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Towards a capability approach to mobility

An analysis of disparities in mobility opportunities among older people

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Towards a capability approach to mobility

An analysis of disparities in mobility opportunities among older people

JEAN RYAN

FACULTY OF ENGINEERING | LUND UNIVERSITY 2019



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among older people

Jean Ryan



LUND
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DOCTORAL DISSERTATION

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Title and subtitle: Towards a capability approach to mobility: An analysis of disparities in mobility opportunities among older people		
Abstract: <p>The overall aim of this thesis is to gain a clearer picture of the differences in mobility among the young-old living in Sweden's large metropolitan regions. This thesis comprises four papers. Paper I explores the inclusion of public transport as an element of mobility among the young-old living in the Stockholm region. Paper II presents an analysis of cycling among older people in the city of Malmö. The third paper explores the links between modal options and the potential to participate in everyday activities among those aged 65–79 and living in Sweden's large metropolitan regions (Stockholm, Gothenburg and Malmö), while Paper IV investigates differences in the potential to carry out everyday activities of value among the young-old living in these same three regions. The results from Paper I highlight that increasing residential density, being a woman and having a higher functional capacity were associated with a positive increase in the likelihood of considering it possible to use, and the use of, public transport, while most of those who included public transport as a mobility element were also users of the private car. For Paper II, cycling was found to be a facilitator of activities and was largely associated with convenience and ease. There were clear differences between cyclists and non-cyclists, with the former generally having a wider range of mobility opportunities available to them. Cycling cessation was anticipated as a distressing, yet inevitable, life event. The findings from Paper III show that there was a lower level of satisfaction with both the quantity and quality of modal options among those who do not have public transport as a modal option. The results suggest that those who do not have public transport as a modal option are less inclined to have the capability to carry out all everyday activities of value. The absence of having the possibility to carry out active physical exercise was rather apparent, with several highlighting health and/or transport-related issues as barriers. For Paper IV, clear links were identified between social resources, holding a driving license, access to public transport, income, health condition and age and the potential to carry out everyday activities of value. These results bring us closer to understanding the role different modal options can have in facilitating continued participation in society among older people. These results call for a greater focus to be placed on potential mobility and its role in facilitating activities of value in order to allow for a more detailed approach to transport equity analyses. As such, more targeted and integrated policy measures can be developed.</p>		
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MADE IN SWEDEN 

To my parents, Anne and Mike

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Preface

Over the underpass

*Over the underpass
Adjacent the trees,
Another revolution,
Knee after knee.*

*I trundle on,
As the wet and icy flakes
Grace my face,
And the wheels struggle on.*

*The will to continue
Spurs on the will to pursue,
And I will get there,
The white parts in two.*

*I bow down
And the snow is displaced,
As one glides past the other,
I am almost there.*

This text is intended to describe the perspective of the cyclist on the front cover. This image, along with the accompanying text, captures what I believe to be the essence of capability in relation to mobility. Together, they speak for themselves, so I need say no more.

Jean Ryan

11 February 2019

Summary

Older people represent a greater proportion of the population than ever before. In Sweden, one in five is now aged 65 and above, and more than one in seven is aged 65-79. This demographic change has challenged and will challenge society, presenting sizeable tasks for the transport sector. These challenges have forced and will force us to question the ways in which we approach and tackle the policy, planning, design and provision of services for an expanding and ever-varying proportion of older people and a changing demographic composition.

The focus for this thesis is on those aged 65-79. This age group represents those who are in the young-old life stage, or what can be described as the earlier stages of later life. This age range signifies the time during which most people transition from working life to retirement, adjusting to a different set of financial circumstances, a different set of daily activities and often, deteriorating health.

Several studies have shown that, as people age, they tend to change the ways in which they travel. In the Nordic context in particular, there is a long history and large inventory of research concerning the travel of older people. However, few have approached such issues from a transport equity perspective – a perspective inherent in this thesis.

Most previous studies have focused on trips, travel habits or travel patterns ('actual travel'). However, there has been a partial shift in focus to include accessibility and opportunities ('potential travel'). Such a distinction is particularly important in the assessment of equity. Not only carrying out valued activities, but even having the possibility to do so is key in the analysis of equity. Potential travel is the main focus of this thesis. The focus then shifts to how potential travel can facilitate the possibility to participate in everyday activities of value.

Previous research has mostly focused on the car, its role, and the absence of its role in later life. The studies contained in this thesis have taken the perspective that other modes such as public transport and cycling could – and should be adapted to – function as alternatives for the young-old. Furthermore, for this thesis, there is a focus on the importance of having a number of modal options, particularly if – or when – it becomes necessary to use alternative modes of transport in order to enjoy continued participation in society.

A person's choice of transport mode could be considered quite arbitrary: if 'x' mode gets you to 'y' activity, then what does it matter whether you could have used another mode, or whether you had a choice in the first place? However, the importance of having a number of modal options may only actualise as one ages. For instance, giving up driving has been linked to declines in travel for social activities as well as a reduced quality of life. The studies upon which this thesis is

based explore the kinds of roles different modal options can have, the meaning of these roles and how they can facilitate the potential to participate in activities of value.

The aim of Paper I was to analyse the characteristics of those who perceive they can use public transport as their main mode of transport and of those who perceive they cannot, as well as the characteristics of those using public transport and of those not using it. This paper facilitates further insight into the links between the variation in such characteristics, and the possibility to use, and the use of, public transport among the young-old living in the Stockholm region.

‘To cycle or not to cycle’ – that was the question posed for Paper II. The aim of Paper II was to gain a greater insight into cycling among those in later life. The characteristics and views of those who cycle, those who do not cycle, as well as those who have discontinued cycling in later life were the main focus. Malmö, a city in the south of Sweden with a strong emphasis on bicycle planning, was the study area.

Cycling was found to be a facilitator of activities and was largely associated with convenience and ease. There were clear differences between cyclists and non-cyclists, with the former generally having a wider range of mobility opportunities available to them. Cycling cessation was anticipated as a very distressing, yet inevitable, life event by those who still cycle. The results of this study suggest that campaigns aimed at increasing the awareness and consideration of other road users towards older cyclists, as well as the introduction of clearer and more visible signage could support older cyclists in prolonging their cycling, as well as improving the experience they have as they do cycle. Increasing awareness of the health benefits of cycling could be another means of encouraging people to continue cycling as they age.

‘What’s mode got to do with it?’ was asked as part of the title of Paper III. This paper explored the links between modal options and the potential to participate in everyday activities among people aged 65–79 and living in Sweden’s large metropolitan regions (Stockholm, Gothenburg and Malmö).

What does mode have to do with it? Findings indicate that there was a lower level of satisfaction with both the quantity and quality of modal options among those who do not have public transport as a modal option. The results suggest that those who do not have public transport as a modal option are less inclined to have the capability to carry out all everyday activities of value. The absence of having the possibility to carry out active physical exercise was apparent, with many highlighting that health issues and transport/infrastructure problems constitute barriers to having the possibility to participate in such activities. Deficiencies in the public transport service was the most common reason provided as to why public transport is not a

modal option for some. These results bring us closer to understanding the role different modal options can have in facilitating continued participation in society among older people.

The aim of Paper IV was to advance the methods informing the transport equity policy agenda by conducting a study investigating differences in the potential to carry out everyday activities of value among the young-old. Clear links were identified between social resources, holding a driving license, access to public transport, income, health condition and age, and the potential to carry out everyday activities of value. These results call for a greater focus to be placed on potential travel and its role for facilitating activities of value in order to facilitate a more detailed approach to transport equity analyses. As such, more targeted and integrated policy measures can be developed.

The results from this thesis highlight the differences in potential mobility among the young-old living in Sweden's large metropolitan regions. The methods used complement one another, and uncover concerns and connections which may have been hidden had just one type of method been used. The dissatisfaction and limitations that can arise from having insufficient modal options in later life are highlighted. Combining and coordinating transport services and the location and provision of other important services in an integrated manner could effect change with respect to the capability to carry out everyday activities of value for this age group.

Sammanfattning

I många Europeiska länder idag utgör äldre människor en större andel av befolkningen än någonsin tidigare. I Sverige är en av fem personer 65 år eller äldre, och fler än var sjunde person ligger inom åldersspannet 65-79. Denna demografiska förändring har inneburit och kommer fortsättningsvis innebära en stor utmaning för samhället. Till exempel påverkas transportsektorn, då vi tvingas ifrågasätta hur vi betraktar policy, planering och utformning av tjänster åt en växande och ständigt varierande andel äldre människor samt en föränderlig demografisk sammansättning.

Fokus i den här avhandlingen ligger på äldre personer i åldersspannet 65-79 år. Den här gruppen kännetecknas av den s.k. yngre-äldre-livsfasen, eller vad som kan beskrivas som ett tidigt stadie av 'ålderdom'. Denna livsfas innebär för de allra flesta en övergång från arbetsliv till pensionering, en tid då många också anpassar sig efter nya ekonomiska förutsättningar, nya rutiner och ofta försämrad hälsa.

Ändrade livsvillkor påverkar ofta vårt beteende. Flera studier har visat att människor tenderar att ändra hur de reser medan de åldras. I Norden finns det en lång historia och ett brett register av forskning rörande äldre människors resbeteende. Däremot har få studier betraktat dessa frågor från ett transporträttviseperspektiv – ett perspektiv som därför särskilt genomsyrar denna avhandling.

Ett kännetecken på tidigare forskning har varit ett fokus på resor, resmönster och resbeteende ('faktiskt resande'). Relativt nyligen har det dock delvis skett ett skifte, som bl.a. inkluderar tillgänglighet och möjligheter ('potentiellt resande'). Att skilja på dessa två resande-begrepp är av särskild betydelse när man undersöker rättvisa i transportsystemet. Inte bara att aktiviteter genomförs utan även möjligheten till att de kan genomföras är viktigt att beakta när man analyserar rättvisa. Potentiellt resande fokuseras därför från början i den här avhandlingen. Efter hand inriktas fokus mot hur potentiellt resande kan stödja möjligheter till att delta i vardagliga aktiviteter av värde för individen.

Ett annat kännetecken på tidigare forskning om åldrande och mobilitet har varit intresset för bilen, dess roll och eventuella frånvaro senare i livet. Studierna som denna avhandling bygger på har dock särskilt utgått från perspektivet att andra färdmedel såsom kollektivtrafiken och cykling kan och borde anpassas för att fungera som alternativ för de yngre-äldre. Utöver detta undersöks betydelsen av att ha flera olika färdmedelsalternativ, särskilt om eller när användningen av alternativa färdmedel blir nödvändig för fortsatt delaktighet i samhället.

Att välja färdmedel kan betraktas som ganska godtyckligt: om färdmedel 'x' ändå tar mig till aktivitet 'y', vad spelar det då för roll om jag hade kunnat använda ett annat färdmedel, eller om jag ens hade valmöjligheter från början? Dock tydliggörs betydelsen av att kunna välja när man åldras. Att sluta köra bil har exempelvis

samband med minskat resande till sociala aktiviteter och en försämrad livskvalitet. Studierna som denna avhandling bygger på utforskar vilka roller de olika färdmedlen kan ha, betydelsen av sådana roller, samt hur de kan stödja möjligheterna att delta i aktiviteter som individen sätter värde på.

Målet med Paper I är att analysera egenskaperna hos dem som upplever att de kan använda kollektivtrafiken som huvudsakligt färdmedel jämfört med dem som upplever att de inte kan, samt egenskaperna hos dem som faktiskt använder kollektivtrafiken jämfört med egenskaperna hos dem som inte gör det. Resultaten ger en bild av hur möjligheterna att använda kollektivtrafiken och faktisk användning av kollektivtrafiken hos de yngre-äldre boende i Storstockholm hänger samman med dessa bakomliggande egenskaper.

‘Att cykla eller inte?’ – så låter frågeställningen som Paper II baseras på. Målet med Paper II är att ge en djupare insikt i äldre personers cyklande. Egenskaper och perspektiv utforskas bland äldre människor som cyklar, bland dem som inte cyklar alls, samt bland dem som har slutat cykla. Malmö med dess starka fokus på cykling utgör studieområdet. Det framgår att cykling tycks underlätta aktiviteter för många äldre. Argumenten är bl.a. bekvämlighet och lätthet. Tydliga skillnader framstår mellan cyklister och icke-cyklister, där de förra oftast har tillgång till fler resmöjligheter. Att sluta cykla uppfattas som en ömmande fast oundviklig livshändelse. Resultaten från den här studien tyder på att kampanjer som bygger på att utöka medvetenhet och hänsyn bland andra trafikanter gentemot äldre cyklister, samt tydligare, mer synlig skyltning, kan stödja äldre människor i både deras fortsatta cyklande och förbättra själva upplevelsen de har medan de cyklar. Att öka medvetenheten om hälsofördelar kan utgöra ett ytterligare sätt att uppmuntra äldre människor att fortsätta cykla medan de åldras.

‘Vad har färdmedel med det att göra?’ är en fråga i titeln för Paper III. Studien utforskar kopplingar mellan färdmedelsalternativ och möjligheten att delta i vardagliga aktiviteter. Resultaten tyder på att det finns en lägre nivå av tillfredsställelse med både utbud och kvalitet på färdmedelsalternativ bland dem som inte har kollektivtrafiken som alternativ. Resultaten tyder också på att de, som inte har kollektivtrafik som alternativ, i mindre utsträckning har möjlighet att genomföra alla önskade vardagliga aktiviteter av värde. Att inte ha möjligheten att träna uppfattades t.ex. som ett problem för många, ett problem som delvis också ofta uppstår på grund av det egna hälsotillståndet och transportsystemets utformning. Brister i kollektivtrafiken anses av vissa som anledning till att kollektivtrafiken inte uppfattas som ett möjligt alternativ. Resultaten kan öka förståelsen för vilka roller olika färdmedelsalternativ kan ha för fortsatt delaktighet bland äldre.

Målet med Paper IV är att utveckla metoder för transporträttvisa och visa hur dessa kan bidra till policyagendan. Därför studeras skillnader i möjlighet att genomföra vardagliga aktiviteter av värde bland yngre-äldre. Tydliga kopplingar identifieras

mellan sociala resurser, körkortsinnehav, tillgång till kollektivtrafiken, inkomst, hälsotillstånd och ålder och möjligheten att genomföra vardagliga aktiviteter av värde. Resultaten tyder på att det behövs ett ökat fokus på det potentiella resandet och dess roll i stödandet av aktiviteter av värde. Studiens metodansats kan användas för att utveckla ett mer detaljerat betraktelsesätt för analys av transporträttvisa. På så sätt kan mer fokuserade och integrerade policyåtgärder utvecklas vidare.

Dessa resultat belyser skillnaderna i potentiellt resande bland de yngre-äldre boende i Sveriges storstadsområden. Metoderna som använts kompletterar varandra, och belyser frågeställningar och samband som vore mindre synliga om endast en typ av metod hade använts. Personer i denna livsfas har poängterat den upplevda otillfredsställelse och de begränsningar som infinner sig när tillräckligt antal färdmedelsalternativ saknas. Att kombinera och koordinera transporttjänster i samklang med en integrerad samhällsplanering, vilken beaktar var och hur viktiga målpunkter i form av service och tjänster görs tillgängliga, skulle kunna göra skillnad när det gäller möjligheten att genomföra vardagliga aktiviteter av värde bland yngre-äldre.

List of papers

This thesis is based on the following papers, hereafter referred to by their respective roman numerals. The papers are appended to the end of the thesis.

Paper I

Exploring public transport as an element of older persons' mobility: A Capability Approach perspective

J. Ryan, A. Wretstrand and S. M. Schmidt

Journal of Transport Geography 48, 105—114 (2015)

J. Ryan: Development of conceptual framework, literature review, data management, statistical analysis, manuscript writing.

Paper II

Cycling and cycling cessation in later life: Findings from the city of Malmö

J. Ryan, H. Svensson, J. Rosenkvist, S. M. Schmidt and A. Wretstrand

Journal of Transport & Health 3, 38—47 (2016)

J. Ryan: Literature review, analysis of empirical material, manuscript writing.

Paper III

What's mode got to do with it? Exploring the links between public transport and car access and opportunities for everyday activities among older people

J. Ryan and A. Wretstrand

Travel Behaviour and Society 14, 107—118 (2019)

J. Ryan: Study and research instrument design, literature review, development of conceptual framework, management of data collection, analysis of empirical material, manuscript writing.

Paper IV

Disparities in mobility among older people: Findings from a capability-based travel survey (Submitted)

J. Ryan, A. Wretstrand and S. M. Schmidt

J. Ryan: Study and research instrument design, literature review, development of conceptual framework, management of data collection, analysis of empirical material, manuscript writing.

Abstracts

Paper I

This study employs Amartya Sen's Capability Approach as a guiding conceptual framework in the exploration of public transport as an element of mobility among the young-old living in Stockholm, Sweden. The aim is to shed light on the variation in mobility resources of those who perceive they can use public transport as their primary mode of transport and of those who perceive they cannot ('mobility capability element'), as well as that of those using public transport and of those not using it ('mobility functioning element'). Increasing residential density, being female and having a higher functional capacity were among the mobility resources which produced a positive increase in the likelihood of considering it possible to use, and the use of, public transport. The higher the ratio of cars to household member, the lower the likelihood of including public transport as a mobility capability element or as a mobility functioning element. Most of those who included public transport use as both a mobility capability element and a mobility functioning element were also users of the private car. There was also a tendency towards car use rather than towards no travel if the individual was not a user of public transport. Through the application of the Capability Approach, this paper facilitates further insight into the variation in mobility resources, corresponding mobility capability and mobility functioning elements of this group, with respect to public transport. It also opens up questions for the future employment of this conceptual framework within transport research.

Paper II

This study aims to gain a greater insight into cycling as an element of mobility among those in later life. The characteristics and views of those who cycle, those who have never cycled, as well as those who have discontinued cycling in later life are the main focus. Malmö, a city in the south of Sweden with a strong emphasis on bicycle planning, is the study area. This study employed a mixed methods approach. The quantitative element comprised a survey which aimed to capture the trends at play when it comes to cycling within this age group. The qualitative element encompassed two focus groups which were carried out in order to gain a deeper insight into older persons' perspectives and perceptions with respect to cycling. The study's findings illustrate the very positive and important role cycling can play in the mobility of older persons in the city of Malmö. It is not only possible but also mostly enjoyable for many older people to cycle. Cycling is a facilitator of activities and is largely associated with convenience and ease. There are clear differences between cyclists and non-cyclists, with the former generally having a wider range of mobility opportunities available to them. Cycling cessation is anticipated as a

very distressing, yet inevitable, life event by those who still cycle. The results of this study suggest that campaigns aimed at increasing the awareness and consideration of other road users towards older cyclists, as well as the introduction of clearer and more visible signage could support older cyclists in prolonging their cycling, as well as improving the experience they have as they do cycle. Increasing awareness of the health benefits of cycling could be another means of encouraging people to continue cycling as they age.

Paper III

The aim of this study is to explore the links between modal options and opportunities to participate in everyday activities among people aged 65–79 and living in Sweden’s large metropolitan regions (Stockholm, Gothenburg and Malmö). This incorporated a specific focus on those considered at a greater risk of transport-related social exclusion. This study applies the Capability Approach as a conceptual framework and employs a mixed methods element. A multinomial logistic regression was conducted in order to identify the characteristics associated with the respective modal options. Five independent variables produced statistically significant results: cohabiting, perceived health condition, income, region of residence and gender. Findings indicate a lower level of satisfaction with both the quantity and quality of modal options among those who do not have public transport as a modal option. The results suggest that those who do not have public transport as a modal option are less inclined to have the capability of carrying out all everyday activities of value. The qualitative strand uncovers the salience of the absence of having the possibility to carry out active physical exercise, with many highlighting that health issues and transport/infrastructure problems constitute barriers to having the possibility to participate in such activities. Deficiencies in the public transport service was the most common reason provided as to why public transport is not a modal option for some. These results bring us closer to understanding the role different modal options can have in facilitating capabilities of value and continued participation in society among older people.

Paper IV

Despite some incremental policy shifts accounting for transport equity concerns, the norms within which transport systems worldwide currently function are still implicitly exclusive. Older people constitute a group which is particularly susceptible to issues within the transport system. However, this susceptibility is not evenly distributed, partly due to the considerable heterogeneity in circumstances among this group. The aim of this study is to advance the methods informing the transport equity policy agenda by conducting an empirical investigation of disparities in capabilities based on Sen’s Capability Approach. This is done by identifying which resources and characteristics among those aged 65-79 are

associated with fewer opportunities relative to their peers. By focusing on capabilities (instead of proxies), the disparities reflecting equity concerns can be more clearly depicted. The research material comprises 1,149 interviews with those living in Sweden's large metropolitan regions: Stockholm, Gothenburg and Malmö. Several analyses were developed in order to address the research questions: a multivariate multinomial logistic regression, a multivariate binary logistic regression and a basic analysis of frequencies. Clear links were identified between social resources, holding a driving license, access to public transport, income, health condition and age and capabilities. These results call for a greater focus on capabilities in travel surveys and a more fine-grained approach to equity analyses and policies by accounting for intersectionality effects. As such, more targeted and holistic policy measures can be developed.

1 Introduction

Planning for an ageing population

In recent decades there has been a heightened awareness of the growing proportion of the population aged 65 and above (Lanzieri 2011; Eurostat 2014). In Sweden, this proportion has grown considerably, with much of the demographic ageing process having already taken place during the course of the 20th century (Sundström 2009). Constituting almost one-fifth of the population, those aged 65 and above now represent a greater proportion of the population than ever before. The ‘young-old’ (here, those aged 65-79) now constitute 14.8 per cent of Sweden’s population (Statistics Sweden 2017).

This demographic change has challenged and will challenge society, posing sizeable tasks for many sectors, not least the transport sector (Metz 2003). With demographic change come changes in lifestyles and aggregate behaviour, and indeed, a changing societal perspective (Thane 2003). These challenges have forced and will force us to question the ways in which we approach and tackle the policy, planning, design and provision of services for an expanding, ever-varying proportion of older people, and the ensuing changing demographic composition.

There is stark variation within this age group – variation which in turn varies over time. This large (and growing), highly diverse segment of the population presents several issues for planning: What are the mobility needs and aspirations of this group?; Which opportunities best meet these needs and aspirations?; Do we need new ways of looking at these issues?; And how should policy respond when so much is changing, and with so many unknowns?

The design of the transport system and the planning and provision of its inherent services is currently based on the implicit assumption that its users have a certain level of physical and cognitive functioning (Cresswell 2010; Jones and Lucas 2012; Martens 2018). The transport system comprises several different sub-systems which complicates matters further. For instance, traditionally, the public transport system is primarily designed to meet the needs of commuters, with seating provided on a first-come-first-served basis (Jansuwan et al. 2013; Faste and Muenchinger 2017), while pedestrian environments can fail to facilitate ease of movement for those who have difficulty walking (Hallgrimsdottir et al. 2015). As a result, people who do not

‘fit in’ with the norms upon which the transport system is based tend to experience significant challenges when attempting to negotiate such environments (e.g. Asher et al. 2012; Cass et al. 2005; Beiler and Mohammed 2016).

