

# Accessibility to the public environment as perceived by teenagers with functional limitations in a south Swedish town centre

AGNETA FÄNGE\* , SUSANNE IWARSSON and ÅSA PERSSON

Department of Clinical Neuroscience, Division of Occupational Therapy, Lund University, Sweden

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## Abstract

**Purpose:** Owing to physical inaccessibility persons with mobility restrictions and other functional limitations often face problems in public environments, leading to restrictions in activity and participation. To investigate general accessibility and perceived problems of accessibility to the public environment in a town centre, as well as visiting preferences to public facilities, among teenagers with functional limitations.

**Methods:** An interview questionnaire specific to a south Swedish town was constructed and used with 33 Swedish teenagers with functional limitations.

**Results:** To a varying degree, all 33 teenagers commented on accessibility problems, e.g. concerning uneven surface material outdoors, steps at entrances, heavy doors and restricted space indoors. The results also indicated that teenagers with functional limitations to a high extent want to visit the same environments as other teenagers, but that it is often impossible owing to accessibility problems. Furthermore, because of accessibility problems, many of the teenagers were dependent on personal assistance.

**Conclusion:** Inaccessibility results in dependence, which might affect personal development negatively, and much effort are required in order to ensure activity and societal participation. Efficient priorities in public environment accessibility matters and discussions with the actors involved require valid and reliable data on local accessibility problems.

## Introduction

Participation in social activities outside home, chosen through interest and not only through accessibility considerations<sup>1</sup> is a fundamental part in most individuals' lives, of importance for life satisfaction.<sup>2</sup> However, owing to physical inaccessibility, persons with

mobility restrictions and other functional limitations often face problems in public environments. The focus of this paper is accessibility to the public environment in a town centre as perceived by teenagers with functional limitations.

As a result of improved life circumstances and medical efforts, the number of young adults living with functional limitations is increasing. The prevalence of functional limitations among children and adolescents in Sweden is about 4/1000 inhabitants. Cerebral palsy is found in 2.5/1000 newborns, while myelomeningocele (MMC) is diagnosed in 3.5/10 000 infants. The prevalence of Juvenile Chronic Arthritis (JCA) is 6.4/10 000 children, while the prevalence of neuromuscular diseases, such as Duchenne's muscular dystrophy, is 4.3/100 000 children. Previously, most teenagers with functional limitations lived in segregated parts of society, but in the Western world today they increasingly live with their parents and siblings in ordinary homes, having greater possibilities to grow up in a way similar to others. However, the prevalence of functional limitations among children with the diagnoses mentioned is substantial, contributing to restrictions in their daily life.<sup>3</sup> Activity limitations as well as restricted participation arise from the gap between the person's capacities and the demands from the environment, not only from disease or injury.<sup>4</sup> Similarly, accessibility is dependent on the relationship between individual capacity and environmental demand<sup>2-5</sup> in accordance with the balance between individual competence and environmental demand as described in Lawton's ecological model.<sup>6,7</sup> A crucial aspect of individual competence is functional capacity, or in negative valence, functional limitations.<sup>8</sup> Applying ICIDH-2 terminology,<sup>4</sup> our definition of functional capacity/functional limitations includes categories of body functions as well as activ-

\* Author for correspondence; e-mail: agneta.fange@arb.lu.se

ities. This definition facilitates a meaningful operationalization of the accessibility concept. Accessibility is one aspect of the person–environment relationship, i.e. in order to understand the concept of accessibility further knowledge is needed of the person as well as of the environmental component. An implication of the fact that accessibility is the relation between functional capacity and environmental demand<sup>2</sup> is that no uniform adapted environment exists, owing to the variation in the functional capacity of persons.<sup>9</sup>

