)', CROW guide on urban infrastructure facilities and specific guides for pedestrian crossings and facilities for the handicapped.

Evaluation

The 'Footsteps in the snow' study is one of the few studies in which walking and pedestrian facilities are highlighted. The study substantiated the basic values for walking that the Dutch and British Pedestrians Association propagate: the 5 C's (Convenient, connected, comfortable, convivial, conspicuous). On the other hand, the impact of the study was at best indirect. The results of the study also had some effect on a recent national project on guidelines for road safety and town planning (still forthcoming). Qua content the study was all right. One has to realise however that the prime condition for impact is that planners and designers, and more importantly their employers (politicians!) must feel the need to incorporate pedestrian interests in their work. For the future this must be the challenge!

Literature

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