With the challenge of population ageing, we must take a critical perspective on the formation of the transport system and the public realm. For whom are these services and spaces intended? Which social norms influence the formation and functioning of such services and spaces? And what are the explicit and implicit codes of conduct?

In order to plan for those who are entering into the later stages of ageing, it is important to delve further into the production of the mobility opportunities they have (or do not have), the processes shaping their mobility, and the role of mobility in facilitating other activities of value.

Transport equity and the application of the Capability Approach

The concept of transport equity encompasses the fair distribution of accessibility to activities of value (see Pereira et al. 2017; Pereira 2019; Martens 2017). This concept is fitting in the context of an ageing population, as it implies that we strive to ensure that everyone has access to activities of value, that older people are not marginalised in the formation of the transport system, and that the negative effects associated with a lack of accessibility are limited.

The Capability Approach (CA) (Sen 1995) is applied to this thesis as a descriptive conceptual framework in the examination of a select few aspects of transport equity. The CA was selected as a conceptual framework as it aided the understanding of (1) the production of mobility opportunities for the individual; and (2) the comparison of circumstances among individuals. Its inherent focus on capability supported the premise of focusing on *potential* as opposed to *realised* mobility.

The CA facilitated both the formulation and analysis of the key questions contained in this thesis. The following are the key features of the thesis, which have both shaped and been shaped by the application of the CA as a conceptual framework:

Potential mobility

The consideration of ‘potential’ (comprising e.g. choices, options and freedoms) is paramount in the analysis of equity (Sen 1995: 36-37). Not only carrying out valued activities, but even having the possibility to do so, is regarded as a key aspect of well-being (Sen 1995: 59-62), with well-being (or the distribution of well-being) in

turn being a key focus of equity. As such, potential mobility (incorporating e.g. accessibility, mobility resources, mobility opportunities, motility and capability) should be the focus as part of transport equity analyses. This is opposed to realised mobility (i.e. trips, travel habits, travel behaviour and travel patterns) or unrealised mobility where mobility needs are unfulfilled.

Potential mobility or, for this thesis, what is termed the ‘mobility capability’ is the preliminary focus of this thesis. The focus then shifts to how the mobility capability can then facilitate the capability to participate in everyday activities of value. Whether or not the mobility, or indeed the activities of value, are then realised is of lesser importance.

Variation and the identification of at-risk groups

A lot is left uncovered by analysing the entire population aged sixty-five and above, as if this were a homogenous group. Such analyses are based on the assumption that we are dealing with one life stage, while several argue to the contrary, that it should, at the very least, be treated as two life stages (Laslett 1989; Baltes and Smith 2003). Even within the different stages of later life, there is much variation. As such, it is important to both acknowledge and investigate the complexity of activities, manifesting itself in terms of variation in corresponding mobility. It is necessary to continue delving into the differences between these individuals and their mobility, and the factors shaping such differences. The group of interest for this thesis is the young-old (for pragmatic reasons, delimited to those aged 65-79), with the differences among this group forming a central part of the thesis.

One of the most pressing societal challenges is to ensure that the expansion of older age groups does not come with an associated increase in transport-related social exclusion. Identifying groups (among the young-old) who are particularly at risk or indeed, who could be at risk later on, and delving further into the issues behind such risk, forms an important element of this thesis.

The intrinsic and instrumental value of modal options

Previous research has mostly focused on the car, its role, and the absence of its role in later life (Davey 2007; Newbold and Scott 2017; Scheiner 2006; Schmöcker et al. 2008). The studies contained in this thesis have taken the perspective that other modes such as public transport and cycling could (and should be adapted to) function as alternatives for the young-old. For this thesis, there is an inherent focus on the importance of having a number of modal options, particularly if or when it becomes necessary to use alternative modes of transport in order to enjoy continued participation in society.

From an instrumental perspective, modal choice could be considered quite arbitrary: if ‘x’ mode gets you to ‘y’ activity, then what does it matter whether you could have used another mode, or whether you had a choice in the first place? However, the importance of having a number of modal options may only actualise as one ages and it becomes necessary to use alternative modes of transport in order to enjoy continued participation in society (Musselwhite 2015). Furthermore, Sen (1995: 59-62) argues that there is a theoretical link between having a larger choice set and a greater well-being, with a limited choice set, in turn, linked to a reduced well-being.

These studies explore the kinds of roles different modal options can have, the meaning and intrinsic value of these roles, as well as their instrumental value in facilitating activities of value.

The contribution of this thesis

In the Nordic context in particular, there is a long history and large inventory of research concerning accessibility, usability and the travel of older people (cf. Iwarsson and Ståhl 2003; e.g. Hjorthol et al. 2010; Siren and Hakamies-Blomqvist 2004; Siren and Haustein 2013; Nordbakke 2013). Ståhl’s work in particular has shaped both the policy and planning surrounding the facilitation of older people’s mobility in Sweden, securing a position at the forefront of this research area internationally during the last number of decades.

However, few have focused explicitly on hypothetical concerns with the specific considerations of transport equity, and even fewer within the spectrum of the CA (with the exception of e.g. Nordbakke 2013). The combination of the transport equity perspective with the application of the CA, with the features of potential mobility, variation and the identification of at-risk groups, as well as the intrinsic and instrumental value of modal options constitutes the uniqueness of this thesis.

The empirical contribution entails the application and development of methods to analyse transport equity through the identification of groups, the analysis of access to different modes of transport and the links between potential mobility and the opportunity to participate in everyday activities of value. This is so that more accurate ways of analysing capabilities and accessibility can be developed and so as to inform the advancement of integrated and more targeted policy interventions.

The theoretical contribution entails the expansion of the CA in the realm of mobility, and its development in the context of transport equity.

The next chapter outlines the thesis aims, with Chapter 3 detailing how the thesis is positioned, both with respect to previous research, and to the concepts upon which the thesis is based. Chapter 4 details the application of the CA to the thesis, while

Chapter 5 presents the methodology and methods employed. Chapter 6 provides an overview of the results of the thesis, while Chapter 7 encompasses a discussion of these results, the contexts from which they can be understood, policy implications and next steps for this area of research.

2 Aims

The overall aim of this thesis is to gain a clearer picture of the differences in mobility among the young-old living in Sweden's large metropolitan regions through the engagement of a transport equity perspective, and through the application of the Capability Approach. The aims of the individual papers combined constitute the overall aim.

The aims of Papers I-IV are outlined as follows:

1. To explore the inclusion of public transport as a mobility option among the young-old within the structure of the Capability Approach framework. (Paper I)
2. To explore:
 - a) The key differences between older cyclists and older non-cyclists;
 - b) The perceptions of older cyclists in relation to cycling as a mode of transport; and
 - c) The factors which are associated with cycling cessation in later life. (Paper II)
3. To explore the links between modal options and opportunities to participate in everyday activities among the young-old living in Sweden's large metropolitan regions, and particularly among those considered at a greater risk of transport-related social exclusion. (Paper III)
4. To advance the methods informing the transport equity policy agenda by conducting an empirical investigation of disparities in capabilities among the young-old based on Sen's Capability Approach. (Paper IV)

3 Positioning the thesis

Central concepts

The nexus between the themes of ageing, mobility and transport equity forms the position of this thesis (see Fig. 1). Given that the lifestyles, experiences, habits and prospects of older people were central to this thesis, the life course perspective on ageing formed the backdrop. The importance of mobility for older people formed the focal point of this thesis, spanning the examination of the roles of different modal options, mobility limitations and how mobility facilitates other activities of value. The concept of transport equity then enters in the analysis of how capabilities are distributed among different kinds of people with differing resources.

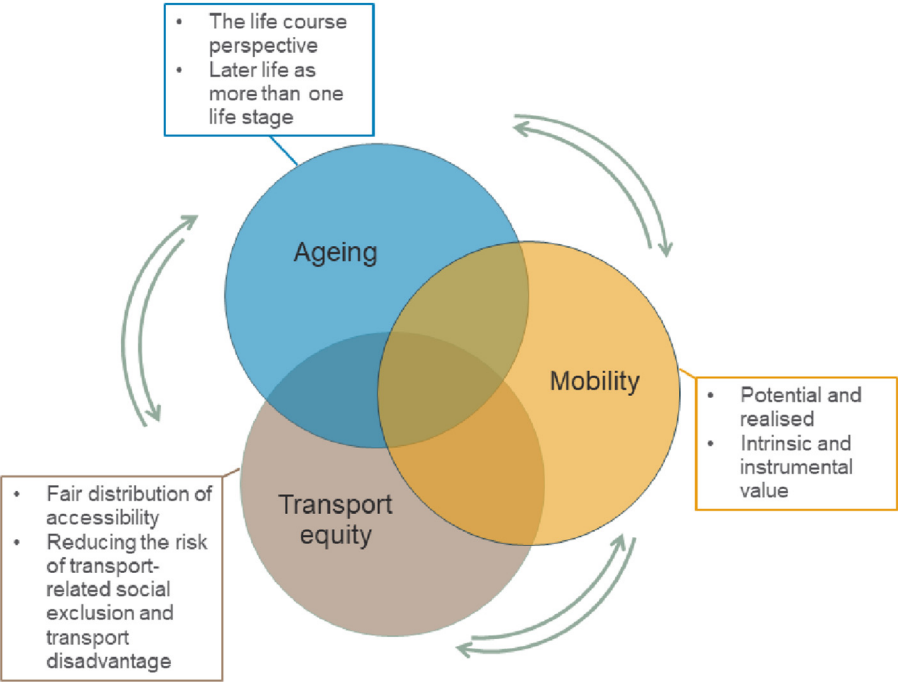


Fig 1. The central concepts in the thesis

The following sections elaborate further on each of these concepts, how each concept is considered and treated as part of this thesis, and leads into the next chapter, where the application of the CA is outlined in more detail.

Ageing

The life course perspective on ageing

The conceptualisation of ageing employed for this thesis is influenced by the life course perspective. Ageing is treated as a life-long, ‘*continuous process of growth and decay, both of which start at birth and continue throughout life*’ (Sabelli and Sugarman 2003: 778): we are continuously developing, continuously growing older, cumulatively gathering information and learning as we age. Ziegler (2012: 1299) argues that an ongoing repositioning of one’s self takes place as a person ages, with this complex process working in tandem with the ‘*accumulative life course experience of the individual*’. Similarly, Sabelli and Sugarman (2003) reason that life does not comprise a sequence of static states, but that a person’s age is merely a moment in a continuous process. They refer to the development process that comes with ageing as the evolution of our self and of our identity.

‘Old age’ is now very different to how it has been in the past (Sundström 2009). Older people are now more likely to be ‘wealthier and healthier’ than older people were within the generations before them, with resources of ‘health’ and ‘wealth’ in turn producing different forms of mobility (Banister and Bowling 2004, referring mainly to older people in the UK). The shift in the differentiation of mobility by age group has been detailed by several, with older people today travelling further and taking more trips than their counterparts before them did (Hjorthol et al. 2010; Banister and Bowling 2004; Rosenbloom 2001).

Later life as more than one life stage

There is considerable inter-personal variation in the lifestyles of older people (Kelley-Moore and Lin 2011: 53-65), so much so that later life is often considered to comprise different stages; the ‘young-old’ stage (the earlier stages of later life), and the ‘old-old’ stage (the later) (cf. Gilleard and Higgs 2010). Both of these stages encompass considerable transitions. The young-old life stage is often associated with the transition from working life to retirement, the adjustment to a different set of financial circumstances, a different set of daily activities and often, deteriorating health (Gilleard and Higgs 2005); while the old-old is usually coupled with a more rapid decline in health (Baltes and Smith 2003; Gilleard and Higgs 2010). These

transitions, in turn, come with consequences for many aspects of older people's lives, not least mobility.

Laslett (1989) is largely credited with the conceptualisation of 'old age' as two life stages. He argued for the existence of what he referred to as the 'Third Age', during which personal fulfilment is expected to take place (usually after retirement). This is in contrast to the 'Fourth Age', which is characterised by rapidly declining health, dependence, and ultimately, death.

The emergence of the young-old life stage and of this group of wealthier, healthier people with fewer time constraints has constituted a substantial demographic and societal change for developed countries – a change comprising both opportunities and challenges (Laslett 1989). Laslett's perspective meant that discussions surrounding old age were shaped by the premise that this was in fact more than one life stage, with the third age characterised by a more positive rhetoric (Schafer and Ferraro 2009).

The delimitation of the young-old age group

The distinction between the young-old and old-old life stages is not necessarily defined by specific chronological age ranges. This is because ageing can be described as an individual form of negotiation process (Baltes and Baltes 1990: 7-8), with almost as many forms of ageing as there are older people in society. However, for pragmatic reasons, a population-based definition of the young-old was employed for this thesis. Baltes and Smith (2003) discuss the difference between a population-based and person-based definition of the young-old and the old-old, arguing that the transition from the third to the fourth age from a population-based perspective is the point at which 50% of the birth cohort is no longer alive. They argue that this point lies within the range 75-80 for most developed countries. This definition has influenced the selection of the uppermost limit of the 'young-old' age range (i.e. age seventy-nine) for most of this thesis, with the exception of Paper II, where the upper age limit is eighty-five. A wider age range was considered for Paper II in order to include those who had stopped cycling, and to compare them to those who still cycle in later life.

Age 65-79 (approximately) represents those who are in the young-old life stage, and thus the earlier stages of later life. This is the age range during which most people transition from working life to retirement. A considerable proportion of this group is still forming travel habits and activity patterns post-retirement (adjusting from travel habits focused around work-related trips). For this thesis, it was also considered that the behaviour formed within this life stage would influence the circumstances and behaviour into the old-old life stage.

Those aged 65-79 constitute 14.8 per cent of Sweden's population (Statistics Sweden 2017). Although this group has increased in size in the last number of years, it is expected to decline in absolute numbers by 2028. The larger cohort (those born in the 1940s) will, by then, have moved into the old-old age range, which combined with increasing longevity, will mean an increase in those aged 80 and above, in both absolute and relative terms (Statistics Sweden 2018).

A relatively recent phenomenon, retirement became a normal phase of life around the middle of the last century. For this thesis, retirement is conceptualised as a disruptive life event. The transition to retirement is not considered a process which spans one day to the next, but instead a process of adjustment which takes place over a longer period of time. The retirement age in Sweden is now flexible, meaning that a person can currently take out a public pension from the age of 61, yet has the right to continue working until the age of 67. A sizeable proportion among those aged 65-79 is still working (Pensionsmyndigheten 2018; Statistics Sweden 2018). There are fewer men than women in this age group, with a ratio of men-to-women of 95:100. However, the surplus of women in this age group is expected to decline in years to come. Mortality has declined to a large extent within this age group and it is expected to decline further. However, the old-old age group (those aged 80 and above) is expected to increase, with substantial growth expected to have taken place by about 2070 (Statistics Sweden 2018).

Mobility

Conceptualisation of mobility

For this thesis, a rather broad definition and conceptualisation of mobility was employed. 'Mobility' was defined as *actual embodied movements and the potential to realise such movements* (cf. Kaufmann 2002; Kaufmann, et al. 2004). Both the embodied movements and the potential to realise such movements were then conceptualised as derivatives of the resources available to the individual (cf. Cresswell, 2010; Nordbakke and Schwanen 2014). Such resources can be both directly and indirectly related to mobility.

Embodied movements are mainly treated as a derived demand, that is, they are considered to be produced by (the location of) a person's home and (the location of) a person's activities (see Mokhtarian and Salomon 2001), or social obligations which result in the perceived necessity of mobility (Urry 2002). In other words, mobility has been – in most instances – treated as a means to an end, rather than an end in itself. For this thesis, mobility has been conceptualised as an element of the individual's well-being (see Chapter 4, and Nordbakke (2013) and Hjorthol (2013) for an expansion of this conceptualisation).

Metz (2000) contends that the concept of mobility comprises five elements: 1. Travel to achieve access to desired people and places; 2. Psychological benefits of movement; 3. Exercise benefits; 4. Involvement in the local community; and 5. Potential travel. The first and last of these key elements are the focal points of this thesis. Travel to achieve access to desired people and places is the key consideration, that is, the instrumental value of mobility in the facilitation of everyday activities of value. The potential to be mobile has been found to be associated with freedom and autonomy (Mollenkopf et al. 2005), as well as comprising important components of well-being in themselves. Potential travel is the second key consideration. Here, not just the instrumental value of mobility, but also the intrinsic value of its potential is considered of importance. Metz (2000) argues that potential should be included as part of valid empirical measurements, with the same perspective employed for this thesis.

Most previous studies have focused on either realised mobility (i.e. trips, travel habits, travel behaviour and travel patterns) or unrealised mobility, where mobility needs are unfulfilled. However, the literature has seen a partial shift in focus from the division of realised/unrealised mobility to a more nuanced picture of potential mobility (incorporating e.g. accessibility, mobility resources, mobility opportunities, motility and capability) (e.g. Kaufmann et al. 2004; Neutens et al. 2011; Le Vine et al. 2013; Patterson and Farber 2015; Papa et al. 2016). Such a distinction is particularly important in the assessment of equity. Not only carrying out valued activities, but even having the possibility to do so, is regarded as a key aspect of well-being (Sen 1995: 59-62), with well-being (or the distribution of well-being) in turn being a key focus of equity.

Several studies have emphasised the importance of mobility for quality of life (e.g. Banister and Bowling 2004; Wretstrand et al. 2009; Metz 2000; Spinney et al. 2009); for well-being (e.g. Mollenkopf et al. 2005; Spinney et al. 2009; Nordbakke 2013; Ziegler and Schwanen 2011); and for social inclusion (e.g. Titheridge et al. 2009; Delbosch and Currie 2011; Lucas 2004). Others have focused on the role of mobility in continued social participation and fostering social networks and independence (e.g. Baltes and Baltes 1990; Mendes de Leon 2005; Ziegler 2012). The strong association between mobility and these central aspects of life forms an important part of this thesis, underlining the importance of supporting and facilitating the mobility of older people.

Mobility during the young-old stage of life is considered to form an element of the individual's life course and mobility trajectory, with the individual's current mobility considered to be linked to the individual's previous experience. Future mobility is in turn considered to be influenced by the individual's current mobility (see Scheiner and Holz-Rau 2007).

Conceptualisation of accessibility

Given the definition of mobility for this thesis, accessibility is treated as a prerequisite for, or inherent element of, mobility. For this thesis, accessibility (or rather, what is more aptly described as the ‘mobility capability’ – see Chapter 4) is conceptualised as *the differing extents to which individuals could reach everyday activities of value given the interaction between their individual resources and the transport and land use system, if they should choose to do so.*

Several existing definitions and conceptualisations of accessibility and potential mobility have influenced the definition employed for this thesis. The concept of accessibility is rather elusive, with a plethora of definitions and applications used in both transport research and practice (Boisjoly and El-Geneidy 2017a; 2017b). Accessibility has been defined in many ways: as the extent to which individuals can reach destinations or activities (see van Wee 2016 for an expansion); ‘*the potential to reach spatially dispersed opportunities*’ (Paez et al. 2012: 141); and ‘*the extent to which individuals and households can access day to day services*’ (Department for Transport (UK), 2014: 2). It has also been aptly described as an indication of the performance of the transport and land use system (Hansen 1959). However, what is somewhat missing from some definitions is the interaction between the spatial component, the transport component and the individuals engaging with these two components. Accessibility invariably varies with individual characteristics, which should be conceptualised as a third layer or component – which is why this is referred to as the ‘mobility capability’ at later stages in this thesis.

From this perspective, the notion of accessibility is not static. It differs with respect to the type of activity; modal options; time of day; the individual or individuals involved. As such, the importance of relativity and context is underlined. Although it is widely considered that there is differential access to activities depending on residential location (e.g. Delbosc and Currie 2011; Paez et al. 2007), purely spatial perspectives on accessibility and mobility have been heavily criticised (Hägerstrand 1970; Scheiner and Holz-Rau 2007). Others have argued that transport problems are inherent in certain socio-economic groups, regardless of residential location (e.g. Hine and Grieco, 2003; Miller, 2005), while Lucas (2004) contends that accessibility should be treated as the crux between individuals, their desired and required activities and their mobility options. Jones and Lucas (2012) advance the argumentation that an individual’s potential mobility (facilitated through accessibility) should be the focus, as opposed to focusing on the individual’s realised mobility. The treatment of large groups of individuals as equally disadvantaged or advantaged is not compatible with such a conceptualisation. It is the latter, more nuanced perspective that has influenced the stance of this thesis.

Transport equity

Conceptualisation of transport equity

The main element of transport equity with which this thesis is concerned is *the fair distribution of accessibility to activities of value among older people with differing characteristics and resources*. This conceptualisation is influenced by Litman's (2002) description of the transport equity policy agenda as placing emphasis on the distribution of the impacts of transport policies, projects and systems among individuals and groups with differing needs and abilities. According to Litman's discussion, an equitable policy aims to facilitate the redistribution of opportunity to those who most need it (Litman, 2002; cf. Martens 2006). Examining the extent to which different population groups can reach and partake in activities which are fundamental for social inclusion is therefore necessary as part of transport equity analyses (cf. Arsenio et al. 2016; Lucas et al. 2016).

Traditionally, transport project and policy analysis has neglected the distribution of social effects (Martens and Di Ciommo 2017; Geurs et al. 2009). Several have argued that it is not mobility but instead accessibility that should be considered in the analysis of transport equity. This echoes Sen's reasoning that in the analysis of equity, it is opportunity (capability) that should be considered, and not realised behaviour (functionings), which has, in turn, influenced the conceptualisation employed for this thesis.

Martens (2017) argues that the focus of transport equity should be on the equitable distribution of accessibility. Pereira et al. (2017) take a similar perspective, arguing, that from a distributive-justice standpoint, the concern should be the distribution and re-distribution of accessibility. However, as detailed above, accessibility is not necessarily purely spatial nor static, and is intertwined with the individual and her/his activities. Indeed, for older people, accessibility is particularly affected by the life course. This calls into question whether geographical accessibility alone is enough or whether the individual capabilities with respect to mobility should also be considered.

Transport-related social exclusion and transport disadvantage

For this thesis, transport-related social exclusion is conceptualised as a *heightened risk of social exclusion brought about by a limited capability to carry out activities of value as a result of a lack of mobility-related resources and/or limited accessibility*. This definition is informed by Sen's (2000) argumentation that social exclusion should be (1) conceptualised as a relative lack of opportunity or 'capability failure' and (2) analysed as a causal process. The latter, in order to determine whether the exclusion is in fact exclusion in its most literal sense, and

whether said exclusion is passive ('left out') or active ('kept out') in nature. At the same time, Sen argues that the emphasis should not necessarily be placed on 'exclusion' in itself, but instead on inclusion on unfavourable terms, what in turn can be conceptualised as 'exclusion from equitable inclusion'. Such distinctions are no less relevant with respect to the application of the term 'transport-related social exclusion'. Bearing this in mind, it is a conceptualised increased *risk* of – as opposed to a definitive state of – transport-related social exclusion that forms the position of this thesis.