Public facilities are important arenas where teenagers spend a fair amount of time, often by hanging around in streets and squares, at cafés or in department stores. Teenagers use the public environment in many different ways, in order to create meaning and connection in their existence, and as a place where they can qualify for adulthood.<sup>10</sup> Public facilities are neutral areas, affording options to try social activities not found elsewhere<sup>11</sup> and are therefore important to teenagers on the verge of adulthood. Consequently, society must be planned and established in such a way that it fosters participation in a wide range of activities, in real environments. The choice and performance of activities varies across the life-span<sup>4</sup> in terms of time and interest, but is vital to the identity as well as functions and skills.<sup>13, 14</sup> On the other hand, physical environmental barriers might restrict participation, resulting in lack of experience, low self-esteem, and dependence on others.<sup>1</sup> Although reduced in comparison to other teenagers, social maturation among teenagers with functional limitations is not related to the severity of the functional limitations themselves, suggesting that the environment is more influential in this process than the underlying impairment.<sup>15</sup>

Research targeting accessibility to the physical environment is scarce, and the empirical studies available mainly focus on housing accessibility, mostly in relation to elderly people.<sup>16, 17</sup> Among the few empirical studies targeting public environment accessibility, McClain and colleagues investigated food stores<sup>18</sup> and restaurants,<sup>19</sup> identifying the most common problems.

To the best of our knowledge, no recent empirical studies on how teenagers with functional limitations perceive public environment accessibility have been published. The objective of this study was to investigate general outdoor accessibility, visiting preferences to public facilities, and perceived problems of accessibility to the public environment in a town centre among teenagers with functional limitations. An additional aim was to gather information on suggested measures for improved public environmental accessibility.

## Methods

### STUDY DISTRICT

The study was carried out in Kristianstad in south Sweden, a local municipality with 74 000 inhabitants, 27 000 of them living in the town and the rest in the sparsely populated countryside or in smaller built-up areas. The town of Kristianstad, founded in 1614, has a mild climate, generally without severe winters. It is an appreciated commercial town with a flat central part built up on four straight thoroughfares, perpendicular to a number of cross-streets. Most of the buildings have at least one step to the entrance, but rebuilding effected in recent years has resulted in the levelling of some entrances. The bus and train terminals are situated on different fringes of the commercial centre, and Kristianstad Airport is located about 20 minutes by car from the town centre.

In 1993, a Specially Adapted Upper Secondary School (SAUSS), adapted to the needs of teenagers with functional limitations, was established. In accordance with current Swedish school legislation, the unit is intended for teenagers aged 16–21 years, in need of adapted educational facilities exceeding the possibilities available in ordinary schools. To be considered for this kind of National SAUSS, the teenager must be in substantial need of qualified multi-professional support during the school day. The teenagers are guaranteed adapted tuition within an ordinary national Upper Secondary School programme, along with qualified habilitation, personal care and assistance, as well as boarding house accommodation. Ordinary Swedish Upper Secondary School programmes comprise three years of study, but since the teenagers targeted by National SAUSS require substantial special efforts, they may choose an additional year of study. The Kristianstad National SAUSS is the southernmost of the four facilities in Sweden. Male teenagers are in the majority, while the situation is the opposite in the units situated in the northern parts of the country. Two of the school buildings and four of the five boarding houses used by the SAUSS are situated in old-fashioned buildings specially adapted for wheel chairs, at walking distance from the shopping centre and the public transportation terminals. The fifth boarding house and some other school buildings used by the SAUSS are situated 1–4 km from the inner city, and most of the teenagers go there by special buses.

### SUBJECTS

All teenagers registered at the Kristianstad National SAUSS at the time of data collection were asked to

participate ( $n=41$ , 29 males and 12 females). Owing to the dropout of eight individuals, the sample consisted of 33 respondents (22 males and 11 females), mainly third-year students. Mean age was 17.5 years. Reasons for dropout were that two teenagers were not accommodated in Kristianstad and thus had very limited experience of moving around in the town centre, one was not motivated to participate, and another failed to be present at the time for data collection. Four teenagers stated that they did not experience any accessibility problems and therefore considered that their participation would not contribute to the study. Out of the 33 participants, 31 had moved to Kristianstad because of the school and now lived in one of the five specially adapted boarding houses close to the school, all of them in need of personal assistance on a 24-h basis. The remaining two participants lived with their families in ordinary housing. Out of these two, one needed personal assistance on a 24-h basis. The diagnoses in the sample were cerebral palsy ( $n=15$ ), myelomeningocele (MMC) ( $n=9$ ), muscular diseases ( $n=5$ ), juvenile rheumatoid arthritis (JRA) ( $n=2$ ), and a few others ( $n=2$ ). The prevalence of functional limitations and use of mobility aids was substantial (table 1).

#### INTERVIEW QUESTIONNAIRE

Since the literature review performed prior to this study failed to identify any previously tested instrument for assessment of personal assistance, perceived accessi-

bility, and visiting preferences in the public city environment, a new interview questionnaire had to be developed. In order to optimize the content validity of the questionnaire, a few pilot interviews were conducted. By personal knowledge of the third author and other experienced occupational therapists at the Kristianstad National SAUSS, seven persons living in the municipality of Kristianstad were enrolled. The main inclusion criteria applied were 'various functional limitations' and 'active and frequent use of the town centre environment'. Because of difficulties in finding persons of similar age and with similar functional limitations as the target group of this study, the mean age of subjects in the pilot interviews was higher (mean age 29 years, range 21–50). The pilot interviews, conducted by the third author, resulted in some revisions of the instrument. The questionnaire was also completed with written instructions.

The first section of the questionnaire comprised five descriptive questions concerning age and school-year, gender, housing conditions, diagnosis and personal assistance needed. The prevalence of functional limitations and dependence on mobility aids in the sample (table 1) was defined using the first part of the Housing Enabler.<sup>20, 21</sup> Furthermore, this assessment was independently validated by an occupational therapist employed at the Kristianstad SAUSS.

The second part of the questionnaire concerned public outdoor environment in general in the inner city, intending to explore user opinions of subjectively experienced problems, suggestions of adaptations, and positive examples of design. It comprised open-ended questions based on ongoing research on public transportation accessibility,<sup>9, 22</sup> detailed in 12 aspects: surface material, kerb cuts, traffic approaching, traffic signs, apparatus and controls, noise level, temporary obstacles in pedestrian areas, lighting, seats, guide lines, parking loading zones, and shop windows.

The third section of the interview questionnaire targeted visiting preferences in the public city environment. First, public facilities identified as relevant for teenagers in general were chosen out of the most recent local official guide of accessible public facilities in the area. Second, since at the time of this study the guide had not been updated for three years, five assistants from the different boarding houses contributed by identifying additional public facilities they knew by experience that the teenagers in the target group often wanted to visit. That is, this part of the questionnaire was built up as a tailored assessment,<sup>23</sup> unique for the target town. It included a variety of different facilities, e.g. restaurants, cinemas, food stores, and music

**Table 1** Prevalence of functional limitations and dependence on technical devices for mobility in the sample,  $n=33$

Functional limitations and dependence on mobility aids <sup>a</sup>	<i>n</i>
Difficulty in interpreting information	11
Severe loss of sight	8
Complete loss of sight	0
Severe loss of hearing	2
Poor balance	24
Incoordination	16
Limitations of stamina	20
Difficulty in moving head	5
Difficulty in reaching with arms	20
Difficulty in handling/fingering	22
Loss of upper extremity skills	0
Difficulty in bending, kneeling, etc.	30
Reliance on walking aids	2
Wheelchair use	30
Extremes of size and weight	0

*Note:* The number of functional limitations/dependence on technical devices for mobility in each subject ranged from 1 to 10. <sup>a</sup>As defined in the Housing Enabler Instrument (Iwarsson 1999, Iwarsson and Slaug 2000).

stores. For use in the questionnaire, the different facilities were categorized (table 2). During the interview, each teenager's visit preferences to specific facilities were identified, and in order to investigate perceived accessibility problems among the teenagers in a systematic manner, five questions were asked about each of these facilities. They were worded 'visits', 'cannot, but want to visit' and 'need for personal assistance', to be answered dichotomously (yes or no). The question 'need for personal assistance' was to be answered for each facility the teenager wanted to visit and was linked to a question on 'problems experienced'. The fifth question was worded 'How often do you want to visit?' and was to be filled in with the estimated number of desired annual visits, i.e. the teenagers were asked to estimate their attendance rates, either to each facility category or specifically for each facility. The interview questionnaire also sought to explore user opinions of subjectively experienced problems, suggestions of adaptations and positive examples of design. Finally, the format comprised one question about how the teenager usually chose facilities to visit, i.e. from consideration of interest or accessibility, or both; and the very last question gave an opportunity to utter positive as well as negative opinions about accessibility.