The concept of social exclusion originated in France, and during the last three decades, it has enjoyed much exposure in several areas of research and evaluation (Sen 2000). It is argued that social exclusion as a concept is not fully developed and that the literature surrounding the concept is not yet very advanced (see Papadopoulos and Tsakloglou 2008; Sen 2000). Nonetheless, the concept took hold in the UK with the establishment of the Social Exclusion Unit and became a pivotal influence for transport policy development during the 1990s and into the 2000s (see Kamruzzaman et al. 2016 for a review). Sen (2000) argues that social exclusion should not be equated with a lack of income – or indeed a lack of any form of means – but instead as a 'capability failure', stressing that this, in turn, can result in the failure of other capabilities. Indeed, some studies have shown that people can be subject to social exclusion regardless of income (e.g. Atkinson and Hills 1998).

According to Sen (2000), social exclusion as a concept is nothing new, but is instead based on very old thinking, such as that of Aristotle. The main attribute of value of social exclusion is its emphasis on relational features (one is excluded relative to the norms in a given society). Similarly, Burchardt et al.'s (1999: 229) definition shares the same perspective, contending that:

An individual is socially excluded if (a) he or she is geographically resident in a society but (b) for reasons beyond his or her control he or she cannot participate in the normal activities of citizens in that society and (c) he or she would like to so participate.

Somewhat problematic is the strictly relational aspect of social exclusion; that the definition is based on norms and 'normal activities' means that some form of 'normal' must be prescribed. This is conflicting with Sen's absolute notion of capabilities, and indeed that they should be defined by the individuals themselves (see Papadopoulos and Tsakloglou 2008). A normative application is also problematic in the sense that norms can change over time and differ with respect to population groups. Despite these shortcomings, transport-related social exclusion is deemed an appropriate and powerful concept for the analyses comprised in this thesis.

The concept ‘transport disadvantage’ is often aligned with transport-related social exclusion, with the former often considered to lead to the latter. It has also gained broad attention and widespread use in research and practice. Stanley and Stanley’s (2004: 14) definition of transport disadvantage is employed for this thesis. They conceptualise transport disadvantage as:

a situation where people experience a shortage of transport options, which restricts their mobility and hence their access to goods, services and relationships.

In this sense, transport disadvantage can be framed as part of the process of becoming at *risk* of transport-related social exclusion, as is the conceptualisation employed for this thesis.

Peripheral concepts

Modal choice and society’s response to the mobility of older people were the more peripheral concepts inherent in various elements of this thesis. These concepts intertwine in the sense that the facilitation of choice can come about through society’s response to the mobility of older people.

Modal ‘choice’ and the role of different modal options

The delicate treatment of the concept of choice comprises an important part of this thesis, with choice in turn comprising an important part of well-being (expanded upon in the next chapter). For this thesis, the following definition of modal choice by De Witte et al. (2013: 331) has been employed:

The decision process to choose between different transport alternatives, which is determined by a combination of individual socio-demographic factors and spatial characteristics, and influenced by socio-psychological factors.

Several have emphasised that the private car is the transport mode of choice among older people in most developed countries (e.g. Davey 2007; Newbold and Scott 2017). However, it is important to consider that older people may not necessarily have a choice in their everyday lives. For those in this age group, the choice to drive is not usually made on a daily basis, nor was it made last year or the year before. It is instead likely to have been made many years ago as part of a larger interdependent composite of choices, influenced by and influencing residential location and the location of the everyday activities in which the person engages (Naess 2005; Scheiner and Holz-Rau 2007; Mercado et al. 2010; Scheiner 2006). This composite of interdependent choices is likely to then impact the individual’s perception of the

possibility to use, as well as the desire to use, other modes (Cairns et al. 2014; Schmöcker et al. 2008).

As such, elements of realised mobility such as car use should be approached with caution, especially in relation to this group. Regarding car use as an active choice in today's context leaves part of the picture uncovered. This thesis, with its inherent focus on potential, allows for this more nuanced approach to the concept of 'choice'.

Society's response to the mobility of older people

Sweden has been described as the pacemaker for population ageing in Europe, as much of its demographic ageing process had already taken place during the course of 20th century, with its median age having been the highest in Europe for much of the last century (Lanzieri 2011).

Thane (2003) argues that there is an association between demographic structures and the culture surrounding how ageing and older people are perceived in society, with countries with larger proportions of older people from the early 20th century having a markedly different approach to the ways in which older people's needs in society are addressed. Perhaps partly related to its long-spanning population ageing process, the mobility of older people has, in Sweden, received attention for a remarkably long period of time. From as early as the 1970s, the activity patterns of households of older people in Sweden were investigated (see Hanson 1977). In Sweden, research regarding accessibility and usability for older and disabled people, demand responsive transport and Special Transport Services (STS) has spanned several decades (e.g. Carlsson and Ståhl 2006; Rosenkvist et al. 2009; Hallgrimsdottir et al. 2016; Wretstrand et al. 2009). While, more recently, the emphasis on the mobility of older persons has seen a marked increase elsewhere (Schwanen and Páez, 2010; Ziegler and Schwanen, 2011).

As far back as 1979, the Swedish government ruled that the needs of passengers with disabilities should be facilitated and that it was the responsibility of public transport authorities to adapt their services in order to ensure this. It was, however, as late as 2000 by the time such issues became a focus as part of conventional public transport planning (Hansson and Holmgren 2017).

Sweden's national transport goals explicitly emphasise that the main function of the transport system is accessibility, that is, to allow people to reach key activities and facilities (see Johansson et al. 2018). As such, the public sector has a legal obligation to provide transport – most often in the form of STS – for those who are deemed unable to use the conventional public transport system and the car. Another policy aim in Sweden is for as many as possible who currently use STS to instead use the conventional public transport system, which means a substantial adaptation and alteration of the current system (Sveriges Kommuner och Landsting 2014; cf.

Hansson and Holmgren 2017). While many significant changes have occurred (mainly since 2000), there is still a considerable amount left to do.

The adjustment of the conventional public transport system could, however, bring with it conflicts between the expectations of passengers. The reconciliation between efficiency and a public transport system that can support a wider range of people with differing needs is a significant challenge. For instance, conventional public transport as a service is largely designed to suit the working population. Commuters have very consistent, more fixed activity patterns relative to those in retirement (Schwanen et al. 2001). This means that the mobility needs and wants of groups such as those in later life may not be catered for to the same extent as the working population when it comes to public transport provision (cf. Coughlin 2009). Balancing the wants and needs of those on-board – or those who might be on-board – is a considerable challenge.

The concepts above – both central and peripheral – are encapsulated in the application of the CA, addressed in the next chapter.

4 Conceptual framework

An introduction to the Capability Approach

The Capability Approach (CA) is primarily based on the notion of freedom and its close association with achievement and well-being (Sen 1995). The CA differs from conventional Utilitarian approaches to choice models in three predominant ways. Firstly, the focus is shifted from the person's resources to their capabilities. Secondly, the outcome is conceptualised as 'functionings' (together constituting well-being) instead of utility (Sen, 1995:40). Lastly, the size of the scope for action is considered to contribute to the individual's well-being (Sen, 1985).

The CA is rooted in liberal thinking, and draws on Rawls' discussion of justice (see Rawls 1971) with some notable divergences (Basta 2016). One of the main features of the framework is the emphasis on the autonomy of individuals to decide which activities or goals should be deemed important by themselves, for themselves. This is in agreement with Mill's thinking that the law or government should not be considered better judges than the individuals themselves (Qizilbash 2008: 64, citing Mill 1988: 19). Sen's CA is very intentionally left open-ended (Alkire et al. 2008), as he did not want to prescribe, define or impose values in a paternalistic sense. This is opposed to Nussbaum's CA, who instead argues that it is apt to outline which capabilities should be considered of importance (see Nussbaum 2011). However, the very vagueness inherent in Sen's CA brings with it issues in its application. Such issues are discussed in more detail later on in this chapter.

There are many different interpretations of, and ways of applying, the CA (discussed in Alkire et al. 2008: 14). The most notable contribution of the concept of capabilities is to the Human Development Index (see United Nations Development Programme 2018). Alkire (2008: 27) emphasises that the CA should be framed as a work in progress and highlights the lack of confidence with respect to methods and methodology employed in the application of the CA.

The CA is becoming a point of interest in transport research (Beyazit 2011; Nordbakke and Schwanen 2014) but has been employed only a handful of times within the field (e.g. Nordbakke, 2013; Smith et al., 2012; Wismadi et al., 2014; Hickman et al. 2017; Eitoku and Mizokami 2010; Hananel and Berechman 2016).

The application of the CA

The CA is applied to this thesis as a descriptive conceptual framework (cf. Alkire et al. 2008 for a description of the different kinds of application) in the examination of various aspects of transport equity. The CA facilitated both the formulation and analysis of the key questions related to this thesis: how capabilities differ with respect to characteristics and access to resources, and how specific mobility-related resources and capabilities can support the capability to carry out everyday activities of value. Here, the approach is not explicitly linked to the outcome of the framework (achievement or well-being), but is instead restricted to the processes producing the outcome, with the implicit predictive content of the approach inherent in its application to this thesis.

The rationale for the adoption of the CA as a conceptual framework was five-fold:

1. The CA encompasses a shift in focus from proxies for capability such as resources (e.g. a driving license) or realised mobility (e.g. trips undertaken) to actual capabilities (e.g. the capability to travel to activities of value).
2. The CA is appropriate for the analysis of an individual's circumstances as well as the analysis of the distribution of (or differences in) circumstances among a group (here, older people).
3. The inherent focus of the CA is on the individual's role in shaping her/his scope for action.
4. The CA involves the very careful treatment of concepts such as 'choice' in the production of e.g. realised mobility.
5. The CA assists in drawing together, and provides an excellent framework for analysing, the aforementioned concerns: the life course, the importance of mobility, transport-related social exclusion and transport equity.

Equity, freedom and capabilities as key concepts

The principle of equity encompasses the fair distribution and re-distribution of opportunities and freedom(s) to achieve that which a person has reason to value. Much of Sen's discussion surrounding freedom is focused on the individual's capability set, which represents the freedom the individual has to shape her/his life in the ways in which she/he values (Sen 1995: 40-42). The size of the individual's capability set is considered to reflect the level of freedom the individual has to achieve desired goals (Sen 1995: 31), with an inherent emphasis on the role the capabilities have in increasing the individual's agency or well-being (Sen 1985; Sen

1995: 59-62). Sen argues that freedom of choice is directly important for a person's well-being (Sen 1993: 33-37; cf. Baujard 2007).

A person's command over her/his resources is said to produce their capability set. The individual is then said to select which capabilities she/he wants to 'operationalise' from her/his capability set. These operationalised capabilities are then referred to as the individual's functionings (the individual's realised behaviour). The sub-set of functionings is, in turn, considered to represent all of the elements of a person's living; their various desired 'beings' and 'doings'. Two individuals with the same capability set may, as such, have different functionings as a result of the different values they place on their various capabilities.

Why capabilities and not resources or functionings?

If we are to consider choice as an element of well-being, then we must distinguish between having chosen to do something and doing the same thing without having chosen it (Sen 1995). Moreover, distinguishing between choosing to do something and doing the same thing without having chosen it is paramount in the analysis of equity (Sen 1995: 36-37). For example, if one individual for some reason is forced to go to the supermarket, despite not actually wanting to go, and a second individual also goes to the supermarket, quite voluntarily, it would not be correct to assume that both had equal opportunities to go (or not go) to the supermarket. Similarly, if we were just to consider realised mobility (a 'functioning') as an indicator of equity, we would make the assumption that both went to the supermarket under the same conditions with the same capabilities (and freedoms) to do so. Travel survey data, which is most often concerned with realised travel behaviour, does not make the distinction between whether or not a person chose to travel at a certain time or in a certain way, or whether the individual had a choice in the first place.

Furthermore, if several individuals were to have equal access to resources, it would not necessarily mean that they would all have the same set of capabilities, nor the same well-being (see Sen 1995: 35). Take the example of a driving license. Five individuals may have the resource of a valid driving license. However, only four of these individuals may consider it possible to drive (be it facilitated by conversion factors such as confidence, ample time, etc.). Applying a conventional approach, it may be assumed that the five individuals would have the same opportunity to choose to drive, if they so wished. However, if we look more closely at the situation, through the lens of the CA, there are differences in their conversion of this resource to a capability. Four individuals may find it entirely possible to drive, thus converting it to a capability which then has the potential to be selected as a functioning. For the fifth individual, she/he may consider that her/his driving skills are not sufficiently developed to drive, and so driving is not regarded as a capability and, as a result, cannot possibly be selected as a functioning. As such, we can argue

that only four of the five individuals have the real opportunity to drive, conceptualised as an element of the individual's mobility capability. This example demonstrates how real opportunities are not compared if we simply compare individuals' resources. It is the freedom to achieve (i.e. capability) rather than means to achievement (i.e. resources) that should be examined when analysing equity (Sen 1995).

Application to this thesis

The intrinsic and instrumental value of capabilities

The distinction between the intrinsic and instrumental value of the individual's capability set is a key element of this thesis. The former refers to the value of freedom in itself (e.g. the value of the freedom to be mobile), while the latter refers to the freedom to achieve something else, a means to an end (e.g. the freedom to be mobile supporting the achievement of something else a person has reason to value) (Sen 1995: 33-36). For this thesis, both the intrinsic and instrumental value of the mobility capability is considered. The intrinsic value of the individual's mobility capability (comprising modal options, etc.) is, in itself, important for the individual. The potential to be mobile has been found to be associated with freedom and autonomy (Mollenkopf et al. 2005), as well as comprising important components of well-being in themselves. The instrumental value the mobility capability has in supporting the capability to carry out everyday activities of value is also considered. This relates to the activities the individual's mobility facilitates i.e. having the possibility to make one's way to an activity of value such as meeting friends and family.

The adaptation of concepts for this thesis

Fig. 2 illustrates the relationships between the key concepts and processes of the CA as described by Sen (1995), and as adapted for this thesis. Fig. 2 depicts an individual with different kinds of resources (e.g. social, material, health, etc.). These resources are regarded as various elements of a person's life which are considered to be either explicitly or implicitly conducive to mobility, but are by no means intended to be exhaustive. This is owing to the many inter-related elements in a person's life which can add to the complexity of their mobility (cf. Julsrud 2014; Arentze et al. 2008; Siren and Haustein 2013; van Acker et al. 2014). Mobility resources can be described as health condition; competence (e.g. being licensed to drive); material resources (e.g. income); social resources (e.g. household composition); and temporal resources (e.g. being retired and having fewer fixed activities or commitments) (see Nordbakke 2013). These resources are considered

by Nordbakke (2013) to work in tandem with spatial and temporal contextual conditions.

According to the framework (Fig. 2), inter-personal differences are expected to lie in the conversion of resources to a capability (Sen 1995: 33-37), highlighted as ‘conversion factors’. A person’s command over their mobility resources is said to produce their mobility capability. In this case, the individual has seven capabilities, one of which is the capability to carry out everyday activities of value (C_3) and another is the mobility capability (C_6). The individual then evaluates her/his capabilities (and elements of the same), and then selects which should be operationalised as ‘functionings’. In this case, the individual has chosen to operationalise C_2 , C_3 , C_4 , C_5 and C_6 , to functionings of the same respective denotations. An individual’s functionings are considered to comprise and represent her/his wellbeing, as discussed above.

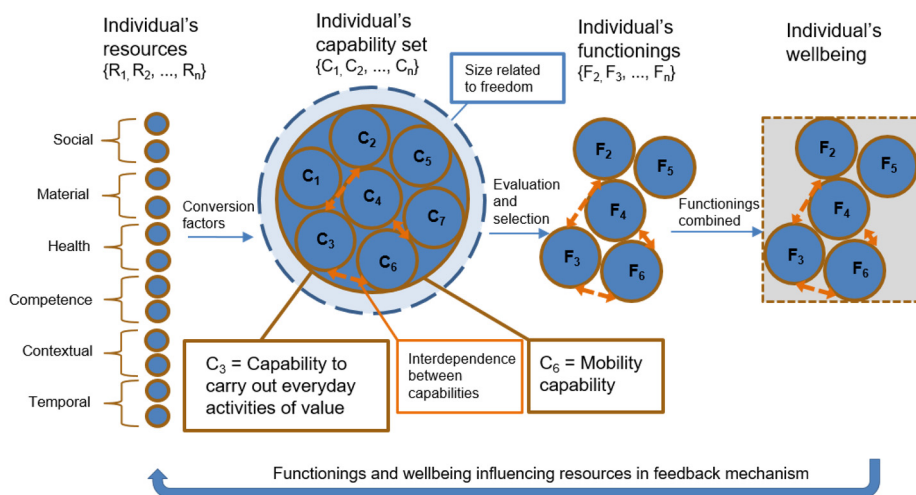


Fig 2. Adaptation and application of Amartya Sen's Capability Approach

A version of this diagram is included in Paper IV. It is an elaborated version of a diagram from Paper I.

Public transport as an element of the mobility capability and functioning

For Paper I, public transport use is conceptualised as a potential element of the individual's mobility. Mobility, in turn, is considered as an element of the individual's well-being (cf. Nordbakke 2013). As such, the potential to use, and the use of, public transport can become a contributing factor to an individual's well-being. The functioning under examination here is the mobility of the individuals; here, restricted to whether or not the individuals are users of public transport.

However, the distinction between the conversion of the resources to capabilities and the evaluation of the capability set which leads to the selection of the functioning is

unclear. For the first part of the analysis, there is no information about the intermediate stage in the framework; the capability. It is purely the relationship between the resources and the individuals' likelihood to use public transport which is analysed. That is, whether their likelihood to 'choose' public transport is influenced by the variation in the conversion of resources or by variation in the evaluation of the varying capabilities is unknown. It can only be assumed, by drawing on the framework, that there are different levels of variation in either the conversion of these resources to capabilities or the evaluation of the resulting capabilities to produce the functionings, or indeed, both.

For the second part of the analysis in Paper I, the theoretical capability to use public transport is included in order to explore the differences between the inclusion of this capability in the capability set and its selection as a functioning (that is, we then have more information about the evaluation process of different groups). Having the information that using public transport is regarded as a capability by the individual in turn gives us more information about the conversion of resources, that is, we have more information about the counterfactual for the individuals who did not select public transport, as well as being able to differentiate between those who converted resources in such a way that using public transport is then regarded as a capability, from those who did not.

From this position, whether using public transport is selected as a functioning or not can then be deciphered from the conversion of resources to capabilities. Whether they consider public transport use as an element worth including in the mobility capability, or whether it is deemed something to convert resources towards, is another question. Here, the individual's use of public transport (for the trips for which it is used) is conceptualised as an element of the individual's mobility functioning. The individual's mobility functioning exists as one of many functionings comprising the individual's well-being.

Cycling as an element of the mobility capability and functioning from a life course perspective

For Paper II, cycling as an element of the individual's mobility capability is considered, as are the characteristics and resources of those who have experienced the removal of cycling from their mobility capability compared to those who have not experienced this disruptive event. Cycling as an element of an operationalised mobility capability (a functioning) is also analysed, with those who cycle compared to those who do not cycle. Both the intrinsic and the instrumental value of cycling as an element of the mobility capability were considered; the former, with a focus on the freedom, convenience, versatility and ease associated with cycling; the latter with a focus on cycling as a facilitator of activities of value.

The CA is complemented by an innate life course perspective as part of Paper II. Cycling is considered as part of the mobility biographical trajectory for those who cycle now, and for those who have cycled previously. Those who have discontinued cycling have experienced a disruptive event as part of their mobility trajectory, and must therefore adapt to a new trajectory without cycling as an element of the mobility capability.

The application of the CA to Paper II is not explicit in that the language of the CA (capabilities, functionings, etc.) is not used. However, the approach in the paper is framed by the CA, as is the analysis of results and the discussion.

Modal options and risk of transport-related social exclusion

For Paper III, groups which have been identified as potentially at risk of transport-related social exclusion (now or in future) are the focus. The definition of the capability was deliberately kept vague so that the respondents themselves could define which activities were of value to them, and to consider whether or not the limitation was indeed related to mobility. This is in line with Sen's CA whereby he argues that it is not fitting for analysts to define capabilities of value (or thresholds) as these should be defined by the people themselves. This was opposed to defining a fixed set of 'important' capabilities in advance and so as not to lead respondents by introducing issues related to mobility as part of the question posed.

Modal choice set and the instrumental role of the mobility capability

For Paper IV, the capability to carry out everyday activities of value is considered to both facilitate and be facilitated by the mobility capability (elements of which include the individual's modal options). The aim of the first research question is to examine which resources and characteristics (both explicitly and implicitly related to mobility) are associated with individuals having a smaller modal choice set (as an element of the mobility capability). This research question and corresponding analysis regards an individual's set of modal options as an unequivocal element of their mobility capability. As outlined above, having more choice is associated with greater freedom, with freedom in turn, associated with well-being. Congruently, having a limited choice set (or fewer modal options) in comparison to peers can be associated with reduced well-being (Sen 1993: 39).

For Paper IV, the mobility capability is conceptualised as *the differing extents to which individuals could reach everyday activities of value given the interaction between their individual resources and the transport and land use system, if they should choose to do so*. The ways in which such activities could be reached is the main focus here, with modal options the main consideration. It is, however, important to stress that modal options should be framed as just one element of the

mobility capability, with several other – arguably less tangible and comparable – aspects forming an individual’s mobility capability. With this in mind, it is not just the ‘how?’ (the mode of transport), but the ‘when?’; ‘where?’; ‘with whom?’; ‘with what level of ease?’ that should also be considered, among other aspects.

One modal option (e.g. the car) could satisfy more needs and desires than two or even three modal options, depending on the contextual conditions and activity patterns of an individual. It is, however, not considered that there is a strict linear – or even ordinal – relationship between having more modal options and a greater well-being. Moreover, the intention is not to suggest that fewer modal options would necessarily mean a reduced well-being, but instead, to consider whether a more robust choice set could be associated with a greater resilience as a person ages.

The intention of the second research question from Paper IV was to explore which resources and characteristics (both explicitly and implicitly related to mobility) are associated with individuals having a limited capability to carry out everyday activities of value. Here, the capability to carry out everyday activities of value is conceptualised as being somewhat limited – however not exhaustively or exclusively – if the individual’s mobility capability is limited.

The third research question from Paper IV explores the extents to which having the possibility to use (elements of the mobility capability) and actual use of each modal option (elements of the mobility functioning) differ. Here, the focus shifts to elements of the individuals’ mobility functionings i.e. which modes individuals have chosen to use from their respective mobility capabilities.

Similarities between the CA applied to mobility and other frameworks

The CA is of course just one perspective on these issues, and there are several other perspectives which both converge with and diverge from the CA. The descriptive application of the CA, as applied here, shares many parallels with the conceptualisation of ‘motility’ (Kaufmann et al. 2004). However, one stark difference between the two is that motility tends to afford more attention to the social structures producing the potential mobility (see Deneulin 2008: 111-122 for a critique of the CA in this respect). The CA, on the other hand, affords more attention to the descriptive process at play, encompassing the freedom of the individual relative to others, the concept of choice, the production of the capability, and the selection of functionings among capabilities. In this sense, the latter aids in the analysis of the decomposition of mobility as a process incorporating resources – conversion factors – capabilities – functionings – well-being (see Comim 2008:

168-169). As such, it is not just the resources (mobility-related or otherwise) in themselves, but also their potential to be realised and their potential to support the realisation of other capabilities of value that is considered. For a further discussion of the (1) operationalisation of the concept of motility, see Flamm and Kaufmann (2006); (2) the potential use of motility in transport policy, Shliselberg and Givoni (2018); and (3) the conceptualisation of motility for the analysis of modal choice, De Witte et al. (2013).