PROCEDURE

As part of ordinary occupational therapy sessions at the SAUSS, the third author informed the teenagers about the study. Data collection was carried out with each of them individually, during a winter period. The interviews were performed following the questionnaire as described above. In addition to the structured format, the author asked further follow-up questions, making use of her experience and substantial knowledge of the group at target, and all answers were carefully noted. Each interview lasted 1½–2 h. The first step of data analysis commenced immediately after each interview. Descriptive statistics were computed with the aid of SPSS, version 8.0. Qualitative data were reduced and added up in compact and interpreted units.

The Ethics Committee, Faculty of Medicine at Lund University, Sweden, approved the study.

Results

USE OF PERSONAL ASSISTANCE

One third of the teenagers ( $n=11$ ) always needed personal assistance, while two thirds ( $n=21$ ) used personal assistance occasionally. One teenager never used

**Table 2** Categories of facilities defined in the questionnaire developed for this study

Type of facility	$n^a$	Type of facility (cont.)	$n$	Type of facility (cont.)	$n$
Art shops	3	Health food stores	5	Photographers	3
Awning shop	1	Hobby and leisure shops	5	Post offices	4
Banks	9	Hotel and youth hostels	5	Public administration	18
Bicycle dealers	4	Jewellers'	8	Pubs and dance halls	13
Booksellers	5	Kiosks	2	Restaurants and pizzerias	26
Cafes	14	Kitchen fixtures shops	4	Second-hand shops	3
Candy shops	4	Lamp shops	2	Sewing-machine shops	3
Car accessories	3	Law offices	6	Shoe shops	7
Carpenters	3	Leather goods	5	Shoemakers	2
Carpet stores	1	Leisure establishment	7	Sports shops	2
Chemists	3	Libraries	2	Television and radio	4
Chiropodist	4	Liquor stores	2	Textile shops	4
Cinemas	2	Locksmiths	1	Tile shops	1
Computer shops	4	Manufacturers	37	Tobacconists	7
Cultural establishments	6	Medical service	7	Tourist agencies	1
Department stores	2	Mobile telephone shops	5	Toy stores	4
Dry cleaners	3	Music shop	4	Transportation	3
Flooring shops	1	Needlework shops	1	Travel agencies	6
Florists	5	Non-categorized facilities	2	Watchmakers'	4
Food stores	7	Opticians	8	Video shops	5
Furniture	3	Paint dealers	4		
Gift shops	9	Perfumeries	6		
Hairdressers	24	Pet shops	4		
Hamburger and hot dog stands	5	Photo shops	3		
Total					380

$n^a$  = number of facilities included in each category. Note that the questionnaire must be tailored for use in other study districts.

personal assistance in public facilities. Nearly two thirds ( $n=23$ ) of the teenagers, irrespective of whether they used personal assistance permanently or only occasionally, stated that they required personal assistance because of accessibility problems in the public environment. The problems perceived were environmental barriers in streets and commercial premises, e.g. difficulties in finding the right way, judging distances and kerbs, difficulties in forcing steps, opening doors, and using elevators, or difficulties taking merchandise from shelves. Furthermore, some teenagers answered that they needed personal assistance in other actions, e.g. handling money and wallet, packing up a bag or carrying merchandise, pushing the wheelchair, changing clothes, or going dancing. Some also stated the need for moral support to perform certain activities.

#### CHOOSING FACILITIES FOR VISITING

Among the 33 teenagers, 32 stated that they, thanks to the availability of personal assistance, had the opportunity to visit many otherwise inaccessible facilities, but the investigation pointed out that less than half of them ( $n=14$ ) chose to visit facilities out of pure interest. Accessibility was the only consideration directing the actual choices for one third ( $n=11$ ) of the sample, while the remaining teenagers reported consideration of accessibility as well as interest when choosing facilities for visiting.