Further parallels can be drawn with, for instance, time geography approaches, where (very simply put) resources and constraints are considered to work in tandem in order to produce an individual's potential mobility (Hägerstrand 1970). However, the decomposition of the different elements and the ways in which they are conceptualised differs to both the CA and motility, with time geography naturally mostly concerned with the production of potential mobility in time-space.

The concept of unmet mobility needs complements the CA. The former, with a focus on needs, the latter with a focus on potential. Unmet travel needs have been defined by Luiu et al. (2017: 489) as:

...mobility needs that remain unfulfilled due to the inability to accomplish needed or desired journeys and activities.

For this thesis, rather than focusing on unmet travel needs, the focus lies on the cause; the inability to accomplish needed or desired journeys and activities – what is conceptualised as a limited capability to carry out everyday activities of value. This amounts to a lack of potential to fulfil needs, regardless of whether or not the needs are then fulfilled. Luiu et al. (2018) put forward a framework for analysing unmet travel needs, based on several studies investigating the same. This framework could be likened to resources and capabilities as deliberated by Sen (1995), and indeed applied and advanced by Nordbakke (2013).

Limitations of the CA

Individualism

One of the main criticisms of the CA is its supposed overly individualist perspective. Critics have argued that there is too much emphasis on the individual and not enough on the social structures in which she/he finds her/himself (see e.g. Deneulin 2008). However, Robeyns (2008) defends the individualism inherent in the CA as ethical individualism, as opposed to ontological or methodological individualism. Furthermore, in Sen's rebuttal to such critique, he highlights that capabilities not only acknowledge but actually focus on relational connections between the

individual and society, and among individuals in society. Sen (2000) rhetorically questions how this perspective could possibly be deemed ‘excessively individualist and insufficiently social’ when its very essence lies on such relational features.

However, Deneulin (2008: 111-122) argues that it is necessary to analyse capabilities from structures of living together, with Robeyns (2008) arguing that inequalities are masked if we just look at household level. Robeyns takes this argumentation further by highlighting that false gender-neutral accounts can emerge when sufficient attention is not paid to social structures, household and family dynamics, with Alkire (2008: 37-41) arguing that it is necessary to look at capabilities which may arise due to group membership.

Temporal and contextual aspects

Temporal and contextual aspects are somewhat lacking in the CA, particularly with respect to social structures (Deneulin 2008: 111-122) and life course aspects (Yaqub 2008: 437-439). This issue presents considerable difficulties when analysing the fluid, dynamic concepts of options and choice. Modal choice and accessibility in particular are not static and are temporally and contextually dependent.

However, as Sen emphasises, it is necessary to clarify the discrepancy between what is acceptable in terms of practical difficulties such as the availability of data, and what the appropriate procedure would have been had there not been such limitations (Sen 1995), with many temporal and contextual aspects somewhat out of focus in this respect.

Adaptive preference

Adaptive preference is a phenomenon whereby it is considered that people who are disadvantaged relative to others have adjusted their expectations and adapted their preferences in accordance with such disadvantage. This phenomenon presents issues for the comparison of individuals as part of empirical studies, as some individuals’ subjective experiences do not fully reflect the extent of their disadvantage (Nussbaum 2001; Nussbaum 2011: 83-84). Accounting for adaptive preference effects was a significant concern for the current empirical investigation: how should those who are worse off know that they are missing out on activities? Perhaps they are happy enough with the possibility to carry out rather few activities because they are used to such a situation and have adjusted their expectations accordingly. Formulating questions and communicating hypothetical scenarios proved to be quite difficult, as did disentangling mobility-related concerns from other concerns not related to mobility.

Furthermore, the discrepancy between the perception of the individual and the observations of the analyst can also present problems in the application of the CA

(Comim 2008: 170-173; Deneulin 2008: 118-119). It is somewhat problematic to empirically assess the distribution of mobility capabilities based on self-reported accounts as such reports can be linked to dependence paths and self-selection processes. However, the observer's account can be just as problematic, potentially influenced by her/his own values and assumptions. Nonetheless, it is considered that individuals' own reports can generate a relatively good indication of their individual circumstances, particularly with respect to the considerations of the CA (cf. Sen 1995: 52-53). Moreover, attempts were made to alleviate some adaptive preference effects by incorporating a two-way communication process between the interviewer and respondent, with the interviewer probing for further information through open-ended questions at different stages of the interview (cf. Comim 2008: 171, see Chapter 5).

Defining and measuring capabilities

The difficulties which can arise when measuring capabilities is something Sen has discussed at length, even as part of his own attempts to operationalise the CA (cf. discussions outlined in Alkire 2008). The measurement, definition and delimitation of capabilities is challenging. As a somewhat elusive concept, the inherent difficulty is capturing what capabilities are, how they should be measured (if they should be measured), and how they should be delimited (if they should be delimited), and whether it is possible to give fair comparisons across a range of individuals.

Alkire (2008) argues that, when defining or measuring capabilities, the main focus should be placed on capability expansion, and that the CA should be applied using a sound approximation of capabilities (with reference to Sen's comments). However, Comim (2008) contends that measurability should not be deemed a necessary condition for shaping a conceptual framework.

Differentiating between resources and conversion factors

According to the CA, resources cannot fully 'explain' the variation in capabilities among individuals, as conversion factors are also considered to be at play. However, it is difficult to decipher whether this unexplained variation is indeed conversion factors or whether the resources considered were not exhaustive. Even if it were possible to somehow draw a line between conversion factors and resources, where should the line be drawn?

The connection between functionings and well-being

Assuming functionings contribute positively to well-being is somewhat problematic in that a person may choose in such a way that does not improve their well-being. Furthermore, the individual may not have all information when choosing among their capabilities in order to know how they would best maximise their well-being.

However, the chosen functioning contains a considerable amount of information about the capability set, that is, it was the 'best' option available to the person, from the person's perspective (Sen 1995).

Nonetheless, despite these limitations, the CA is considered to be an optimal way of framing the issues presented as part of this thesis, for the reasons outlined in the beginning of this chapter. The next chapter details the methodology and methods employed for the different papers, and how the CA was operationalised as part of the data collection and analysis.

5 Methodology, material and methods

The methodological stance of the thesis

This thesis is underpinned by a postpositivist research methodology (see Sharma 2010 for an outline). The stance of the thesis is considered postpositivist in that the empirical material is not treated as objective or free from bias, or that it reflects the ‘real’ situation for the individuals. It is instead treated with caution. This research framework is fitting in that much of this thesis comprises perspectives based on inherently quantitative concepts and relational measures, yet includes some smaller qualitative elements. The empirical elements of this thesis are comprised of cross-sectional studies, which are considered an optimal way of capturing inter-individual variability (Schafer and Ferraro 2009). Standardised methods of data collection and statistical analysis are employed.

For this thesis, the empirical material is not approached as telling some kind of ‘objective truth’ but is instead considered to give a nuanced perspective on the circumstances of the individual. This is the case for Paper II in particular. The material is instead treated as clues, and the disturbances and fragmentations in the rhetoric are analysed. A postpositivist stance, combined with infusions of hermeneutics and poststructuralism forming a reflexive perspective, are present here (see Alvesson and Sköldbberg (2009) for an elaborate discussion).

For Paper III, the embedded qualitative strand enters in order for individuals to report their own experiences, and to allow for the expansion of ideas. This element is included so as to limit the extent to which the researcher’s values and reasoning would shape the results. This rationale is further underpinned by postpositivist thinking. Table 1 presents the research questions upon which the four papers are based.

Table 1. List of research question upon which the papers are based

Paper	Research questions
I	<p>What are the relationships between different mobility resources and the perception of the possibility to use public transport as a primary mode of transport among older persons?</p> <p>What are the relationships between different mobility resources and the use of public transport by older persons?</p> <p>What are the key differences between the resulting public transport user and non-user groups in terms of their travel behaviour?</p>
II	<p>What are the key differences between older cyclists and older non-cyclists?</p> <p>What are the perceptions of older cyclists in relation to cycling as a mode of transport?</p> <p>Which factors are associated with cycling cessation in later life?</p>
III	<p>Which characteristics and resources are associated with the respective modal options?</p> <p>How satisfied are respondents with their respective modal options?</p> <p>How do the proportions of those with a limited capability differ between the different types of modal options?</p> <p>Which activities would this group like to have the possibility to carry out?</p> <p>What prevents this group from having the possibility to carry out such activities?</p> <p>Why is it not possible for this group to use public transport?</p>
IV	<p>Which resources and characteristics (both explicitly and implicitly related to mobility) are associated with individuals having:</p> <p>A smaller modal choice set (as an element of the mobility capability)?;</p> <p>A limited capability to carry out everyday activities of value? and;</p> <p>What are the differences between the proportions of (i) those who have the possibility to use and (ii) those who actually use each modal option among this group?</p>

This chapter presents a detailed outline of the methodology and methods employed for each paper. However, further information regarding each of the individual papers is available in the appendix.

The sequence of the thesis

The papers comprising this thesis follow one another in a sequential manner. Paper I functions as a form of test study, influencing the empirical studies upon which Papers III and IV are based. The data upon which Paper I is based is part of Sweden's National Travel Survey (Transport Analysis 2014a). This survey is by no means intended to capture any elements of what would be termed 'capabilities'. However, for the Stockholm region only, a question regarding the possibility to use public transport (conceptualised as an element of an individual's mobility capability) was included. This question fit rather well with the notion of capabilities.

For Paper I, the focus was mainly on public transport and its role, while for Paper II, cycling in the city of Malmö was analysed as a more focused case study. For Paper III, the focus was on the differences between public transport and the car as modal options, whereas for Paper IV, all modes were considered.

Papers III and IV were based on an empirical investigation purposefully designed and shaped to capture elements of the CA. Ethical approval was granted for this study by the Regional Ethical Approval Board in Lund in September 2015 (Dnr 2015/447). Designing and conducting such an investigation was a unique opportunity, and a unique challenge, with even Sen emphasising that there are significant empirical difficulties attached to the employment of the CA (Sen 1995: 52-53; see Comim 2001; Comim 2008). Such difficulties are mainly considered to arise when capturing hypothetical situations, attempting to alleviate adaptive preference effects and framing issues and survey questions in a comprehensible and consistent way. This investigation was no different.

The questionnaire was developed with the intention of capturing three specific elements of the CA: resources, capabilities and functionings (see the appendix for the interviewer's script). The questionnaire was formulated, tested and adapted a number of times in consultation with data collection consultants, colleagues and experts prior to the commencement of data collection. Draft scripts were also rigorously tested and revised in advance of data collection. The capability to carry out activities of value was intentionally *not* specified as part of this investigation. This was in order to avoid posing a leading question, and to avoid influencing respondents' answers (so that they would not automatically answer regarding mobility issues), and in order to gain a more holistic perspective regarding the context of the individuals' mobility and everyday activities.

The conceptualisation of capabilities – particularly the distinction between their intrinsic and instrumental roles – advanced as the thesis progressed. In this way, the papers are ordered in a logical sequence.

The questions posed as part of this survey are rather dichotomous in nature. However, the notion of capabilities is conceptualised as somewhat binary: one either has or does not have said capability, even if this may change over time, and depending on the context (see the discussion in Qizilbash 2008). Likert scales were not used as it was considered that this would result in having to make an arbitrary decision regarding where the threshold should lie, in order to determine whether a person has said capability or not. As mentioned earlier on in the thesis, what was measurable or comparable in terms of capabilities and functionings was rather limited, posing considerable challenges for data collection.

The analyses employed for the different papers changed several times, and different forms of regression and analysis techniques were tested (e.g. ordinal regression for Papers III and IV). Similarly, several resources which were initially considered to be of importance were tested in various configurations (scale, ordinal, binary categorical) and were later excluded as independent variables as part of the analyses. In this way, the analyses evolved on a trial-and-error basis, from paper to paper, and

as the thesis progressed. Not all analyses turned out as planned, but were considered optimal given the circumstances in each instance.

Description of study areas

Definition and delimitation of study areas

The concept of the large metropolitan region ('*storstadsområde*' in Swedish) is presented by Statistics Sweden (2005), where large cities (in a Swedish context) and their hinterlands are recognised as a form of functional urban area (FUA). The configuration of large metropolitan regions (LMR) is based on commuter patterns and movement between the central municipality and outer municipalities, and takes into account collaboration with respect to planning (Statistics Sweden, 2005). This definition and delimitation is rather closely aligned with other definitions of FUAs¹. For Papers I, III and IV, this definition and delimitation is employed, with Paper I focusing exclusively on Stockholm LMR, and Papers III and IV focusing on all three LMRs: Stockholm, Gothenburg and Malmö. This geographical level was deemed appropriate as it was considered that it would approximately reflect the potential path areas and action spaces of inhabitants in terms of everyday activities (with some exceptions e.g. where people live close to the border of the LMR).

The focus of Paper II is delimited to that of Malmö municipality (referred to as 'Malmö city'), which broadly represents the central areas of Malmö and much of the geographical cycling patterns of its inhabitants. The locations of the study areas are highlighted in Fig. 3.

¹ A functional urban area is the hinterland of an urban centre (or centres), with cores defined using population density, and commuting flows used to identify the surrounding area which is integrated with the cores in terms of its labour market movement (cf. OECD 2013)

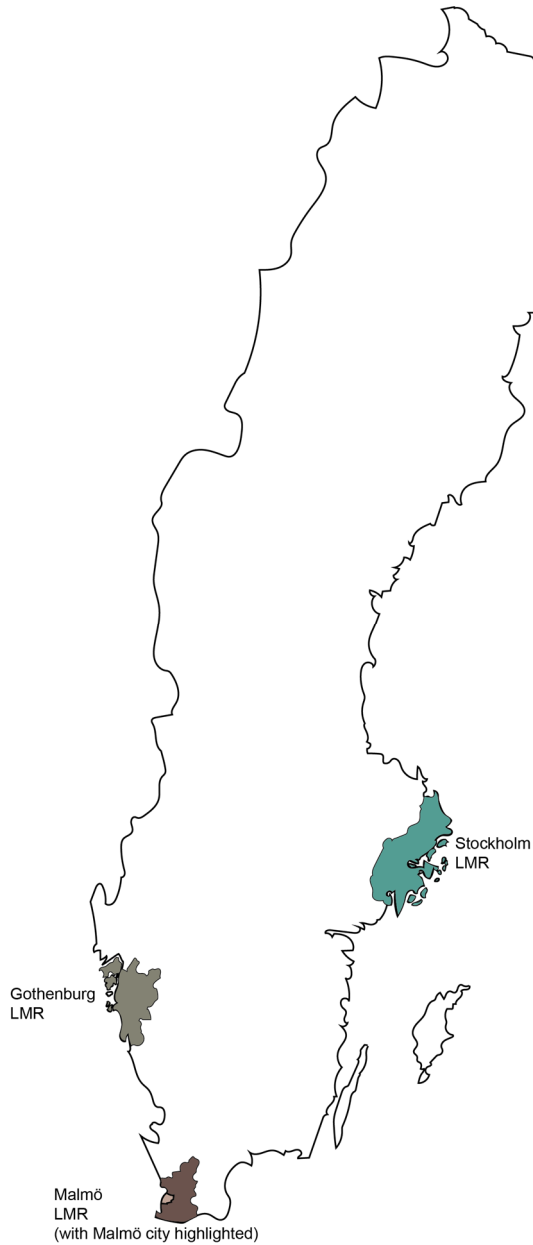


Fig. 3 Map of Sweden with the study areas highlighted

Study area for Paper I

The Stockholm LMR formed the study area for Paper I. This LMR has an overall residential density of 337 persons/km² (Statistics Sweden 2014). However, there is

quite a disparity in terms of how far from the mean several municipalities lie (Statistics Sweden 2014, see Fig. 4). The denser municipalities lie in and around the centre of Stockholm, with the municipalities of least density generally lying further from the centre. It must, however, be highlighted that there is also a disparity at municipal level, with several higher density centres, and much lower density peripheries dispersed across municipalities. This is in keeping with Lundin and Gullberg's (2011) characterisation of the (inner) areas along the subway lines as dense settlements with strong communications.

Although there is considerable public transport use in the region (55% of the market share compared to car use at three key cordons), older age groups are underrepresented among public transport users (Storstockholms Lokaltrafik 2013). The region has an overall strong provision of public transport, but there are geographical differences between the municipalities.

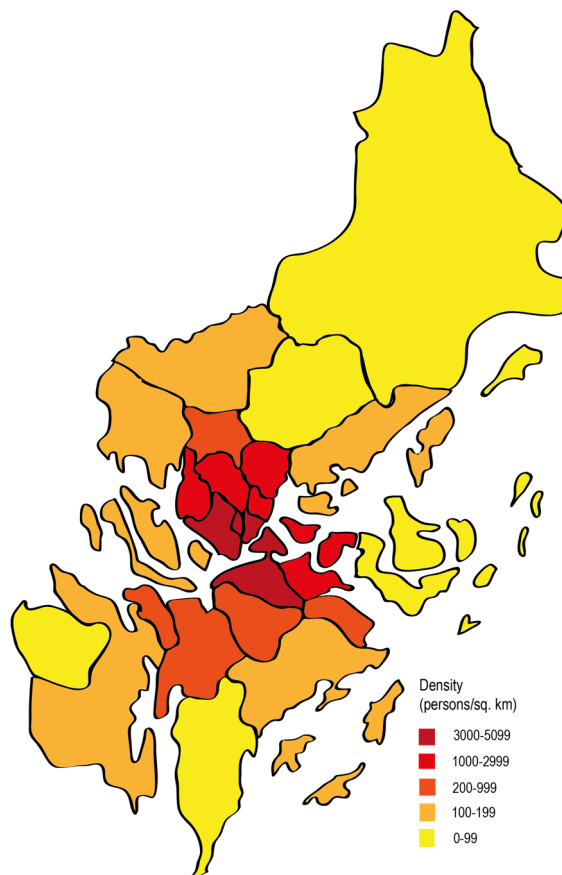


Fig. 4 Residential density in Stockholm's LMR
A version of this figure is included in Paper I. Source of data: Statistics Sweden (2014).

Study area for Paper II

The municipality of Malmö comprised the study area for Paper II. Malmö is a city of approximately 320,000 inhabitants, with 13% of inhabitants aged 65-85. This is opposed to 17% lying within this age range for the whole of Sweden. It is a relatively ‘young’ city, which has experienced rather dramatic population growth in the last 30 years. Malmö’s population has grown 38% since 1985 to its current highpoint of approximately 320,000 (Statistics Sweden 1985; Statistics Sweden 2014).

Malmö is a low-lying, rather flat city, with a strong history of cycling and a ubiquitous cycling culture. This cycling culture was embedded in the shipbuilding industry which dominated the city’s industrial development during the 20th century. Malmö Municipality has put a strong emphasis on its aim for cycling to be a part of its inhabitants’ everyday lives, with 467 kilometres of cycle lanes and exemplary cycling infrastructure (Malmö Municipality 2012; Malmö Municipality 2015).

Study area for Papers III and IV

Sweden’s three LMRs, Stockholm, Gothenburg and Malmö, were chosen as the study area for Papers III and IV. Key details regarding each of the LMRs are outlined in Table 2.

Table 2 Key characteristics of Sweden’s three LMRs

Source of data: Statistics Sweden (2015).

Variable	Stockholm LMR	Gothenburg LMR	Malmö LMR
Population	2,231,439	982,360	695,430
Area	6,524 km ²	3,694 km ²	2,521km ²
Density (persons/km ²)	342	266	276
Percentage aged 65-79	12%	13%	13%

Stockholm is the most well-off of the three LMRs. The mean income for those aged 65-79 is significantly higher (t-test, one sided) in Stockholm compared to Malmö ($p < 0.004$) and Gothenburg ($p < 0.005$). In Stockholm, just 9.3% of this age group has an income less than 60% of the median income. For Gothenburg, it is 12.6%, and for Malmö, 12.4% (Statistics Sweden 2015). However, the cost of living in Stockholm is notably higher than in the other two LMRs.

The Gothenburg LMR is located in the west of Sweden, with a less apparent disparity in population distribution when compared to Stockholm. Gothenburg’s reputation for public transport is not as strong as that of Stockholm, possibly owing to its prominent industrial history of car manufacturing (Enhörning 2010). Much of

Gothenburg city's public transport is tram-based, as distinct from the cities in the other two LMRs.

Malmö's LMR is located in the south-west of Sweden, east of the Öresund fixed link which connects the region to Denmark's capital city, Copenhagen. Malmö's LMR has a higher population density than Gothenburg's, but still much lower than that of Stockholm. The urban centres of Malmö and Lund are often credited for their cycling infrastructure and culture (Cykelfrämjandet 2016). Malmö is the only LMR of the three that does not have a congestion charge zone in its city centre.

Methods of data collection

Data collection for Paper I

The focus of Paper I was on those aged 65-79 and living in Stockholm LMR. The data source was the travel survey dataset ('*Den nationella resvaneundersökningen (RVU)*') in Swedish, Transport Analysis, 2014a). These data were collected through telephone interviews using a prescribed questionnaire, based on a random sample during 2011-2013. The overall response rate for the survey period was 44% (Transport Analysis, 2014b, authors' calculations, see Table 3 for more information). These data were then combined with local level (approximately postal code level) register data (Statistics Sweden, 2011).

Data collection for Paper II

Paper II employed both a quantitative method of data collection and analysis (a survey with statistical analysis) as well as a qualitative method of data collection and analysis (focus groups and content analysis). The intention of employing a mixed methods approach was so that both breadth and depth of understanding would be facilitated (cf. Johnson et al. 2007). The aim was for the quantitative element to give an overview of the surface issues and of the characteristics of this age group. The qualitative element was intended to complement this understanding, through engaging further in the processes at play behind the quantitative material, to allow for stories to be told and experiences and perceptions to be expanded upon, through the study of meaning. This mixed methods approach allowed for a better understanding of the research problem, as opposed to what would have been the case had just one method been employed (cf. Creswell and Plano Clark 2011: 5).

Questionnaires were sent by post to a random sample of 766 persons aged 65-85 living in Malmö city. Addresses were extracted from the Swedish national register. After one reminder, 456 questionnaires were completed and returned, resulting in a

response rate of 60% (see Table 4 for more details). The survey questionnaire comprised three parts:

1. Background information and personal characteristics of the respondents
2. The perspectives and perceptions of those who consider themselves not/no longer to be cyclists
3. The perspectives and perceptions of those who consider themselves to be cyclists

Two focus groups were carried out in order to gain a deeper insight into older persons' perspectives and perceptions with respect to cycling. Focus group participants were recruited through inviting all survey respondents to state whether or not they would be interested in participating in a focus group related to the topic of cycling. Of those who expressed such an interest, eleven participated in the first focus group (five men and six women), and nine in the second (five men and four women). Both focus groups were conducted during October 2012. The theme of the focus groups was 'To cycle or not to cycle as an older person'. The discussion guide comprised two main themes:

1. Reasons for cycling/not cycling
2. The cycling experience in Malmö

Data collection for Papers III and IV

An initial stratified random sample of 3,200 people aged 65-79 and living in Sweden's LMRs was drawn from a population register, with contact details comprising both fixed and mobile telephone numbers. A letter with information regarding the survey ('Mobility opportunities among older people in the large metropolitan regions') was then sent by post to this sample in October 2015. This letter stated that the individual may (or may not) be contacted by telephone within the coming weeks and asked to participate in the survey. The letter provided the researchers' contact information so that we could address any concerns they may have about the study and for them to opt out if they so wished. Eleven people opted out prior to the commencement of data collection (and two more during data collection).

This survey was conducted using CATI. This method of data collection allows for interviewer-respondent interaction with a focus on reducing misunderstanding and facilitating a two-way communication process. This type of data collection – as opposed to a traditional postal survey and web-based/online survey methods – also allows for a continual feedback process (Kelly 2008).

Once interviewing had commenced, interviews were closely monitored in order to ensure that respondents comprehended the questions, and that these questions were understood in a rather consistent manner. Interviewers were provided with instructions so that they themselves would have a clear understanding of the issues the survey intended to capture. They were also given on-screen instructions which were used to explain the questions to respondents. These techniques were used in order to reduce the risk of misunderstanding. At each question, respondents were given the option of answering 'Do not know' or 'No answer', with interviewers then recording any further comments provided by respondents as an open-ended alternative. In this way, several of the answers provided by respondents could be coded into the pre-codes following the completion of data collection.

From the remaining sample of 3,189 people (stratified random sample by age and by region), attempts were made to contact 2,119 (randomly selected but with a dependent probability i.e. successively changed probabilities of being called as the survey progressed). Of these 2,119 people, 1,150 agreed to participate in the study, resulting in a response rate of 54% (56% for Stockholm; 52% for Gothenburg and 55% for Malmö). The remaining 1,070 were not contacted after the quota of 1,150 interviews was reached. This number of interviews (1,150), at a response rate of 50%, had a confidence level of 95% and a confidence interval of 5%. There were no concerning statistically significant differences between the sample and the population it was intended to represent.

The 1,150 interviews were conducted between early November and early December 2015. One interview in Stockholm was later excluded as it was discovered that the respondent had answered the questions based on a second address outside of the Stockholm region, reducing the number of valid interviews in Stockholm to 383, and the total valid number to 1,149 (383 in Stockholm, 383 in Gothenburg and 383 in Malmö). The reasons given for not participating were (1) the person does not participate in surveys out of principle (29%); (2) there was no answer from the person when they were contacted (18%); and (3) the person does not have time to participate (13%). The interviews were only carried out in Swedish and over the telephone meaning that some people who were contacted could not participate (5.7% of those who could not participate had difficulty speaking/spoke unclearly/could not speak Swedish). Table 5 presents an outline of the differences in key descriptive statistics between those interviewed and the populations living in the LMRs.

For Paper III, a mixed methods approach of a small qualitative strand embedded in the larger quantitative study design was employed (Creswell and Plano Clark 2011). The quantitative strand was intended to give a comprehensive view of the relationships between different personal circumstances, modal options and limited capabilities, with the embedded qualitative strand then allowing us to delve further

into modal options, limited capabilities, the ways in which they are limited and individuals' perceptions as to why they are limited. Paper III drew on the pre-coded, quantitative survey, with the questionnaire specifically formulated so as to identify two groups who are considered at a higher risk of transport-related social exclusion (see Fig. 5). The qualitative strand then zoomed in on the issues experienced by these two groups. The qualitative strand took the form of three open-ended question techniques embedded in the larger quantitative study design. This fixed approach was employed so as to allow for complementarity between the methods, facilitating a more rounded understanding of the research problems in comparison to what would have been the case had just one type of method been employed (cf. Creswell and Plano-Clark 2011: 67-71). The qualitative strand was intended to give a greater freedom to these specifically selected groups of respondents, so that they could voice their concerns beyond the rigid pre-coded quantitative survey format and what we as researchers had deemed was important for them.

Key details of the sample for Papers III and IV are detailed in Table 5. While there were no significant issues with representativeness for each individual LMR, when all three LMRs were combined to form one large sample, Stockholm was underrepresented and Malmö overrepresented. As such, these two LMRs were assigned weights so that, when analysing all three, the phenomena in Stockholm were not underrepresented, and those in Malmö overrepresented. Those living in Stockholm were assigned a weight of 2.15, in Malmö a weight of 0.72, and in Gothenburg a weight of 1.00. It was important that the data accurately represented all three LMRs as the main aim of Paper IV was to look at the metropolitan regions together and not to delve into the differences between them. While data collection was taking place, the characteristics of respondents were monitored with respect to a stratified sampling frame which accounted for gender, age and residential location. This was done in order to decide whether it was necessary to continue interviewing beyond the quota in the case of difficulty reaching a certain sub-group.

Description of samples

The sample size for Paper I was N=1187 (see Table 3 for more information).

Table 3 Sample information (from Paper I)

Source of data: Transport Analysis, 2014a, author's calculations.

Variable	Proportion
<i>Household status</i>	
Living with others	65.5%
Women living alone	23.0%
Men living alone	11.1%
<i>Car access</i>	
Holding a driving licence and having access to a car	71.7%

Table 4 details the key characteristics of the survey respondents for Paper II (N = 456).

Table 4 Comparison of characteristics of the net sample with the population in Malmö city

Source of population data: Statistics Sweden (2012).

Variable	Malmö city survey sample (population)
<i>Gender</i>	
Proportion of women	62% (56%)
Proportion of men	38% (44%)
<i>Age</i>	
65-70	43% (40%)
71-75	23% (24%)
76-80	20% (20%)
81-85	14% (16%)

Table 5 details the key sample information for Papers III and IV (N=1149).

Table 5 Comparison of characteristics of the net sample with the population in the three LMRs

Source of population data: Statistics Sweden (2015)

Variable	Stockholm LMR survey sample (population)	Gothenburg LMR survey sample (population)	Malmö LMR survey sample (population)
<i>Gender</i>			
Proportion of women	55% (53%)	52% (52%)	54% (52%)
Proportion of men	45% (47%)	48% (48%)	46% (48%)
<i>Age</i>			
65-69	33% (42%)	39% (41%)	42% (40%)
70-74	42% (36%)	35% (35%)	37% (36%)
75-79	25% (22%)	26% (24%)	21% (24%)

Analysis of material

Analysis of material for Paper I

For Paper I, each of the mobility resources was classified into a specific ‘Mobility resource realm’, that is, the aspect of the individual’s life with which the resource is most concerned (cf. Nordbakke 2013). The entire dataset was initially examined in order to derive variables which could be considered key to influencing the mobility of this group. Those indicating particular relevance for public transport use were given a greater consideration. Thirty-three potential variables were initially included in the scope. Several of these variables were constructed through combining variables in the travel survey dataset, as well as combining travel survey data with register data. During the subsequent testing of such variables, it was found that some produced statistically non-significant results (at a significance level threshold of $p \leq 0.05$). A proportion of the independent variables was excluded on the basis of their dependence on other independent variables in the model. Those which were included were deemed more crucial and/or carried a greater predictive power, or improved the models’ fit to a greater extent compared to those excluded (see Table 7 for information regarding the variables included in the models).

The analysis model for Paper I is based on three parts: Mobility capability element analysis; Mobility functioning element analysis; Comparison of ‘user’ and ‘non-user’ groups. Two logistic regression models were carried out using SPSS Statistics 21: the first, analysing the relationship between mobility resources and the production of the ‘mobility capability’ element, and the second, analysing the relationship between mobility resources and the production of the ‘mobility functioning’ element. The final part consisted of the comparison of travel behaviour(s) of the four groups produced from the first two analyses.

The dependent variable was constructed based on the following question (Transport Analysis 2011):

Even if you seldom or never travel with public transport, I have a question about how you look upon your opportunities to travel with public transport. To what extent do you agree with the statement: ‘I can use public transport for the majority of trips I take’? Answer on a scale from 1-5 where 1 is to completely disagree and 5 is to completely agree.

These answers were recoded whereby those answering 1-3 (‘completely disagreeing’; ‘disagreeing in part’; or ‘neither agreeing nor disagreeing’) were coded as not having the possibility to use public transport as a primary mode (code ‘0’), while the remaining (4 and 5; ‘mostly agreeing’ or ‘completely agreeing’) were coded as having the possibility (code ‘1’). The sample size was reduced to $n=943$ due to non-response for this question.

The dependent variable for the second part of the analysis was constructed based on the following question (Transport Analysis 2011):

How often do you usually travel using public transport (that is, travelling with local bus, metro, commuter train, regional train, tram, and so forth)? This regards local and regional trips and does not apply to trips with special services such as a school bus.

Those who answered that they more seldom than once a month or never travel using public transport were coded as being a ‘non-user’ of public transport (code ‘0’). The remainder of respondents (those using public transport once a month or more often) were coded as being a ‘user’ (code ‘1’). The sample size was reduced to n=1127 due to non-response for this question.

Four user and non-user groups resulted from the first two parts of the analysis. Comparisons between the groups’ frequency of travel and modal choice between private car and public transport were conducted. These comparisons were carried out through cross-analysing the four user and non-user groups produced in the first two parts of the analysis with pre-coded travel behaviour types based on an interaction variable accounting for both the frequency of car and public transport use of the respondents (see Table 6).

However, this breakdown of groups can be considered somewhat problematic in that those who use public transport as their primary mode cannot be directly matched to the frequency of use. This is because we do not know how often people travel and for what proportion of their trips public transport is used. This is a limitation of the way in which the question is phrased, and a limitation which arises as a result of a shortage of information surrounding the overall travel behaviour of the individuals.

Table 6 Public Transport ‘User’ and ‘Non-user’ Groups

Group name	Mobility capability element	Mobility functioning element	Description of group
Users I (n=563)	Yes	Yes	Users of public transport and considering it is possible to use it as their primary mode.
Users II (n=238)	No	Yes	Users of public transport but not considering it is possible to use it as their primary mode.
Non-users I (n=80)	Yes	No	Non-users of public transport but still considering it is possible to use it as their primary mode.
Non-users II (n=86)	No	No	Non-users of public transport and not considering it possible to use it as their primary mode.

Analysis of material for Paper II

For Paper II, the quantitative survey data were analysed using descriptive statistics in order to fulfil the first aim of the study; and a binary logistic regression model was conducted in order to fulfil the third. For the binary logistic regression model, the dependent variable was formed through dividing respondents into two groups: those who have given up cycling (code '1'), and the remainder of respondents (code '0'). Those coded '0' are therefore a combination of those who do not cycle and have never cycled and those who do still cycle. The formation of the group 'those who have given up cycling' are therefore not just compared to those who currently cycle, but to those who have not experienced the trajectory-changing and disruptive event of cycling cessation (both current cyclists and those who have never cycled).

The independent variables which were ultimately included in the model were selected on the basis of their potential importance (based on previous research and reasoning surrounding preliminary findings), statistical significance in the model (at a threshold of $p \leq 0.05$), contributing to a better fit for the model, and their low correlation with other variables included in the model (see Table 7).

The empirical material collected during the focus group discussions was analysed using a content analysis technique (cf. Hsieh and Shannon 2005) in order to fulfil the second aim of this study. The material was analysed and categorised, with three predominant themes arising.

Analysis of material for Paper III

Fig. 5 depicts the routing of the questionnaire which led to group formation, and the development of the two main variables of interest. The variable 'Limited capability' constitutes two groups: one reporting a limited capability (i.e. not having the possibility to carry out all everyday activities of value), and the other constituting the rest of the respondents. The former is considered to be at a greater risk of social exclusion and is therefore a focus for the qualitative analysis. Here, the term 'potential modalities' is used to describe a potential way of travelling (i.e. a certain mode or combination of modes, or the absence of a mode). A potential modality is considered to form an element of an individual's mobility capability, or the choice set an individual has with respect to their mobility.

The 'Potential modalities' variable comprises three groups: (1) those with no possibility to use public transport (car only or neither option); (2) those who have the possibility to use public transport but not the car; and (3) those who have the possibility to use both public transport and the car.

The first group is considered to be at a greater risk of social exclusion than the other two. However, not having the possibility to use public transport does not necessarily constitute a risk of transport-related social exclusion but if or when the individuals

in this group who currently drive are faced with having to stop driving (or do not have driving as an alternative), a risk of social exclusion may materialise. The inclusion of those who cannot use either option (neither car nor public transport) in this group may mask some of the effects of simply not having the possibility to use public transport. This is a limitation of this model.

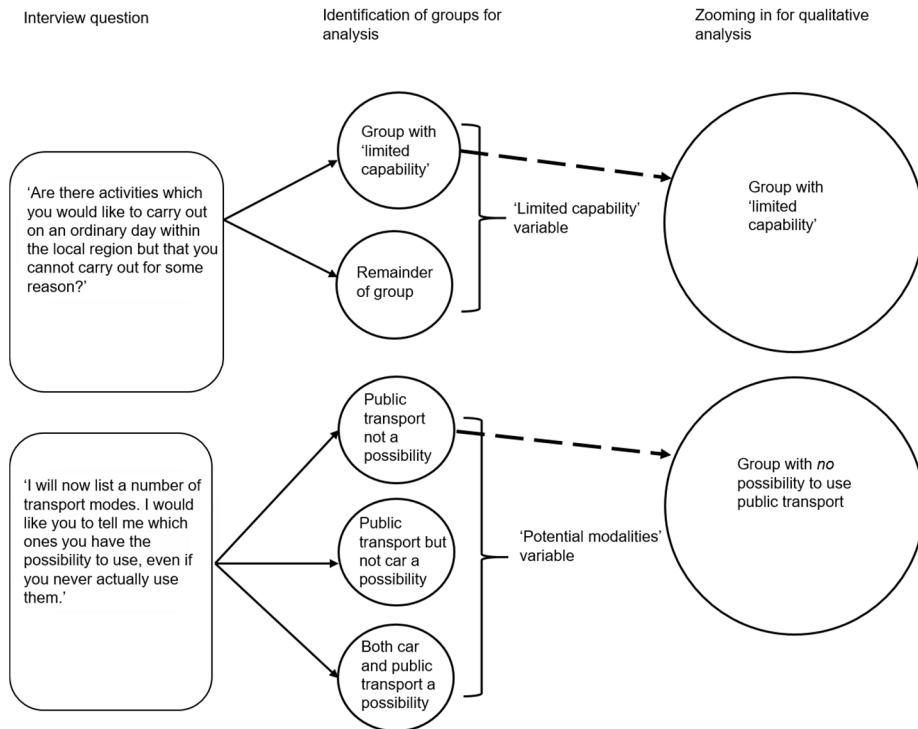


Fig. 5 Questionnaire routing leading to group formation and case selection for qualitative analysis

The quantitative strand comprised three main analyses. The first consisted of a multivariate multinomial logistic regression, which was intended to capture circumstances and characteristics which would produce increased likelihoods of being in one group over another. Several independent variables were tested, with just five included in the final model, as they did not produce considerable multicollinearity effects and each produced a statistically significant result (at a threshold of $p \leq 0.05$) (see Table 7).

The second analysis comprised simple chi-square tests to investigate whether there were significant differences between the groups with respect to satisfaction with potential modalities. The third analysis was again a chi-square test which intended to show whether there were differences between those with a limited capability and

the remainder of respondents among the different potential modality groups. Frequencies by LMR of residence were also presented and briefly analysed for the second and third parts of the analysis.

The qualitative strand took the form of three open-ended question techniques embedded in the larger quantitative study design. This form of data collection was not classically qualitative in that it did not allow for a more detailed examination of meaning, nor did it allow for a more detailed two-way interaction on the issues. It instead simply allowed for the two groups of respondents who were identified as being at a greater risk of social exclusion to voice their own concerns and to give more details regarding the subject matter (outside of the prescribed quantitative survey format). Once data collection was complete, all open-ended answers were read, re-read and then analysed. These answers were then coded according to their content (with the partial exception of one of the analyses where some pre-codes existed). A code-book was then developed, based on the most prominent and prevalent codes. Thematic formation was then carried out, based on groups of similar, related codes.

Analysis of material for Paper IV

Three statistical analyses were developed for Paper IV: a multivariate multinomial logistic regression and two multivariate binary logistic regressions. These analyses were developed by testing the inclusion of resources and characteristics which were considered likely to play a role in the capabilities of the respondents. These resources and characteristics were expressed in terms of independent variables in various formats and configurations and subsequently tested for statistical significance (at a threshold of $p \leq 0.05$). These variables were tested in the analysis of the likelihood of being included in the group with fewer modal options; in the analysis of the likelihood of being included in the group with a limited capability to carry out everyday activities of value; and in the likelihood of being included in the group with a transport and/or-mobility related limited capability to carry out everyday activities of value. Independent variables were excluded if they did not produce a significant result, if there were multicollinearity effects owing to their inclusion in the models and/or if they did not significantly contribute to the models (see Table 7 for the variables included).

For the first part of the analysis, respondents could report having the possibility to use a minimum of 0 modes and a maximum of 5. The modes included in the scope of this variable were public transport; car (as a driver); car (as a passenger); cycling; and walking.

For the second part, those conceptualised as having a limited capability to carry out everyday activities of value were coded as '1', and the rest as '0'. These respondents were asked to give reasons for why they perceive this capability to be limited.

Twenty-seven per cent of these responses were characterised by mentions of specific transport and/or mobility related issues, with a further 35% reporting issues with health which in many cases could constitute a barrier for mobility. Other responses were characterised by a lack of time (15%); a lack of energy/motivation (7%); financial concerns (4%); attachment to the home (3%); weather (3%); and other/not specified (6%). Several of these reasons could in part overlap with mobility issues, making it rather difficult to disentangle explicit mobility concerns from implicit mobility concerns, from concerns which are not at all related to mobility. The analysis was then expanded to address this concern by isolating those who reported that they had a limited capability *due* to a specific transport or mobility-related issue.

The last part of the analysis for Paper IV examined the proportions of respondents reporting having the possibility to use public transport (any combination of one or more of the following: local bus, regional bus, tram, underground, train, cross-rail); private motorised transport as a driver; active transport (walking, cycling) (elements of the mobility capability) and the proportions choosing to use each of the modes (elements of the mobility functioning). This encompassed a basic analysis of frequencies.

Summary of regression models

Table 7 presents an outline of the regression models included in each of the four papers, the dependent variables used and the independent variables ultimately included in the models.

Table 7 Summary of regression models

Paper	Regression type	Dependent variables	Independent variables included
I	Binary logistic regression	Including public transport as an element of the mobility capability	Gender (woman) (categorical, binary) Number of cars/household member (scale, continuous) Functional capacity indicator (categorical, binary) Residential density (scale, continuous)
	Binary logistic regression	Including public transport as an element of the mobility functioning	Woman living alone (categorical, binary) Number of cars/household member (scale, continuous) Functional capacity indicator (categorical, binary) Residential density (scale, continuous) Education level (ordinal)
II	Binary logistic regression	Having stopped cycling	Participating in desired activities (categorical, binary) Access to a car in the household (categorical, binary) Associating cycling with health (categorical, binary) Age (scale, continuous)
III	Multinomial logistic regression	Public transport but not car a possibility Both public transport and car a possibility Public transport not a possibility (code 1, reference)	Household status (not cohabiting) (categorical, binary) Monthly household income (higher) (categorical, binary) Perceived health condition (no reported daily problems when travelling) (categorical, binary) LMR of residence (categorical, 2 X binary) Gender (woman) (categorical, binary)
IV	Multinomial logistic regression	0-2 modal options (code 1, reference); 3 modal options 4 modal options 5 modal options	Household status (cohabiting) (categorical, binary) Monthly household income (lower) (categorical, binary) Perceived health condition (reported daily problems when travelling) (categorical, binary) LMR or residence (categorical, binary X2) Age (scale, continuous)
	Binary logistic regressions (Parts A and B)	Having a limited capability to carry out all activities of value (Part A) Having a limited capability to carry out all activities of value due to a specific transport or mobility-related issue/(s) (Part B)	Having someone to provide lifts (categorical, binary) Monthly household income (lower, high threshold) (categorical, binary) Perceived health condition (categorical, binary) Holding a driving license (categorical, binary) LMR or residence (categorical, binary) Age (scale, continuous) Possibility to use public transport (categorical, binary) Having someone to provide lifts (categorical, binary) Monthly household income (low, lower threshold) (categorical, binary) Holding a driving license (categorical, binary) Possibility to use public transport (categorical, binary)

Summary of methodology, material and methods

Table 8 presents a summary of the methodological perspectives, data sources and methods employed for each of the four papers.

Table 8 A summary of the methodology, methods and material employed for each paper

Paper	Perspective	Type of method	Study area	Age range	Sources of material	Analysis
I	Postpositivist	Quantitative	Stockholm LMR	65-79	National Travel Survey Data 2011-2013 (Transport Analysis 2014), National register data (Statistics Sweden 2011)	Multivariate binary logistic regressions and analysis of frequencies
II	Postpositivist hermeneutical post-structuralist (reflexive)	Mixed methods (quantitative and qualitative)	Malmö municipality (Malmö city)	65-85	Survey data ('Survey about cycling to you who are 65 and above'), Focus group material	Multivariate binary logistic regression, analysis of frequencies, content analysis from a reflexive perspective
III	Postpositivist	Mixed methods (quantitative with embedded qualitative strand)	Stockholm LMR Gothenburg LMR Malmö LMR	65-79	Survey data ('Mobility opportunities among older people in Sweden's large metropolitan regions'), Embedded open-ended data	Multinomial logistic regression, chi-square analyses, analysis of frequencies, content analysis and thematic analysis
IV	Postpositivist	Quantitative	Stockholm LMR Gothenburg LMR Malmö LMR	65-79	Survey data ('Mobility opportunities among older people in Sweden's large metropolitan regions')	Multinomial logistic regression, binary logistic regressions and analysis of frequencies

6 Results

The results of the thesis can be placed in themes according to their categorisation as elements of the CA. This chapter presents the synergetic aspects of the results; the ways in which the results from the respective papers complement each other and can be combined to produce a more complete picture than the sum of their parts. For more detailed accounts of the results, see the respective individual papers in the appendix.

Personal characteristics and resources

Perception of health

The perception of health emerged as an important resource as part of the empirical analyses for this thesis. For Paper I, the functional capacity indicator variable produced higher odds of including public transport as a mobility capability element. There was also an increase for the mobility functioning element associated with this variable.

There was a marked difference as to how cyclists and non-cyclists perceived their health, with 80% of cyclists satisfied with their health, compared to 57% of non-cyclists (Paper II).

For Paper III, those who perceive that their health does not cause problems for them on a daily basis when travelling were more likely to have a potential modality of public transport but not car compared to not having the possibility to use public transport. Furthermore, those who perceive that their health does not cause problems for them on a daily basis when travelling were more than nine times as likely to have a potential modality of both public transport and car (when compared to not having public transport as a modal option).

For Paper IV, those who reported that their health causes problems for them at least once a day when they want to travel were more likely to be in the group with fewer modal options available to them. This variable saw progressively and markedly lower odds of being in the groups with a greater number of modal options available to them. This indicates that poorer health could reduce the scope of an individual's

modal choice, and as such, her/his freedom and her/his well-being, as conceptualised by Sen (Sen 1993:39). For the second part of the analysis for Paper IV, those who reported that their health causes problems for them at least once a day when they want to travel somewhere were more likely to have a limited capability.