#### PERCEIVED ACCESSIBILITY PROBLEMS

##### *General outdoor environment*

All the teenagers ( $n=33$ ) interviewed gave opinions of outdoor accessibility. The majority ( $n=26$ ) of them commented on surface material. The greatest obstacle experienced was paving stones, stated by two thirds of the teenagers. Problems mentioned with paving stones were pedestrians stumbling on the joints between stones. Wheelchair users reported bumping sensations in wheelchairs, small wheelchair wheels getting stuck in between the stones, the risk of tipping over, and damage to the electronics of powered wheelchairs. High and steep kerbs without kerb cuts were other environmental barriers experienced by nearly every teenager ( $n=29$ ).

##### *Traffic situation*

Traffic approaching from two directions and unguarded pedestrian crossings were the main problems

at intersections and crossings, according to almost half of the sample ( $n=18$ ). Bicycle parking and truck loading on pavements were also reported as problematic situations. Apparatus and controls placed too high were experienced as problems by less than half of the sample ( $n=14$ ). Lack of traffic signs at pedestrian crossings, high noise level generally, poor lighting, too few seating possibilities in the city centre, shared areas for pedestrians and bicycles, and parking loading zones occupied by non-disabled drivers, were barriers mentioned by a minority ( $n=7$ ) of the teenagers.

##### *Entrances and indoor environments*

In terms of accessibility problems indoors or at the entrance to the different facilities, the answers showed that the most common problem was the occurrence of steps at entrances. Other general problems were difficulties in attracting shop assistants' attention in order to gain help to access the premises, heavy doors, restricted space, difficulties in picking merchandise from the shelves, and paying. Problems in reading signs and finding their way around the premises were also reported by some teenagers. Bank dispensers placed too high, elevators placed at the back of the buildings, steep ramps, or having to ask for the key to the toilet were also mentioned as barriers to independent use of the facilities. Two teenagers said that shops and pubs in the town centre in general were inaccessible.

#### PERCEIVED FAVOURABLE ENVIRONMENTAL CONDITIONS

##### *Physical environmental conditions*

Most of the teenagers gave examples of environmental conditions they considered favourable. As regards the outdoor environment in general, tarmac was said to be the best pavement surface, and level and even prefabricated concrete slabs, e.g. along walls, were positively experienced as well. In addition, the frequent occurrence of kerb cuts allowing for wheelchair passage was mentioned as a favourable condition throughout the city centre. Concerning the facilities *per se*, frequently mentioned positive examples were fixed or portable ramps at entrances, removal of stairs, the presence of automatic door openers to elevators, and the presence of outside doorbells. Large text signs notifying accessible facilities, the occurrence of banisters, and large space inside facilities were mentioned as well. The presence of auditive information on queue numbers as well as catalogues presenting the range of merchan-

dise in shops were also mentioned as measures improving the usability of the facilities.

### Attitudes and social experiences

Regarding phenomena besides the physical environment dimension, the most frequently mentioned example was good personal service and a positive attitude on the part of the owner of the facility. In spite of many inaccessible environments in the city centre, some of the teenagers said that they experienced a greater openness towards persons with functional limitations, compared with when they first moved to the city. They also knew that some environmental adaptations in stores and other facilities had been accomplished to satisfy the SAUSS pupils' desires and expressed needs.

### VISITING PREFERENCES

All the teenagers interviewed ( $n=33$ ) reported their visiting preferences. Department stores, banks, and music shops were popular facilities for nearly all ( $n=31$ ), while cinemas, pharmacies, post offices, manufacturers, restaurants, pizzerias, hamburger and hot dog stands were appreciated by 27 of them. Preferred visits to pubs and dance halls, cafeterias, cultural centres, public medical service establishments, and libraries were mentioned by 25 individuals in all, while more than half of the sample ( $n=19$ ) identified kiosks, shops for hobby and leisure products, and video centres as interesting to visit (table 3). Under several facility categories, there were a few specific facilities reported as impossible to visit. In most cases, only few (2–4) teenagers reported such examples, but one noteworthy detailed result is that more than half of the sample ( $n=17$ ) mentioned one of the cinemas as impossible to access.