Chronological age, education level and gender

Increases in continuous chronological age produced a significant result in the comparison between (1) having five transport modal options and (2) having two or less for the first part of the analysis for Paper IV. Interestingly, for the second part of the analysis for Paper IV, the older respondents were less likely to have (or report having) a limited capability.

The results from Paper I indicate that a higher level of education was associated with higher odds of being categorised as a public transport user but did not produce a statistically significant result for including public transport as a mobility capability element.

Women were more likely to consider using public transport as a primary mode as an element of the mobility capability. This indicates that it is not only the actual use of public transport that experiences a gendered difference, but also the perception of mobility opportunities in terms of its use (results from Paper I). The results from Paper II showed that 72% of older men were cyclists, compared to the proportion of women (59%), while the results from Paper III indicated that women were more likely to have a potential modality of public transport but not car compared to not having the possibility to use public transport.

Social resources

Household status

While women were more likely to include public transport as a mobility functioning element, the 'gender' variable was subsequently removed from the model and replaced with the 'woman living alone' interaction variable (Paper I). This was because the latter was associated with a greater increase in the odds of using public transport, and also gave the model more information. 'Living alone' as a variable did not produce a statistically significant result for the model. This highlights that this specific combination of being an older woman and living alone means a systematic tendency towards public transport use as part of the analysis for Paper I.

The results from Paper III showed that those who do not cohabit were more likely to have a potential modality of public transport but not car compared to not having the possibility to use public transport. However, cohabitation was not statistically

significant in the comparison between the 'Both public transport and car' and 'Public transport not a possibility' potential modalities.

For Paper IV, it was found that those who cohabit were significantly less likely to have five modal options available to them (with reference to having 0-2 options).

Having someone or several people who can provide lifts

Those who reported having the social resource of someone who could provide lifts on a daily or almost daily basis were almost half as likely to have a limited capability. They were also less likely to be in the group with a more specific transport and mobility-related limited capability (results from Paper IV).

Competence resources

Holding a driving license

The findings from Paper IV highlighted that holding a driving license was associated with a lower likelihood of having a limited capability, suggesting that holding a driving license could be a key resource for having the possibility to carry out everyday activities of value. Those who hold a driving license were also less likely to be in the group with a specific transport and mobility-related limited capability.

Material resources

Car access

As part of the findings from Paper I, higher ratios of cars to member of household saw a decline in the odds of including public transport as a primary mode in the mobility capability. The same variable produced a decrease in the odds of including public transport as a mobility functioning element (findings from Paper I).

Paper II highlighted that cyclists also tend to have the mobility resource of car access, with 72% of cyclists reporting having a car in the household which they themselves drive, while only 35% of the non-cyclists report having this same mobility resource.

Household income

For Paper III, household income did not produce a statistically significant result in the comparison between having a potential modality of public transport but not car

compared to not having the possibility to use public transport. However, those with lower incomes were less likely to have a potential modality of both public transport and car compared to not having the possibility to use public transport.

The results from Paper IV showed that those within the lower income bracket saw a progressively lower likelihood of being included in the groups with greater modal choice. Here, a rather clear association between a lower income level and a smaller choice set is established. The second part of the analysis from Paper IV showed that those with monthly household incomes of up to 5,733 USD (49,999 SEK) were almost twice as likely to report having a limited capability. However, the group with incomes below this level should perhaps not be perceived as being at a disadvantage to those with incomes above, but instead, those with incomes above could be considered to be a high-income minority with more opportunities available to them than the majority. Those with lower incomes (at a lower threshold) were more than twice as likely to be in the group with the more specific transport and mobility-related limited capability.

Contextual resources

Residential density

The results from Paper I showed that an increasing residential density at a local level was associated with an increase in the odds of the individual considering it possible to use public transport as their primary mode of transport, and of the individual being a public transport user. The difference between the apparent effects of density on both statistical models from Paper I appears to be minimal, suggesting that density perhaps plays a similar role when it comes to both the inclusion of public transport as a mobility capability element, and as a mobility functioning element.

Large metropolitan region of residence

The results from Paper III indicated that those living in Stockholm were more likely to have a potential modality of public transport but not car compared to not having the possibility to use public transport. While those living in Malmö LMR were much less likely to have the modality of public transport but not car compared to not having the possibility to use public transport.

The results from Paper IV showed that those living in Stockholm were almost twice as likely as those living in the other two regions to have five modal options available to them, as opposed to having two or less. As opposed to living in either of the other two LMRs, those living in Malmö were more than one-and-a-half times as likely to report having a limited capability.

Elements of the mobility capability

Self-reported possibility to use public transport

Those who reported having the possibility to use public transport were almost half as likely to have a limited capability to carry out everyday activities of value, compared to those who did not report having such a possibility. Those who have the possibility to use public transport were also less likely to be in the group with a specific transport and mobility-related limited capability (results from Paper IV).

Satisfaction with quantity and quality of options

The results from Paper III highlight a certain level of dissatisfaction among those who do not have the possibility to use public transport. However, some people in the group who do not have the possibility to use the car are somewhat dissatisfied, with almost one-fifth expressing that they would like to have more options. Analysis of the same frequencies for each of the LMRs exposed some of the regional differences. Those living in Malmö who do not have the option of using public transport are less inclined to consider their modal options as insufficient. A higher proportion of those who do not have public transport as an option seem to be dissatisfied (or indifferent) with the quality of their options. When regional differences were considered, a lower percentage of those living in Malmö who do not have the modal option of public transport were dissatisfied/indifferent with the quality of their modal options.

The results from Paper III show that there is a notably higher proportion of those who do not have the possibility of using public transport in the group with a limited capability, in comparison to the proportions of the other potential modalities. The smallest proportion of those with a limited capability was among those who have both public transport and the car as modal options. There are, however, some differences by LMR of residence with those living in Malmö with public transport but not car as a modal option more represented among those reporting a limited capability.

Comparisons between mobility capabilities and functionings

Public transport as a capability and functioning element

The results from Paper I show that the largest group of those who include public transport use as both a mobility capability element and a mobility functioning

element are also users of the private car, with a much smaller group leaning more towards public transport use. The ‘Users II’ group mostly comprises those of the ‘Both modes’ behaviour type. This is consistent with these respondents using public transport but not considering it is possible to use it as their primary mode, and therefore making greater relative use of other transport modes as opposed to those in the Users I group. Both ‘Non-user’ groups comprise the car-inclined behaviour type (8.2% and 8.9% of the total, respectively), indicating that there is a tendency towards car use rather than towards no travel – or perhaps towards the use of other modes – if the individual does not include public transport as an element of the mobility functioning. Public transport did not feature as an element of the mobility functioning for several respondents (n=166) despite an overall strong provision of public transport in the Stockholm LMR (results from Paper I).

Cycling as a capability and functioning element

There were several key differences between older cyclists and older non-cyclists, as demonstrated by the results from Paper II. Among the cyclists, 69% answered that they have travelled by bike most of their lives, while a much lower proportion started cycling in more recent years (2%). The majority of the cyclists (71%) believe that they will cycle for many more years to come, while 29% consider that they will only cycle for a few more years before they discontinue using the bicycle. Only 15% of cyclists never travel using the bus while 22% of non-cyclists never travel by bus. 89% of cyclists consider that they participate in activities as much as they would like to, compared to 64% of non-cyclists.

Compared to the other methodological approaches, the qualitative analyses of cycling revealed additional insights. During the focus group discussions outlined in Paper II, it became apparent that cycling plays a strong role in the lives of the participants, and has done so for most of their lives. Cycling pervades everyday life as a form of mobility, as a mode of transport, as a form of recreation and exercise. It appears as though cycling is not only shaped by the participants’ activities, but also performs a function in shaping their activities. Cycling was repeatedly described using words such as ‘comfortable’, ‘practical’, ‘inexpensive’ and ‘lovely’. Overall, there was general agreement among focus group participants that cycling was both comfortable and practical. Although this positive stance towards cycling was very apparent during the focus group discussions, there were also clear fragmentations in what could at times be described as a rhetoric.

The spatio-temporal freedom associated with cycling was articulated during focus groups. The emphasis on the freedom of the bicycle could be interpreted as uncovering a perceived lack of freedom associated with other modes of transport. Direct comparisons with other modes of transport were presented by participants, in order to contrast the favourable nature of cycling with the perhaps not so favourable

nature of other modes. In comparison to using the bus, cycling was described as more direct and less expensive. One of the participants remarked:

I never travel by bus, I don't know how to. It is quicker to cycle than to travel by bus.

There was a sense that cycling was favourable in comparison to walking in terms of avoiding putting pressure on an injured foot or on a 'bad knee'.

The bicycle was also described as useful by respondents, particularly at times when they wished to transport items, for example, groceries from the grocery store. Strategies for carrying larger items or several items at once were elaborated upon, once again underlining the versatility of using the bicycle.

The participants' views of cycling ranged from carrying out daily errands to exercising through cycling quickly and/or cycling long distances.

The cycling environment in Malmö was perceived as good in comparison to the cycling environments in other places. This discussion was largely characterised by the participants' positivity towards the cycle lanes in Malmö. The participants argued that they prefer cycling on cycle lanes that are separated from the roads.

All modes as capability and functioning elements

The results from Paper IV showed that the largest proportion (95.8%) of respondents consider that they have the possibility to use public transport. This is opposed to having the possibility to walk (a close second at 90.7%), to use the car (75.7%), or the bicycle (65.6%). However, of those who report having the possibility to use these modes, not all actually use them (not all select these modes as mobility functioning elements). Of those who report having the possibility to use public transport, only 78.0% actually use it. Of those who report having the possibility to walk, the largest proportion (90.3%) reports actually walking. This is in comparison to driving as a close second, where 89.8% of those who include this in their mobility capability select this option for inclusion in their mobility functioning. Cycling appears to be the least popular mode for selection with only 62.7% of those who report having the possibility to cycle actually cycling.

Activities of value

Rather surprisingly, only 8% of respondents reported having a limited capability to carry out everyday activities of value (reported in Papers III and Paper IV).

The results also suggest that the absence of the possibility to carry out active exercise is rather salient among this group (Paper III). Less dominant themes were those of a more social, less physically demanding, but perhaps more cognitively challenging, nature e.g. *Education: learning*. Desires to have the possibility to participate in shopping activities were mainly associated with comparison goods shopping or browsing. These reports described trips to the city or larger urban centre, which incidentally incorporated a shopping component i.e. the main trip purpose was to be in the city, or wander around the city, rather than to actually shop. The themes with an explicit social feature (as part of the same analysis), *Leisure: association/club activity and Social: friends and family*, were less prominent. Very few respondents did not have the possibility to participate in non-leisure, non-social activities (*Themes: Essential: convenience goods shopping and Essential: healthcare*) (results from Paper III).

Barriers

Barriers to being able to carry out all activities of value

The most prominent themes with respect to barriers (as explored in Paper III) were *Health issues* and *Transport or infrastructure problems*. While *Health issues* formed the most dominant theme, a combination of two or more of the codes encompassed in the two themes was also commonly reported by respondents. *Time commitments* and *Energy constraints* were recurring themes, while the themes *Financial concerns* and *Weather* were somewhat surprisingly less prominent. The relative scarcity of responses shaped by *Weather concerns* was particularly surprising, considering winter was approaching during the timeframe within which the interviews took place.

Barriers to being able to use public transport

Deficiencies in the public transport service dominated the responses regarding the barriers which inhibit the possibility to use public transport, as part of the results from Paper III. These responses centred around the absence of a public transport service (usually those living in remote or rural areas of the LMRs). Responses were also characterised by poor frequency, poor connections (not taking respondents where they want to go), and not suiting the respondents' schedules. Complaints

surrounding the complications in the system were also common, along with complaints about the distance to the closest bus stop.

Barriers to being able to cycle

Less pre-defined barriers emerged in the qualitative approach. Feelings of apprehension surrounding cycling were expressed as part of the focus groups reported on in Paper II. These feelings of apprehension served as disturbances in an otherwise largely consistent and affirmative position towards cycling. Words such as ‘*dangerous*’, ‘*risky*’ and ‘*problematic*’ characterised such disturbances. This allowed us to delve further into a more nuanced picture of cycling in Malmö.

One participant remarked that he appreciates having cycleways in the outskirts of Malmö, but that the centre lacks this kind of cycleway infrastructure. Some of the participants discussed stretches of road where there are cars parked along the side of the road. These stretches of road were generally considered unpleasant to cycle along. The participants also argued that there is a lack of bicycle parking in the centre, and that some of the bicycle parking spaces were too narrow.

Several participants highlighted that there are problems with the ways in which some other road users behave in the traffic, with some apparent tensions between older and younger road users emerging. Discussions regarding non-compliance with traffic regulations emerged. Participants mentioned that different groups behaving in different ways and not following the same set of rules was an issue for them. Several participants highlighted that, if a cycle lane lies beside a footpath, pedestrians tend to walk out onto the cycle lane.

The participants also pointed out that cycle lanes can become congested and, as a result, some of them choose not to cycle at times when there are many others out cycling. This was supported by some participants arguing that, at these times, some faster cyclists weave in and out between other cyclists in order to get past. This was regarded as distressing by the participants.

Cycling through certain infamous areas (which are often negatively spoken and written about) emerged as a topic of discussion. Some participants expressed the care they take when choosing their route, highlighting that they think consciously about which routes they take through Malmö, and which they avoid.

The removal of a mobility capability or functioning element

Associations with cycling cessation

The language used by participants in relation to cycling cessation created distance between the participants themselves and the event of cycling cessation (Paper II). The participants mostly referred to cycling cessation as something that would apply to a relative, grandparents in years gone by, or simply as something for someone else. This might suggest a reluctance, or a discomfort, on the part of some of the participants, to imagine themselves in the circumstances of having to stop cycling.

Giving up cycling was regarded as distressing. The participants considered that giving up cycling, or giving up driving the car, would restrict their daily lives. One participant brought up functional limitations as a reason for not cycling. Several mentioned fears such as not being able to judge situations as quickly as they could before. Fear resulting from having been involved in a cycling accident was also mentioned as a reason for an older person to stop cycling.

Statements of resilience, resourcefulness and determination were made when participants were faced with the notion of cycling cessation. Several of the respondents voiced their intentions to cycle as long as their body and mind allows for it, with one participant stating:

As long as one has their head and legs intact, then it's fine. Then I will cycle.

The factors associated with cycling cessation in later life

For Paper II, the predominant reasons which were given for discontinuing cycling were both the respondent's own health (63% of those who had discontinued cycling) and the feeling of danger in the traffic environment e.g. that other road users do not show due consideration (65%). Having lost motivation also ranked quite highly at 44%. Infrastructure did not seem to play such a large role. These factors relate quite closely to the reasons put forward by focus group participants.

Approximately half of those who have given up cycling miss cycling now, while 35% answered that they do not miss it at all. The results of the binary logistic regression model showed that there were three factors associated with a lower likelihood of having ceased cycling. These were: participating in desired activities; having access to a car in the household; and associating cycling with health. The only variable associated with higher odds of having ceased cycling was age.

There are clear consistencies between these factors and the discussions which emerged as part of the focus groups. Interestingly, most of the focus group

participants do participate in activities to the extent they would like, and most of them do indeed still cycle. Several of the focus group participants also discussed using the car and the role of the car in their lives, complementing the quantitative finding that having access to a car is associated with a lower likelihood of having stopped cycling.

Summary of results by paper

The following tables (Tables 9, 10, 11 and 12) present summaries of the results from the respective papers.

Table 9 Summary of results from Paper I

Analysis	Analysis type	Key results	Model summary
Including public transport as an element of the mobility capability	Binary logistic regression	Number of cars/household member (OR: 0.388 CI: 0-265-0.568, $p < 0.001$) ² Gender (woman) (OR: 1.428 CI: 1.075-1.896, $p = 0.014$) Functional capacity indicator (OR: 1.384 CI: 0.999-1.918, $p = 0.051$) Residential density (OR: 1.007 CI: 1.003-1.010, $p < 0.001$)	-2 Log likelihood: 1139.57 Chi-square/df.: 60.434/4 Cox & Snell R-squared: 0.062 Nagelkerke R-squared: 0.086
Including public transport as an element of the mobility functioning	Binary logistic regression	Woman living alone (OR: 3.056 CI: 2.000-4.670, $p < 0.001$) Number of cars/household member (OR: 0.472 CI: 0.321-0.693, $p < 0.001$) Functional capacity indicator (OR: 2.831 CI: 2.061-3.899, $p < 0.001$) Residential density (OR: 1.010 CI: 1.006-1.015, $p < 0.001$) Education level (OR: 1.491 CI: 1.327-1.675, $p < 0.001$)	-2 Log likelihood: 1114.74 Chi-square/df.: 168.443/5 Cox & Snell R-squared: 0.139 Nagelkerke R-squared: 0.204
Travel behaviour types	Cross-tabulation analysis	Users I (9.0% public transport inclined, 49.2% both modes); Users II ($\leq 1\%$ public transport inclined, 23.7% both modes); Non-users I ($\leq 1\%$ neither mode, 8.2% car inclined); Non-users II (8.9% car inclined).	-

² 'OR' is an abbreviation for 'Odds Ratio', 'CI' is an abbreviation for 'confidence interval'.

Table 10 Summary of results from Paper II

Analysis	Analysis type	Key results	Model summary
Differences between older cyclists and older non-cyclists	Analysis of frequencies	72% of men were cyclists, 59% of women were cyclists. 80% of cyclists satisfied with their health, 57% of non-cyclists were satisfied with their health. 89% of cyclists participate in activities as much as they would like, compared to 64% of non-cyclists. 72% of cyclists have a car in the household, 35% of non-cyclists have the same mobility option.	-
The perceptions of cycling among older cyclists	Qualitative content analysis, reflexive perspective	Cycling associated with convenience, versatility and ease, however some disturbances and fragmentations e.g. danger and risk. Cycling cessation anticipated as inevitable. Issues when cycling and tensions with other road users and cyclists.	-
Having stopped cycling	Binary logistic regression	Participating in desired activities (OR: 0.165 CI: 0.084-0.324, $p < 0.001$) Access to a car in the household (OR: 0.298 CI: 0.162-0.549, $p < 0.001$) Associating cycling with health (OR: 0.030 CI: 0.011-0.080, $p < 0.001$) Age (OR: 1.105 CI: 1.051-1.162, $p < 0.001$)	-2 Log likelihood: 306.71 Chi-square/df.: 151.16/4 Cox & Snell R-squared: 0.34 Nagelkerke R-squared: 0.47

Table 11 Summary of results from Paper III

Analysis	Analysis type	Key results	Model summary
Potential modalities	Multinomial logistic regression	<p><i>Public transport but not car a possibility</i></p> <p>Household status (not cohabiting) (OR 3.812, CI 1.960-7.411, p < 0.001)</p> <p>Perceived health condition (no reported daily problems when travelling) (OR 6.652, CI 3.208-13.796, p < 0.001)</p> <p>LMR of residence</p> <p>Stockholm: (OR 3.264 CI 1.607-6.630, p = 0.001)</p> <p>Malmö: (OR 0.232 CI 0.091-0.591, p = 0.002)</p> <p>Gender (woman) (OR 3.288 CI 1.703-6.349, p < 0.001)</p> <p><i>Both public transport and car a possibility</i></p> <p>Monthly household income (higher) (OR 2.245, CI 1.249-4.036, p = 0.007)</p> <p>Perceived health condition (no reported daily problems when travelling) (OR 9.652, CI 5.267-17.688 p < 0.001)</p>	Pseudo R-squared values: 0.26 (Nagelkerke) and 0.18 (Cox and Snell)
Satisfaction with potential modalities	Pearson's chi-square tests	<p>'Insufficient': <i>Public transport not a possibility</i>: 36.7%; <i>Public transport but not car a possibility</i>: 19.5%; <i>Both modes a possibility</i>: 13.0%.</p> <p>'Dissatisfied or indifferent': <i>Public transport not a possibility</i>: 38.3%; <i>Public transport but not car a possibility</i>: 14.8%; <i>Both modes a possibility</i>: 11.9%.</p>	<p>Pearson chi-square: 29.98 (p < 0.001)</p> <p>Cramer's V: 0.142 (p < 0.001)</p> <p>Pearson chi-square: 34.53 (p < 0.001)</p> <p>Cramer's V: 0.153 (p < 0.001)</p>
Potential modalities and capability	Pearson's chi-square tests	'Limited capability': <i>Public transport not a possibility</i> : 25.5%; <i>Public transport but not car a possibility</i> : 13.3%; <i>Both modes a possibility</i> : 6.0%.	<p>Pearson chi-square: 39.38 (p < 0.001)</p> <p>Cramer's V: 0.163 (p < 0.001)</p>
Activities lacked	Code assignment/thematic formation	Leisure: active exercise, leisure: cultural activity and leisure: moderate exercise were prominent themes.	-
Barriers to having the possibility to participate in these activities	Code assignment/thematic formation	Health issues, transport or infrastructure problems, time constraints were more prominent while other themes were less prominent.	-
The reasons behind not having the possibility to use public transport	Code assignment/thematic formation	Deficiencies in the public transport service, only having the possibility to use STS and health issues were prominent.	-

Table 12 Summary of results from Paper IV

Analysis	Analysis type	Key results	Model summary
Having fewer modal options	Multinomial logistic regression	<p><i>3 modal options</i></p> <p>Monthly household income (lower) (OR 0.62 CI 0.39-0.97, p = 0.036)</p> <p>Perceived health condition (reported daily problems when travelling) (OR 0.28 CI 0.16-0.48, p < 0.001)</p> <p><i>4 modal options</i></p> <p>Monthly household income (lower) (OR 0.51 CI 0.34-0.79, p = 0.002)</p> <p>Perceived health condition (OR 0.12 CI 0.07-0.21, p < 0.001)</p> <p><i>5 modal options</i></p> <p>Household status (cohabiting) (OR 0.34 CI 0.22-0.53, p < 0.001)</p> <p>Monthly household income (lower) (OR 0.31 CI 0.20-0.48, p < 0.001)</p> <p>Perceived health condition (OR 0.05 CI 0.03-0.11, p < 0.001)</p> <p>LMR or residence Stockholm: (OR 1.93 CI 1.19-3.16, p = 0.008)</p> <p>Age (OR 0.92 CI 0.87-0.96, p = 0.001)</p>	<p>-2 Log likelihood: 1510.42</p> <p>Pseudo R-squared values: 0.22 (Nagelkerke) and 0.21 (Cox and Snell)</p>
Having a limited capability to carry out everyday activities of value (Part A)	Binary logistic regressions (Parts A and B)	<p>Part A:</p> <p>Having someone to provide lifts (OR 0.49 CI 0.32-0.76, p = 0.001)</p> <p>Monthly household income (lower than high threshold) (OR 2.04 CI 1.13-3.67, p = 0.017)</p> <p>Perceived health condition (reported problems when travelling) (OR 0.12 CI 0.07-0.20, p < 0.001)</p> <p>Holding a driving license (OR 0.40 CI 0.24-0.65, p < 0.001)</p> <p>LMR or residence Malmö: (OR 1.63 CI 1.02-2.62, p = 0.044)</p> <p>Age (OR = 0.93 CI 0.89-0.98, p = 0.010)</p> <p>Possibility to use public transport (OR 0.44 CI 0.22-0.89, p = 0.021)</p>	<p>-2 Log likelihood: 722.83</p> <p>Pseudo R-squared values: 0.16 (Nagelkerke) and 0.07 (Cox and Snell)</p>
Limited capability due to transport and/or mobility-related issues (Part B)		<p>Part B:</p> <p>Having someone to provide lifts (OR 0.284 CI 0.113-0.712, p = 0.007)</p> <p>Monthly household income (lower than lower threshold) (OR 2.057 CI 1.012-4.180, p = 0.046)</p> <p>Holding a driving license (OR 0.304 CI 0.139-0.665, p = 0.003)</p> <p>Possibility to use public transport (OR 0.309 CI 0.100-0.952, p = 0.041)</p>	<p>-2 Log likelihood: 293.07</p> <p>Pseudo R-squared values: 0.09 (Nagelkerke) and 0.02 (Cox and Snell)</p>

The next chapter places these findings in the context of the current literature and previous research findings. A discussion of possible policy implications is also presented.

7 Discussion

Recapitulation of aims

The overall aim of this thesis was to gain a clearer picture of the differences in mobility among the young-old living in Sweden's LMRs through the engagement of a transport equity perspective, and through the application of the CA.

The aim of Paper I was to explore the inclusion of public transport as a mobility option among the young-old, within the structure of the CA framework. The relationship between mobility resources and the perceived possibility to use public transport as a primary mode; the relationship between mobility resources and the use of public transport; and the travel behaviour differences between these resulting groups were analysed.

Paper II explored the key differences between older cyclists and older non-cyclists; the perceptions of older cyclists in relation to cycling as a mode of transport; and the factors which are associated with cycling cessation in later life, while Paper III presented the links between modal options and opportunities to participate in everyday activities among the young-old living in Sweden's LMRs, and particularly among those considered at a greater risk of transport-related social exclusion.

The aim of Paper IV was to advance the methods informing the transport equity policy agenda by conducting an empirical investigation of disparities in capabilities among the young-old based on Sen's CA.

Personal characteristics and resources

Perception of health

The individual's perception of their functional capacity was an indicator as to whether he/she will use public transport. It seems that functional capacity plays a lesser (or less systematic) role when it comes to considering it possible to use public transport than it does for actually using it. Previous studies have highlighted how health issues tend to present problems for mobility opportunities (e.g. Scheiner 2006; Mollenkopf et al. 2005; Hallgrímsdóttir et al. 2015). Whereas, mobility has

also been found to have a role in maintaining health (e.g. Rantanen 2013; Fristedt et al. 2014). The results presented in Paper I are in line with such findings, but the focus of this study is specifically on public transport elements of mobility. The effect of lower levels of functional capacity for such opportunities could indeed be stronger than general mobility opportunities as it has been emphasised that health issues that come with age often result in greater negative effects for public transport use than they do for car use (Hjorthol 2013).

Health perception was a differentiating factor between cyclists and non-cyclists. Those who cycle consider that they are in better health in comparison to the perception of non-cyclists of their own health. This is similar to the findings by Fristedt et al. (2014), where lower subjective health predicted decreased community mobility for both men and women. Although the health benefits of cycling are emphasised (e.g. Deenihan and Caulfield 2014), whether those who cycle are indeed healthier because they cycle or whether they simply perceive that they are healthier and thus choose to cycle is unclear from the results presented in Paper II.

The apparent effect of perceived problems with health when travelling (results from Paper III) was also in keeping with previous studies. People with severe health problems most often have more difficulty navigating the public transport system compared to using other modes and often have a limited choice set as a result (Hjorthol 2013), while older people in good health are more likely to use public transport (Schmöcker et al. 2008). Kim (2011) found that those in good health were less likely to have a transport deficiency but did not find the same effect for chronological age. The results from Paper III reflect those of Kim (2011), in that those in better (subjective) health were better off in terms of modal options.

While *Health issues* featured as the most dominant theme as part of the results for Paper III, a combination of two or more of the codes encompassed in the two main themes *Health issues* and *Transport or infrastructure problems* was commonly reported by respondents. This suggests that if the transport or infrastructure problem reported by the respondent could be alleviated, the health issue may not be such a barrier. This may also suggest that if the transport or infrastructure environment exerts an insurmountable level of pressure on the individual, it may become impossible for her/him to overcome these barriers (Iwarsson and Ståhl 2003).

The results from Paper IV showed that those who reported that their health causes problems for them at least once a day when they want to travel were more likely to have a limited capability to carry out everyday activities of value. This finding is in line with those of other previous studies (e.g. Scheiner 2006; Mollenkopf et al. 2005). At the same time, there can be a feedback mechanism, in that those who reduce their participation in activities can begin to experience functional decline (see Gill et al. 2003).

Age

Interestingly, older respondents (in the sample) were less likely to report having a limited capability to carry out everyday activities of value. This somewhat contradicts findings from other studies, which suggest that the older one gets, the less mobile one becomes and the fewer trips one takes (e.g. Hjorthol et al. 2010). This finding could also suggest that the older respondents in this group have adjusted their expectations according to changes in their abilities as they age, in line with what some theories of ageing suggest (see, for instance, the Selection Optimisation and Compensation (SOC) model presented by Baltes and Baltes (1990)). Others have indeed discussed the consideration that reduced mobility can be considered an element of the ageing process with older people often adjusting their expectations accordingly (Diehl and Wahl 2010). This finding is also in agreement with much of the discussion surrounding adaptive preference as part of the CA (e.g. Nussbaum 2001), where preferences are shaped by the restrictions an individual faces.

Level of education

Those with higher education levels were more likely to include public transport as a functioning element (results from Paper I). Socio-demographic variables such as education act as strong predictors of mobility (cf. Stern 2000; van Wee, 2013) and, here, education marks a distinct indicator of heterogeneity within this group. Furthermore, Newbold et al. (2005) highlight that higher levels of education tend to be associated with higher levels of mobility, underscoring its importance as a mobility resource.

Gender

Women living alone were more likely to use public transport. Some studies support that living alone is conducive to mobility (e.g. Scheiner 2006; Paez et al. 2007), but others have argued that living with a partner may be a mobility resource (e.g. Nordbakke and Schwanen 2015; Nordbakke 2013; Hjorthol 2012), with – most often – the male taking the role of the driver in the household. This gendered difference perhaps reflects men prolonging their car use into later life, with women doing so to a lesser extent (Dillén 2005; Hjorthol et al. 2010). This result could indicate women's reliance on a partner as a driver (e.g. Hensher 2007), their greater propensity to use public transport (Rosenbloom 2004), and/or their self-reliance for alternative strategies to mobility opportunities when living alone (cf. Nordbakke 2013).

Gender was one of the key differences between those cycling and those not cycling. A higher proportion of older men cycled than that of older women. That a smaller proportion of women cycle could indeed be a reflection of the life-long gendered

difference among cyclists; men are generally more inclined to cycle than women throughout the life span (e.g. Heesch et al. 2012, Turcotte, 2011). The proportion of older male cyclists being greater than the proportion of older women mirrors the apparent gendered difference in driving in later life. Men are more likely to prolong their driving into later life than women (e.g. Rosenbloom 2004; Hjorthol et al. 2010). However, gender did not arise as a significant topic of discussion in the focus groups.

Household status

Those cohabiting were significantly less likely to have five modal options in comparison to having two or fewer (results from Paper IV). This result could be related to Nordbakke's (2013) finding that multi-modality and mobility strategies comprising several modes can be much more apparent among those (particularly women) living alone without a partner, as they tend to be less reliant on the car.

Having someone or several people who can provide lifts

For Paper IV, those who reported having someone who could provide lifts on a daily/almost daily basis were almost half as likely to have a limited capability to carry out everyday activities of value. This result highlights the importance of having this kind of social resource. Several other studies have highlighted the role social networks and social capital can play in supporting not only realised mobility but also the achievement of everyday goals, which can then result in the achievement of more important personal goals (e.g. Hjorthol 2013; Hjorthol et al. 2010).

Holding a driving license

For paper IV, we can see that holding a driving license functions as an important mobility resource. This result reflects findings in Nordbakke and Schwanen (2015), where it is emphasised that having the possibility to drive can mean much more freedom for older people, in fulfilling needs which may otherwise go unmet. Having the possibility to use public transport seemed to suggest a comparable freedom, indicating that public transport can have a similar role to car access in supporting the capability to carry out everyday activities of value. This, however, may depend on the individual's subjective experience of public transport, the individual's preferences and her/his established activity patterns (e.g. Schwanen et al. 2001; Rosenbloom 2004).

Residential density

Residential density at a local level was treated as a proxy for the centrality of the local area and intensity of service provision (Paper I). It was associated with an increased likelihood of including public transport as mobility capability and mobility functioning elements. Several studies have noted the importance of a higher residential density for mobility opportunities, predominantly trip frequency (e.g. Schwanen et al. 2001; Nordbakke 2013; Hjorthol 2013). This is most likely related to a better public transport provision and shorter distances to destinations (Nordbakke 2013; Hjorthol 2013). While much is known about thresholds of density which affect the viability of public transport provision (e.g. Cervero and Guerra 2011), it seems a much larger feat to pinpoint such a threshold whereby there appears to be an effect for the individual's mobility opportunities. Further research is required to indicate whether there is a 'critical' density level which does affect mobility opportunities.

Large metropolitan region of residence

Those living in Stockholm's LMR were significantly more likely to have five options available to them in comparison to those living in Gothenburg and Malmö LMRs (results from Paper IV). This result could perhaps be explained by a possible wider availability of public transport in the Stockholm region. Older age saw a reduced likelihood of having five options available, in comparison to having two or fewer. This finding is consistent with Scheiner et al.'s (2016) findings from a German study where those aged 75 and above were found to use fewer modes than those aged 60-74. Similar results have been reported by Stjernborg et al. (2015), with declining numbers of options as transitions appear in later life.

Those living in Malmö LMR were more than one-and-a-half-times more likely to have a limited capability. This result may reflect a lower number of opportunities in the Malmö LMR as opposed to the other, larger LMRs or it may reflect deeper socio-economic differences between the regions (cf. Anderson 2014). However, further investigation is required in order to decipher this result.

Those living in Malmö LMR and not having the possibility to use public transport were more inclined to be satisfied with their modal options than those living in the other two LMRs (results from Paper III). This result could point to a greater difficulty associated with car use in the other two LMRs (for instance, both of these cities have congestion charge zones while Malmö does not), or indeed that the bike may somewhat compensate for not having access to public transport in Malmö LMR.

Material resources

The increasing number of cars per member of household saw a decreased likelihood of including public transport as a mobility capability element as well as a mobility functioning element (Paper I). This result may not be a true indication of the individual's opportunities to use public transport. It could instead be regarded as an indication of self-selection (cf. Bohte et al. 2009) or path dependence (Scheiner 2006).

Income produced a significant result as part of Paper III, with those with lower incomes less likely to have both car and public transport as options. This finding echoes that of Kim (2011) who found that older people with lower incomes were more likely to have a transport deficiency. This result is important for equity considerations, in that there is a rather direct and distinct link between higher incomes and a wider choice set, with a larger choice set (or capability set) conceptualised as being associated with an increased well-being (Sen 1993) and a smaller choice set, congruently, associated with a reduction in well-being.

Furthermore, the analysis for Paper IV revealed a rather apparent link between a lower income and fewer modal options. Income has been a huge topic of interest in the transport equity discussion (see Di Ciommo and Shiftan 2017). However, further research is required to decipher whether those living in lower-income areas are subject to fewer modal options (whether there is e.g. poorer public transport provision or infrastructure in such areas), or whether individuals with lower incomes are subject to fewer modal options, regardless of the areas in which they live. Furthermore, here, only household income was analysed, which is particularly problematic, especially in terms of the application of the CA (see Robeyns 2008). This was because, when designing the data collection, it was considered that asking respondents to give an indication of income (given in ranges at household level) would be less sensitive than asking the individual to disclose their own individual income.

Comparisons between mobility capabilities and functionings

Public transport as a capability and functioning element

The results from Paper I showed that most of those who include public transport use as both a mobility capability element and a mobility functioning element are also users of the private car. There is also a tendency towards car use rather than towards no travel or perhaps towards the use of other modes if the individual does not include public transport as an element of the mobility functioning element. These results

indicate the considerable presence of the car as an element of the mobility functioning, even for those who consider they can use public transport as their primary mode. This is despite a relatively strong provision of public transport in the Stockholm region (Storstockholms Lokaltrafik 2013).

The theme *Deficiencies in the public transport service* dominated the responses framed around barriers inhibiting the possibility to use public transport, as outlined in Paper III. These responses centred around the absence of a public transport service (usually those living in remote or rural parts of the LMR). This corresponds with findings of associations between the more remote geographical location of a person's home and having a reduced number of mobility opportunities (Paez et al. 2007), with older people who report having more transport problems found to live in more remote or rural areas (Delbosch and Currie 2011). Several of the responses were characterised by reports of poor frequency, poor connections and the public transport schedules not suiting the respondents' activity schedules (similar to the problems highlighted by Kasper and Scheiner (2002) and Su and Bell (2009)). These results emphasise the difficulties people can have in deciphering complicated systems and the losses (in passengers and in passenger time) that are made through complicated routes with many changes. These findings are in line with those of Habib et al. (2011) who found that people (and particularly older people) value reliability and convenience when using public transport. The use of the public transport system often requires a certain familiarity, and a relatively high level of physical and cognitive functioning, requirements that exclude some groups of older people.

Cycling as a capability and functioning element

Themes which were repeatedly emphasised in the focus groups were the convenience and ease of cycling (even in comparison to other modes). This underscores the importance of the bicycle as a facilitator of mobility for cyclists, and also provides another link between cycling and participation in desired activities. However, while cyclists may experience the use of the bicycle as a very positive element of their mobility (see also Zander et al. 2013), their concerns surrounding cycling were also very apparent. Their safety while cycling featured as a prominent concern, as did the apparent lack of consideration by other cyclists and other types of road users, so much so that some developed strategies to avoid such situations. A perceived lack of signage made cycling less enjoyable for participants and led to problematic situations in traffic.

Activities of value

A large proportion of cyclists (89%) consider that they participate in activities to the extent they would like, compared to 64% of non-cyclists (results from Paper II). This result may suggest that the bike is a facilitator of mobility (cf. Le Vine et al., 2013), and gives older persons who cycle a greater chance to participate in desired activities. This result could also be associated with the cyclists in this study generally having more mobility opportunities available to them, with, for instance, greater car access in their households than the non-cyclists (a result also found by Winters et al. (2014) in their study of cycling among older adults). Similarly, in the analysis concerning cycling cessation, those who had discontinued cycling were six times less likely than the other respondents to agree that they participate in activities to the extent they would like. This could be an indication of the circumstances which resulted in the individual stopping cycling having affected their participation in desired activities. It could also be that those who have stopped cycling no longer have the use of the bicycle as a facilitator of mobility, and without it, they cannot participate in activities to the extent they would like.

Only 8% of respondents reported having a limited capability, with even fewer (2.3%) reporting having a limited capability due to transport and/or mobility-related issues (results from Paper IV). These were surprisingly small proportions, particularly in comparison to the results from Hjorthol (2013), who found that larger proportions of the young-old would like to participate in given activities more regularly. Nordbakke and Schwanen (2015) reported similar results for the whole population of older people, but emphasised that unmet activity needs are not merely a function of age. Thus, the results from this thesis may indicate that there is an implicit high level of satisfaction with capabilities to carry out everyday activities among this group. This finding is in line with Mollenkopf et al. (2011) who found a relatively high level of satisfaction with mobility opportunities and few reported problems among the young-old. Differing results could indeed be related to the differences in research questions and approaches. Here, we have focused on the *potential* to realise rather than whether or not the respondent then realises (or does not realise) such activities.

The dominance of *Leisure: active exercise* indicates that these are the kinds of activities which have the lowest possibility of being fulfilled by this sub-group (results from Paper III). Interestingly, the absence of partaking in such physically-demanding activities could result in an even more diminished state of health, and could affect other capabilities and well-being (Davis et al. 2015). Social, less physically demanding, activities were less prominent. The lower ranking of *Leisure: association/club activity* and *Social: friends and family* was rather surprising. The highest-ranking themes were not explicitly framed by a desire for social interaction, but more for a personal goal: recreation, exercise, keeping fit, learning and

experiencing, although the social elements of these activities may be more implicit, as many of these activities are likely to have an inherent social component. It could also be that the possibility to carry out social activities exists, or that social activities are carried out and, as such, this group does not report lacking such a possibility.

These findings are somewhat in contrast to those discussed in the review by Luiu et al. (2017), where visiting family and friends were the trips most unfulfilled. This difference could in part be explained by the differentiation by age group i.e. perhaps the young-old are more inclined to fulfil this kind of trip. Kasper and Scheiner (2002) found that cultural activities (such as visiting the theatre, concert opera or museum) were most often mentioned as an unfulfilled activity wish (mentioned by 51.5% of respondents) whereas, for this study, this kind of activity only received 15.8% of mentions. This could, in part, be due to differing levels of participation in this type of activity in the respective regions (Sweden's LMRs compared to Bonn and its hinterland).

Slightly more than a quarter (27%) of the problems reported by this group were characterised as transport or infrastructure problems. This finding is very similar to that of Kasper and Scheiner (2002), where almost one-quarter of respondents cited problems with public transport as the reason why they had unmet travel needs. The specific deficiencies mentioned in Kasper and Scheiner's (2002) study were problems with timetables, ticket machines and insufficient connections which are, again, similar to the issues raised by our respondents (infrequent service, complications, lack of connections, the timetable not fitting with activities). Su and Bell (2009) had similar findings, with their results shaped around problems with frequency, unreliability and unsuitable timetables.

When focusing on a limited capability to carry out everyday activities of value which is perceived as being explicitly linked to transport and mobility-related issues, only variables related to mobility produced significant results (along with income) (Paper IV). The social resource of having someone who can provide lifts, holding a driving license and having the possibility to use public transport encompass mobility resources which seem to be of utmost importance for having/not having the capability to carry out everyday activities of value. A lower level of income was associated with an increased likelihood of having a transport or mobility-related limited capability, reinforcing the connection between lower income and limited scope for action. Other resources such as those related to health seemed to play a smaller role when only mobility-related issues were considered.

The removal of a mobility capability or functioning element

Having stopped cycling was associated with those who do not participate in desired activities to the extent they would like, those who do not have access to a car in the household, those who do not associate cycling with health and those who are older. This paints a picture of relatively vulnerable individuals who have fewer mobility resources available to them, who are somewhat restricted from carrying out desired activities and who do not consider cycling to be so healthy.

Complementing this picture, the focus group participants articulated that cycling cessation was something inevitable but also emphasised the distress and restriction to mobility that this event would bring with it. Similar to the potentially shattering effects of driving cessation (e.g. Johnson, 2003), cycling cessation means surrendering a certain kind of independence and having to readjust one's mobility to suit a new set of circumstances.

Limitations

The analysis in Paper I was limited in its scope as the database used was derived from travel survey and register data. A deeper analysis of the conversion factors was not possible. This would have allowed for a more fine-grained approach to the analysis of inter-personal variation. Conversion factors can be very personal aspects of a person's life to which travel survey data do not easily lend themselves. According to the CA framework, unexplained variation could be interpreted as either mobility resources which have not been included in the analysis (such as social network outside of the home) or as variation in conversion factors. It is probably a combination of both. Although, this has been a more general criticism of the Capability Approach (Comim 2001; Kremakova 2013; Clark 2005).

Furthermore, the functionings are a reflection of the 'best' options available to the person, based on their evaluation of their capabilities (Sen 1995). As such, we can derive from this analysis, that if the individual is a user of public transport, they have chosen this mobility element from a set of options, the rest of which – applied to the trips for which they used public transport at least – would be of lower ranking from the individual's perspective. However, the value of having the freedom to choose functionings from a set of capabilities is also emphasised (Sen 1995). Sen reasons that freedom of choice is directly important for a person's well-being, arguing that there must be a distinction between having chosen to do something and doing the same thing without having chosen it. However, for Paper I, we

unfortunately do not know whether the individual has chosen to use public transport for these trips or whether it was the only option available to them. Furthermore, whether it is possible to use public transport as a primary mode, from a person's individual perspective, could have as much to do with their daily activities as it does with their access to it or the value they place on it (cf. Neutens et al. 2011; Rasouli and Timmermans 2014). In other words, here, the interpretation of the mobility capability is rather subjective in nature. Another issue could be that of self-selection, whereby individuals who are more inclined to use public transport are more positive about their capability to do so, perhaps having chosen to live in a particular area or not to obtain a driving license with the intention of using public transport as a primary transport mode.

A prominent limitation of Paper II is the absence of the consideration of socio-economic circumstances, income and education as factors influencing cycling, cycling cessation and access to mobility resources in general. Not having controlled for such factors means that some of the findings could be exaggerated or indeed understated due to the invisibility of these sub-processes at play.

Paper III employed an approach that was not without its limitations. Luiu et al. (2018) outlines a comprehensive framework for the analysis of unmet needs among older people. However, only some selected aspects of this framework are examined here, meaning that some issues are left unexplained. Another limitation was the limited insight allowed for by the qualitative strand. As this strand was not 'classically' qualitative it did not allow for a deeper exploration of meaning.

Furthermore, the threshold of physical functioning required for public transport use (in its current state) is quite high (see Hjorthol 2013). However, for this paper, it has been considered that public transport could function as an alternative to car use in later life if driving cessation occurs. For many people, this may not be possible, depending on the reasons behind driving cessation, and depending on whether or not the public transport system can – and will be – adapted to facilitate those who have ceased driving. Moreover, if autonomous vehicles with inherent safety features are made available in the near future, driving cessation may not be an inevitable event for many people, who otherwise may have had to stop driving.

Language may have been a barrier for participation in the survey upon which Papers III and IV are based, as might disabilities such as hearing impairments (although this issue only arose for 5.7% of those who could not/chose not to participate). There may have been others who do not consider themselves as relevant participants for the study choosing not to participate.

This thesis was largely based on so-called 'subjective' reports, or self-reported capabilities. As with most studies relying on self-reported data, it is difficult to draw comparisons between individuals. For instance, adaptive preference effects may be

present, in that many may experience difficulties but may have adjusted their expectations and preferences according to their restricted circumstances and thus report that they can, for instance, carry out all everyday activities of value (see Nussbaum 2001, see Paper IV for an expansion on these issues). Despite the limitations of this study, it is considered that individuals' own reports generate a good indication of their individual circumstances, particularly with respect to the considerations of the Capability Approach (cf. Sen 1995: 52-53).

The difficulties which can arise when measuring capabilities is something Sen has discussed at length, even as part of his own attempts to operationalise the CA (cf. discussions outlined in Alkire 2008). This study was no different. Formulating questions and communicating hypothetical scenarios proved to be quite difficult, as did disentangling mobility-related concerns from other concerns not related to mobility. This can make deciphering how corresponding policy measures can be developed a rather complex task. Furthermore, accounting for adaptive preference effects was a significant concern: how should those who are worse off know that they are missing out on activities? Perhaps they are happy enough with the possibility to carry out rather few activities because they are used to such a situation and have adjusted their expectations accordingly.