### Estimated annual visits

Department stores represented the most popular facility category to visit, and were assigned a total of 2852 estimated annual visits. The major department store in the city centre accounted for 2110 estimated annual visits, while the second biggest one accounted for another 500. Two teenagers explicitly reported that they were reduced to visiting department stores; they were not able to access the stores they wished to visit. Banks were assigned a total of 1510 estimated annual visits, of which the major national bank received 868 visits while another major bank office had 230 visits a year. Summed estimated annual visits to the 15 most frequently mentioned facility categories are presented in table 3.

**Table 3** The 15 most preferred facility categories, total number of visitors and estimated annual visits to each facility category

Facility category	Total number of visitors ( $n=33$ )	Estimated annual visits to each facility category <sup>a</sup>
Department stores	32	2852
Banks	32	1510
Music shops	30	974
Cinemas	28	451
Hamburger bars/hot dog stands	27	678
Manufacturers	27	448
Pharmacies	27	415
Post offices	27	263
Restaurants/pizzerias	27	1418
Leisure establishments	25	591
Cafeterias	22	166
Pubs and dancehalls	25	800
Cultural establishments	20	330
Public medical service	20	206
Libraries	20	168

<sup>a</sup>The estimated attendance rates reported for specific facilities were summed for each category.

### Discussion

The results of this study indicate that teenagers with functional limitations experience many accessibility problems in public environments in inner cities. Even if current Swedish policy and regulations<sup>24</sup> as well as international guidelines and statements of rights<sup>25</sup> set out high ambitions as concerns accessibility, they are still not met in practical reality. The fact that less than half of the sample chose environment only from interest is highly remarkable and might affect independence and participation in social activities negatively. It should be kept in mind though, that this study is a first, explorative step towards general knowledge in this field. Our findings cannot be generalized to other groups of teenagers or other users, nor to other towns in Sweden or in other parts of the world. People living in other parts of the world may have vastly different expectations given past experiences, the political climate in their country, their culture-specific roles and habits, etc. Nevertheless, the results indicate that there is much important knowledge to be gained through this kind of approach. Our knowledge on how social conditions and structures should be designed in order to ensure all citizens full participation is still scarce, but accessibility is a prerequisite for universal participation in the processes of citizenship and consumership.

Obviously, teenagers with functional limitations do not have the same accessibility to and possibility to choose environments from their willpower as their fellow teenagers do, but they have the same visiting

preferences.<sup>26</sup> Having to use the back door of public facilities or the goods elevators in storage spaces may be unequal and insulting experiences that do not promote participation. In contrast to international intentions, solutions excluding persons with functional limitations threaten democracy and may well result in discrimination and marginalization.<sup>25</sup> According to the docility hypothesis,<sup>6</sup> even the removal of very small environmental barriers considerably influences the ability to perform desired activities, especially in individuals with severe functional limitations, making every achievement towards increased accessibility worthwhile.

Owing to the inaccessibility of preferred facilities, the majority of the teenagers participating in this study needed support from a personal assistant in the public environment. Since an essential part of the transition to adulthood is independence from parents and others,<sup>27</sup> teenagers should not be forced to rely on personal assistance to overcome environmental barriers, but instead be able to gain experience on the basis of their own initiatives and activities.<sup>1</sup> Department stores were frequently mentioned as accessible facilities and therefore considered the easiest to visit independently, even though the high frequency of estimated annual visits might not reflect the teenagers' main interests. The change of routines and habits as a result of the combination of declining physical capacity and environmental barriers is a well-known adaptation strategy among elderly people.<sup>28</sup> In fact, even though this study targeted a considerably younger group, the visiting preferences expressed by the teenagers may well be a result of individual adaptation to overcome environmental barriers, not a result of interest only.