While there is no consensus as to how accessibility should be defined or measured, it is somewhat problematic to compare self-reported accounts, as these can be influenced by dependence paths and self-selection processes. At the same time, purely 'objective' indicators (calculated levels of accessibility using data on land use and the transport system) are influenced by the observer's values and assumptions. A combination and comparison of the two accounts could give a more nuanced picture of the distribution of capabilities, perhaps garnering a more accurate representation of the phenomena at hand.

Conclusions

The results from this thesis highlight the sizeable variation in mobility resources among the young-old living in Sweden's LMRs, producing differences in both the mobility capability and mobility functioning elements, particularly with respect to public transport.

The instrumental role of cycling as a facilitator of activities was rather apparent, as was its association with convenience and ease. However, this narrative was interrupted by reports of issues when cycling, mainly with respect to interactions with other road users. These results suggest that a focus on sustainable and active urban transport throughout the life span, but particularly into later life, could support cycling among older persons. A conscientious approach to the ageing population

has characterised Malmö Municipality's approach to facilitating cycling (cf. Malmö Municipality 2012), meaning that cycling has reached the stage where it is ubiquitous in the city of Malmö, even for those in later life. Campaigns aimed at increasing the awareness and consideration of other road users, as well as the introduction of clearer and more visible signage could support older cyclists in prolonging their cycling, as well as improving the experience they have as they do cycle. Campaigns aimed at increasing the awareness of the health benefits of cycling could facilitate in encouraging older people to continue cycling during the young-old stage of life (cf. Gamble et al. 2015), perhaps forming an inherent part of the age-friendly cities agenda (cf. Beard and Montawi 2015).

However, while the results from Paper II emphasise the prominent and significant role of cycling among older people, the results from Paper IV show that cycling is the most 'sensitive' when it comes to including it as a mobility capability element, and as a mobility functioning element, with both proportions notably lower than the corresponding proportions for the other modes. This perhaps highlights that although for some older people in certain contexts (for instance in Malmö), cycling is an important and prominent mode of transport, for others in other contexts, it does not even feature as part of the modal choice set. This indicates that there is more work to be done in terms of ensuring that the pre-conditions for cycling are in place, particularly for people within this life stage.

The results from this thesis reinforce the notion that mixed methods can complement one another, and uncover concerns and connections which may otherwise be hidden with the engagement of just one form of data collection and analysis. Financial issues were not so salient in the qualitative strand (of Paper III). However, income exposed itself as an important demarcating factor between the potential modalities as part of the regression analysis. The same can be said for gender; this variable produced a significant result as part of the regression analysis but was not raised as an issue as part of the embedded qualitative strand. The perception of health condition and health issues were palpable in both the quantitative and qualitative strands. Cohabiting produced a significant result as part of the quantitative analysis. Although not explicitly mentioned as part of the qualitative strand, some respondents mentioned that they were reliant on another individual to drive them where they want to go. Similarly, the mixed methods approach employed for Paper II highlights consistencies between the different types of results in terms of the differences between cyclists and non-cyclists, with for instance, the former having more mobility resources available to them.

The importance of having a larger choice set and the dissatisfaction and limitations that can arise from having insufficient modal options in later life are reinforced by the results of this thesis. The apparent dissatisfaction with the absence of public transport as a modal option was quite striking, calling into question the innate focus

on car use, car dependence and driving cessation, and in turn, the relative lack of focus on public transport use and public transport as a viable alternative to the car.

Those with only one modal option (or no modal options) were worse off in virtually all of the analyses. A latent demand for alternatives among those who are dependent on the car was rather apparent. Informed by comprehensive and integrated accessibility analyses, interventions in the form of adjusting the locations of activities, the introduction of new or complementary forms of transport modes and/or services could prove fruitful in solving some of these issues. These results call into question whether we as a society have adequately considered access to public transport as a mechanism for overcoming an increased risk of transport-related social exclusion in later life, particularly when the car may no longer be an option. Planners and policymakers face a significant challenge in improving the public transport system (and the transport system as a whole) so that older people have alternative modal options and can continue to participate in society as they age. Supporting multi-modality through the seamless integration of modes could help to bridge the gap for those who cannot use conventional public transport, yet do not have a health condition deemed so severe that they have been given access to STS. Having alternative options could mean the difference between having the possibility to continue to participate in activities of value as one ages or not.

Those with lower incomes, those co-habiting, those with self-reported health problems when travelling, those living in Malmö LMR and older people (in the sample) seem to be ‘worse off’ with respect to numbers of modal options. If having fewer modal options is associated with less freedom and a limited mobility capability (now or in the future), individuals with these characteristics could be at risk of transport disadvantage and/or social exclusion. This risk may not materialise while these people are in the earlier stages of the young-old life stage but may present problems later on, when driving or cycling cessation occurs, or when using public transport is no longer an option (cf. Musselwhite 2015). In this respect, having a wider choice set, or policy efforts encouraging people – and particularly older people – to have several modal options could be worth considering. In turn, making modal options more ‘age-friendly’ could prove beneficial. Ensuring that walking and cycling environments and public transport modes are accessible (and usable) is crucial in this respect (see Iwarsson and Ståhl 2003). Here, following standards and guidelines may not suffice. Instead, engaging older people – and particularly those who may be at a particular risk – in the planning, development and maintenance of such environments is important. Again, the use of such modes is not enough to analyse equity, as those who had the possibility to use but chose not to and those who did not have the possibility to use them are not adequately considered.

The results from this thesis further emphasise the benefits of social resources and ‘good health’, along with how having a driving license and capability element of public transport can manifest themselves in the capability to carry out everyday activities of value. This, in turn, highlights the importance of the instrumental value of the mobility capability. These results reinforce the interdependence of mobility with many other aspects of life. Policy responses could take the form of improving public transport (for instance, the environment, the information available, how information is made available) to include more of those who do not consider they have the possibility to use public transport, particularly those who feel that problems with their health excludes public transport from their set of modal options.

Health issues appeared to prevent many in this group from having the capability to carry out everyday activities of value, with several mentioning both health and transport issues as barriers for this capability. Here, it is difficult to separate health issues from transport issues. From an ecological theory of ageing (ETA) perspective (Lawton and Nahemow 1973), it could be considered that the pressure the transport environment exerts is too high relative to the functional or cognitive capacity of the individual, with the individual in turn then ‘blaming’ these issues on their own health. However, it could be argued that the transport environment should be adapted to support people with health issues in as far as possible.

While the sphere of influence of transport and mobility planning and policy alone may be rather limited, combining and coordinating services (transport services, the location and provision of social services, the delivery of groceries, health centre locations, etc.) in a holistic and somewhat integrated manner could effect change with respect to the capability to carry out everyday activities of value for this age group. For an expansion of the discussion regarding the integration of policies, see Phillips and McGee (2018).

Furthermore, the results from this thesis stress that a rather coarse-grained categorisation of older people may indeed mask certain aspects of vulnerability to which only certain sub-groups may be subject. Overlooking the intersectionality of different traits, as well as the importance of capability as opposed to resources or realised behaviour may result in an analysis which does not necessarily reflect the reality for many people. These findings call for a greater focus on potential and hypothetical considerations when developing empirical analyses to inform transport equity policies.

This thesis has, through the application of the CA, facilitated an insight into the variation in mobility resources, mobility capability and mobility functioning elements of individuals in this life stage. It has also opened up questions for the next stages of the employment of the CA as a conceptual framework within transport research.

Directions for future research

This research could be taken further by applying a life course approach to mobility capabilities. Yaqub (2008) criticises so-called ‘ahistorical’ analyses of capabilities – analyses which do not account for differences in opportunity over time. Yaqub discusses how a person’s chances of overcoming disadvantage decline with age, highlighting how chronic disadvantage is cumulative disadvantage, and how inequality over time is aggregated inequality. As a person’s conversion factors (command over one’s resources) vary over time and with age, taking a cross-sectional approach or snapshot in later life may not give the full picture of how such circumstances came into being. This is particularly relevant with respect to mobility, as the notion of mobility biographies are coming to the fore, analysing choice (or lack thereof), decision-making processes and responses to circumstances over time, all with respect to mobility (see Scheiner et al. 2016). A life course approach to mobility capabilities, incorporating elements of mobility biographies, is likely to produce a much more detailed picture of mobility opportunities among older people. Such an approach could detail how opportunities are shaped, limited or stifled, and indeed, how inequalities can develop, perhaps leading to plausible means of preventing or alleviating such inequalities in later life.

Further research into the interactions between objective health and cycling, especially from a life course perspective, would provide a greater insight into cycling in later life. Investigating cycling cessation (by those who have already stopped cycling) through the use of further qualitative insights would also provide a deeper understanding of the factors at play behind the decision (or necessity) to discontinue cycling.

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Appendix A – Interviewer’s script

The interviewer’s script from the survey upon which Papers III and IV are based (translated from Swedish to English).

The CATI-system begins with Question 1.

Question 1: Hello, am I speaking to _____?

(single answer)

- Yes. (go to the Introduction).
- No. (proceed to Question 1a.).

Question 1a.: May I speak to _____? I am calling in relation to a research project conducted by Lund University regarding everyday travel.

(single answer)

- Yes. (thank the person who answered the call and return to Question 1.).
- No. (thank the person who answered the call and consider, based on the information given, whether the person should be contacted again).

Introduction.

Hello _____, my name is _____. I am calling you today on behalf of Lund University, we sent out a letter to you a few weeks ago. You have been randomly selected to participate in a study focusing on your everyday travel and movements within the local region. Participation involves answering a 10-minute long telephone interview containing questions about your everyday travel. You may of course leave or interrupt the interview at any time. Your answers will not in any way be directly linked to you or your name and you will not be identifiable through the research results that will be presented later.

Question 2. Would you like to participate in the interview?

(single answer)

- Yes. (start the interview; go to Question 2b.) / (if the respondent states that he/she would like to participate in the study but that it does not suit right now, choose ‘Unsure’ and go to Question 2a.).

- No. (if the respondent is unsure or does not give a definite 'No', choose 'Unsure' and go to Question 2a.) / (if the respondent gives a definite 'No', thank the respondent and wish them a good day/evening).
- Unsure. (go to Question 2a.).

Question 2a. If now is not a suitable time for you to participate in the interview, is there another time which might be more convenient for you?

(single answer)

- Yes. _____ (take note of date and time and any comments. Thank the respondent and tell them that they will be contacted at that time. Wish them a good day/evening).
- No. _____ (take note of any reasons given and wish the respondent a good day/evening – if it is appropriate).

Question 2b. Can I confirm that I am speaking to _____?

(single answer)

- Yes. (proceed to Question 3.).
- No. (return to Question 1a.).

Section A.

I will start the interview by asking you a few questions about some aspects of your life which may affect your daily travel.

Question 3. Do you have a driving license, even if you do not use it?

(single answer)

- Yes. (proceed to Question 4.).
- No. (go to Question 5.).
- The respondent states that he/she does not know. _____ (take note of any comments given and go to Question 5.).
- No answer. _____ (take note of any comments given and go to Question 5.).

Question 4. Do you have access to a car you may/can drive, even if you do not use it?

(single answer)

- Yes.
- No.
- Sometimes.
- Only to some of the activities I want to undertake.
- Only sometimes and only to some of the activities I want to undertake.
- Other answer. _____ (take note of any comments given).

- The respondent states that he/she does not know. _____ (take note of any comments given).
- No answer. _____ (take note of any comments given).

(all alternatives proceed to Question 5.)

Question 5. Is there someone or several people you know who could give you a lift to where you want to go on a daily or almost daily basis, even if they never do? (if appropriate): With this question I do not mean a bus driver or a taxi driver, but someone you know.

(single answer)

- Yes, daily/almost daily, one person. (proceed to Question 5a.).
- Yes, daily/almost daily, more than one person. (proceed to Question 5a.).
- Yes, one person, often but not on a daily/almost daily basis. (proceed to Question 5a.).
- Yes, several people, often but not on a daily/almost daily basis. (proceed to Question 5a.).
- Yes, one person, but just sometimes/now and then. (proceed to Question 5a.).
- Yes, several people but just sometimes/now and then. (proceed to Question 5a.).
- No. (go to Question 6.).
- Other answer. _____ (take note of any comments given and go to Question 6.).
- The respondent states that he/she does not know. _____ (take note of any comments given and go to Question 6.).
- No answer. _____ (take note of any comments given and go to Question 6.).

Question 5a. What relationship does this person/do these people have to you?

(several answers can be accepted if the respondent has stated 'More than one person/several people' for Question 5.)

(take note of the gender. If the gender is not given at first, probe.)

(He/she is my _____.)

- Husband
- Wife
- Partner (cohabiting) (man)
- Partner (cohabiting) (woman)
- Partner (not cohabiting) (man)
- Partner (not cohabiting) (woman)
- Friend (man)
- Friend (woman)
- Son

- Daughter
- Son-in-law
- Daughter-in-law
- Brother
- Sister
- Nephew
- Niece
- Father
- Mother
- Uncle
- Aunt
- Another relationship. _____ (take note of the relationship).
- No answer. _____ (take note of any comments given).

(all alternatives proceed to Question 6.)

Question 6. Do you have access to a bicycle you can cycle, even if you never use it?

(single answer)

- Yes.
- No.
- Sometimes.
- The respondent states that he/she does not know. _____ (take note of any comments given).
- No answer. _____ (take note of any comments given).

(all alternatives proceed to Question 7.)

Question 7. How many people live in your household or home (where you yourself are included in the number)?

(single answer)

- 1 (go to Section B).
- 2 (proceed to Question 7a).
- 3 (proceed to Question 7a).
- 4 (proceed to Question 7a).
- 5 (proceed to Question 7a).
- 6 (proceed to Question 7a).
- 7 (proceed to Question 7a).
- More than 7 _____ (take note of the number and proceed to Question 7a).
- The respondent states that he/she does not know. _____ (take note of any comments given and proceed to Question 7a).

- No answer. _____ (take note of any comments given and proceed to Question 7a).

Question 7a. Do you live with a partner or a husband/wife?

(single answer)

- Yes.
- No.
- The respondent states that he/she does not know. _____ (take note of any comments given).
- No answer. _____ (take note of any comments given).

(all alternatives – proceed to Section B.)

Section B.

I will now ask you some questions regarding your daily mobility opportunities. With ‘daily mobility opportunities’ I mean the trips you could carry out on a normal day within the local region, regardless of whether you actually carry them out or not.

Question 8. Are there activities which you would like to carry out on a normal day within the local region but that you cannot for some reason?

(if appropriate): By ‘activities’ I mean things one does outside the home. For example, grocery shopping, going to the cinema, working...

(single answer)

- Yes. (proceed to Question 8a.).
- No. (go to Question 9.).
- The respondent states that he/she does not know. _____ (proceed to Question 8a.).
- No answer. _____ (take note of any comments given and go to Question 9).

Question 8a. Which activities would you like to carry out but cannot?

(open-ended)

- _____

Question 8b. What prevents you from having the possibility to carry out such activities?

(probe)

(several answers can be accepted)

(This is a list of expected answers. If you are unsure, code as ‘other’ and take note of the answer)

- The transport modes I use restrict me (time)
- (answers regarding time e.g. It takes too much time to travel using x transport mode)
- The transport modes I use restrict me (energy)
- (answers regarding energy e.g. I do not have enough energy to travel using x)
- Weather (e.g. summer, too hot)
- Weather (e.g. winter, cold, slippery, rainy)
- I have to be at work/I have to work a lot
- I cannot afford to/I do not have enough money
- I have to look after someone (an older person)
- I have to look after someone (a young person)
- Poor health
- I do not have enough energy/motivation
- I prefer to be at home (e.g. to watch television, to cook, sedentary lifestyle, etc.)
- I feel unsafe outside (crime, etc.)
- I feel unsafe outside (transport, traffic safety, other road users/passengers, etc.)
- There are too many people everywhere
- The infrastructure is unsuitable/does not suit me (e.g. the footpath, roads, etc.)
- I do not have anywhere to go
- I do not have anyone to come with me
- Someone else decides
- I have become accustomed to being at home
- Other _____ (take note of any comments given).

I will now ask you some questions regarding your possibilities to use different modes of transport. When I refer to your ‘possibilities’ I mean whether you can/could or cannot/could not travel using such modes of transport, regardless of whether you actually choose to use them or not.

Question 9. I will now list a number of transport modes. I would like you to tell me which ones you have the possibility to use, even if you never actually use them. (several answers can be accepted)

- Local bus
- Regional bus
- Tram
- Metro
- Train
- Cross-rail
- Special transport services
- Car (as a driver)
- Car (as a passenger)
- Cycling

- Walking
- None of these. _____ (take note of any comments given)
- The respondent states that he/she does not know. _____ (take note of any comments given)
- No answer. _____ (take note of any comments given)

(If this results in a combination excluding any public transport option, go to Question 9a. All others, go to Question 10.)

Question 9a. You answered that you do not (emphasise) have the possibility to use public transport. Why is it not possible for you to use public transport?
(open-ended)

- _____

Question 10. Now I will read out some statements and I would like you to choose the one which best describes your perception of the number of transport modes you could use.

(single answer)

(if just one option was selected for Question 9, read Statements 1 and 2):

- Statement 1: There is just one transport mode I can use (in order to reach the activities I would like to carry out). I would like to have more options.
- Statement 2: There is just one transport mode I can use (in order to reach the activities I would like to carry out). I would not like to have more options.

(if more than one option was selected for Question 9, read statements 3, 4 and 5):

- Statement 3: I can use a sufficient number of transport modes (in order to reach the activities I would like to carry out).
- Statement 4: I can use several transport modes (in order to reach the activities I would like to carry out). However, I would like to have more options.
- Statement 5: There are too many transport modes for me to choose between to reach the activities I would like to carry out.

(all alternatives – proceed to Question 10a.).

Question 10a. How satisfied are you with the quality of the transport modes you could/can use in order to reach the activities you would like to carry out?

(single answer)

Are you:

- Very satisfied?
- Satisfied?
- Neither satisfied nor dissatisfied?
- Dissatisfied?
- Very dissatisfied?

(Proceed to Section C).

Section C.

I will now ask some questions about your actual everyday trips. By 'actual everyday trips' I mean trips that you actually carry out. Here I would like you to focus on your everyday trips to and from the things you usually do.

Question 11. How often do you leave your home?

(single answer)

- Several times a day
- Once a day
- Several times a week
- Once a week
- Several times a month
- Once a month
- More seldom
- Never
- The respondent states that he/she does not know. _____ (take note of any comments given)
- No answer. _____ (take note of any comments given)

(all alternatives – proceed to Question 11a.)

Question 11a. How often do you use public transport?

(single answer)

- Several times a day
- Once a day
- Several times a week
- Once a week
- Several times a month
- Once a month
- More seldom
- Never
- The respondent states that he/she does not know. _____ (take note of any comments given)
- No answer. _____ (take note of any comments given)

(all alternatives – proceed to Question 11b.)

Question 11b. What are your most common destinations? (within the local region)

(open-ended)

- _____

(all alternatives – proceed to Question 12.)

I will now ask some questions about your actual use of different transport modes.

Question 12. I will repeat the list of transport modes which you mentioned that you could use. This time I would like you to tell me which of them you actually use. (several answers can be accepted. Transport modes that were not mentioned by the respondent are removed.)

- Local bus
- Regional bus
- Tram
- Metro
- Train
- Cross-rail
- Special transport services
- Car (as a driver)
- Car (as a passenger)
- Cycling
- Walking
- None of these. _____ (take note of any comments given)
- The respondent states that he/she does not know. _____ (take note of any comments given)
- No answer. _____ (take note of any comments given)

(Question 12a. should be asked to just those who selected fewer transport modes for Question 12 than they did for Question 9. In other cases: go to Section D.)

Question 12a. Why do you choose to use these transport modes and not the others you could have used?

(several answers can be accepted)

(This is a list of expected answers. If you are unsure, code as ‘other’ and take note of the answer)

- They are more suitable (e.g. the others are more annoying: ‘I do not need to change bus’; ‘I do not need to drive alternative routes’, etc.)

- I do not use the others because of my health
- They are safer (traffic safety e.g. ‘I do not need to worry about crashing; other drivers do not drive carefully’).
- I feel safer (crime e.g. ‘I do not need to worry about someone mugging me’)
- They are cheaper
- They are more comfortable (e.g. ‘I can sit on the train’).
- I can rely on them (punctuality)
- They are faster than the others
- They are more enjoyable (experience, scenery, etc.)
- They are more sustainable (e.g. ‘better for the environment’)
- I don’t think about it. It is just how I have always travelled
- Someone else decides
- Other answer. _____ (take note of any comments given).
- The respondent states that he/she does not know. _____ (take note of any comments given).
- No answer. _____ (take note of any comments given).

(all alternatives – proceed to Section D.)

Section D.

Next I will ask you some questions about you as a person. I would like to point out once again that your details will not in any way be directly connected to you and you will not be identifiable through the research results that will be presented later.

Question 13. How would you rate your health?

(single answer)

Would you rate your health as:

- Very good?
- Good?
- Neither good nor bad?
- Bad?
- Very bad?

(all alternatives – proceed to Question 13a.)

Question 13a. How often does your health cause problems for you when you travel or when you want to travel?

(single answer)

(code according to the respondent's answer. If the respondent answers in a vague way, probe.)

- Always/all the time
- A couple of times/several times a day
- Once a day
- A couple of times/several times a day
- Once a week
- A couple of times/several times a month
- Once a month
- Less often than once a month
- Almost never
- Never

(all alternatives – proceed to Question 14.)

Question 14. Are you retired?

(single answer)

- Yes.
- No.
- Partly. (the respondent states that he/she works part-time or has reduced his/her time at work, etc.)
- The respondent states that he/she does not know. _____ (take note of any comments given)
- No answer. _____ (take note of any comments given)

(all alternatives – proceed to Question 15.)

Question 15. What is your approximate household income per year, that is, in total before tax?

(single answer)

(read out the ranges)

- Less than 100000 SEK per year (less than 8333 SEK/month)
- 100000-199999 SEK per year (8334-16666 SEK/month)
- 200000-299999 SEK per year (16667-24999 SEK/month)
- 300000-399999 SEK per year (25000-33333 SEK/month)
- 400000-499999 SEK per year (33334-41666 SEK/month)
- 500000-599999 SEK per year (41667-49999 SEK/month)
- 600000-699999 SEK per year (50000-58333 SEK/month)
- 700000-799999 SEK per year (58334-66666 SEK/month)
- 800000-899999 SEK per year (66667-74999 SEK/month)
- 900000 SEK per year or more (75000 SEK/month or more)

- The respondent states that he/she does not know. _____ (take note of any comments given)
- No answer. _____ (take note of any comments given)

Give the respondent's age.

(single answer)

(not a question. Information is taken from the register)

- (value from 65 to 79)

Give the respondent's gender.

(single answer)

(not a question. Information is taken from the register)

- Man
- Woman
- Other

Give the respondent's address, postal code and SAMS area.

(not a question. Information is taken from the register)

(proceed to End.)

End.

The interview is now complete. Thank you very much for participating in this study. If you have any questions or if you would like more information about the study and the study's results please give your telephone number so that you can be contacted by the researcher or consultant working on this project. Otherwise you can get our contact details so that you can contact us.

Goodbye!



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