Teenagers in need of personal assistance do not visit inaccessible facilities spontaneously and represent a lost purchasing power. Instead of arranging a time with an assistant, demanding efforts of planning and time, they seemed to choose facilities where they could go independently. Shop owners should be aware that they would most likely benefit from improved accessibility through enhanced consumer appeal, attracting customers who would otherwise make their purchases elsewhere.<sup>29</sup> As shown by McClain and Todd,<sup>18</sup> the presentation of accessibility survey results may lead to active measures by shop owners. The results of studies like this could be used in order to influence the willingness of shop owners to effectuate accessibility measures in their facilities, positively affecting the general level of public environment accessibility in city centres, and such implementation is now in progress in Kristianstad. Unfortunately, because of the wording used in the inter-

view questionnaire, it was not possible in this study to validly differentiate between the number of visits really made to different facilities and the estimated annual visit rates. After revision of the interview format, in future studies such differences could be utilized in order to really concretize the effects that increased accessibility might have on purchasing power.

The majority of the teenagers in this study were dependent on mobility aids, and from their descriptions during the interviews, they seemingly often exposed themselves to risks in the traffic environment, rather than refraining from performing meaningful activities. Similar strategies for overcoming environmental obstacles have been reported by others,<sup>30</sup> but the presence of environmental barriers forces the teenagers to take unnecessary risks. Accessibility and safety issues are important, not only to persons in the target group but also to the population in general, and public environments need to be designed to conform to people's divergent capacity.

The fact that some of the teenagers experienced increasing openness towards persons with functional limitations indicate that positive effects are likely to occur when people in general become more accustomed to regular interaction with people with divergent capacity. It is important to notice that personal service and positive attitudes were frequently mentioned as circumstances bridging the gap between the person's capacity and environmental conditions. In accordance with others,<sup>1, 9, 31</sup> it is concluded that supportive environments do not include only the physical dimension of the environment but social and attitudinal dimensions as well. A positive attitude towards persons with divergent capacity may well act as a mediator, making physical environmental barriers easier to overcome in a specific situation. Another aspect of the fact that a supportive social environment might counterbalance physical environmental barriers is that the users themselves might be unaware of certain physical environmental barriers that could be removed in order to increase their independence. For example, when comparing the problems reported in this study with the authors' personal knowledge of the facilities in central Kristianstad, it seemed as though the teenagers regularly using assistants were so used to personal support that they did not report on obvious accessibility problems, such as heavy doors.

Even if public environment accessibility issues are gaining increased attention, there still is a lack of systematic procedures for making efficient priorities. Measures undertaken in order to solve accessibility problems are often made ad hoc, rather than based on

the results produced by use of systematic assessments. Valid and reliable assessments of physical environmental accessibility requires the use of a professional as well as a client-centred perspective. Such an approach has greater opportunities for explaining the impact of the physical environment on activity and participation than only the client-centred or professional perspectives respectively.<sup>13, 32, 33</sup>

The method developed for this study was useful for investigation and documentation of opinions of accessibility matters from a client-centred perspective, but it needs further refinement and scientific testing. The facility items in the questionnaire were specific to the city centre of Kristianstad, but the facility categories can be found in any city. The method could be tailored for future studies in other cities, preferably utilizing a computerized format, providing a new way for systematic investigation of accessibility preferences in any group of users. However, since accessibility is a relative concept,<sup>2, 5</sup> persons with functional limitations in general are able to report validly only on accessibility problems in relation to their own functional limitations. That is, even if the subjective opinions of users constitute an important background for making priorities among measures for improving public environment accessibility, qualified accessibility assessments require analyses of environmental barriers in relation to the profiles of functional limitations identified in specific individuals or user groups. In order to cover accessibility problems in relation to a wider range of possible functional limitation profiles, accessibility problem surveys should be based on the professional use of norm-based, valid, and reliable instruments as well, for example, with instruments based on the Enabler Concept.<sup>21</sup> Usability, on the other hand, is a question of subjective perception and experiences<sup>29</sup> and cannot be assessed objectively.

In conclusion, the results of this study are unique since they describe subjective experiences of the interaction between teenagers with functional limitations and the public environment. Teenagers with functional limitations want to visit the same kind of public facilities as other teenagers do, but much effort is required in order to ensure them full participation in society. Current building legislation and international intentions specify requirements for public environment accessibility, but the regulations are in the main subject to local interpretations. Only with valid and reliable data on local accessibility problems at hand, including users' opinions as well as objective, norm-based assessments, can efficient discussions with the actors involved take place.

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