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Older female road users: A review

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Väg- och transport-forskningsinstitutet

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The present study reviews and critically discusses existing research on older female road users. A first finding was that research literature on older women in traffic is scarce. In addition, the methods used in the studies reviewed for this report were predominately quantitative and there were few observable attempts to a deeper understanding of the central concepts, or of the main findings. However, the existing research evidence shows that women and men do indeed travel differently. The women's travel is in general limited to geographically smaller areas and it is more influenced by social factors than men's travel is. To some extent, such gender-related differences decrease with age. The nature and causes of gender differences in travel and traffic behavior defy easy explanations. In the current literature, the concepts of traffic, age, and gender have not been problematized and specific methodological problems related to the study of gender or of aging were not often mentioned. It is suggested that a wider perspective including an increasing use of qualitative methods might be useful for future research trying to fill in the present gaps of knowledge and understanding in this field.

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Denna studie redogör för och diskuterar kritiskt den existerande forskningen om äldre kvinnliga trafikanter. En första upptäckt var att forskningslitteraturen om äldre kvinnor i trafiken är knapp. Andra resultat var att det främst används kvantitativa metoder i de genomgångna studierna samt att det endast finns ett fåtal försök till att fördjupa förståelsen av centrala begrepp, eller av huvudresultaten i studierna. Den existerande forskningen visar dock att kvinnor och män reser olika. Kvinnornas resande är i regel begränsat till geografiskt mindre områden och är mer påverkad av sociala faktorer än mäns resande. Till viss del minskar dock sådana könsrelaterade skillnader med åldern. Könsskillnaderna i resande och trafikantbeteende, dess natur och orsaker, är svåra att förklara på ett enkelt sätt. I den nuvarande litteraturen har inte begrepp som trafik, ålder, kön eller gender (de sociala aspekterna av kön) problematiserats och specifika metodologiska problem som är relaterade till studerandet av kön eller åldrande nämns i allmänhet inte. I denna studie föreslås därför att ett vidare perspektiv som inkluderar en ökad användning av kvalitativa metoder kan vara användbart i den framtida forskningen för att på så sätt fylla ut de nuvarande luckorna i kunskap och förståelse inom detta fält.

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Foreword

The present study was commissioned by Vinnova, (formerly Swedish Communication Research Board) and prepared in collaboration with the Traffic Gerontology group at the University of Helsinki, Swedish School of Social Science. We thank Ericka Johnson at the Department of Technology and Social Change, University of Linköping, for constructive comments, Per Henriksson at VTI for help and support, and the VTI library for excellent service.

The report consists of three main blocks. In the Introduction, we attempt to introduce a novice reader to the central concepts of gerontology, female studies, and traffic research, against a background of philosophy of science. A reader already acquainted with these issues may wish to go directly to the second part where we review existing research on older women as road users. The discussion critically addresses a few of the problems of this field and outlines a more comprehensive future research perspective on traffic, aging, and gender.

Linköping in April, 2001

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Contents Page

Sammanfattning		7
Summary		9
1	**Introduction**	11
1.1	Theories of science	11
1.1.1	Natural science versus science of arts	11
1.1.2	Applying the science of arts in to “the natural world”	13
1.1.3	The foundations of traffic research	14
1.2	Gender	15
1.2.1	Definitions of sex/gender	15
1.2.2	Different theoretical perspectives on gender in gender research	17
1.2.3	Gender in traffic research	19
1.3	Aging and the aged	19
1.3.1	The definition of age and aging	19
1.3.2	Age and the aged in research	21
1.3.3	The aged in traffic research	23
1.4	Older women	25
1.4.1	Some general themes in being an older woman	25
1.4.2	Older women in research	26
1.4.3	Older women in traffic research	27
1.5	Summing up	27
2	**Older women as road users in literature**	29
2.1	Historical basis for female travel	29
2.2	Overall patterns of female mobility	30
2.2.1	Travel and trip patterns	30
2.2.2	Availability of transport and problems in mobility	31
2.2.3	Special quality of female travel patterns	33
2.3	Traffic behavior of older women	34
2.3.1	Older women’s modal choices	34
2.3.2	Older women’s driving habits	35
2.3.3	Older women’s experiences while driving	36
2.3.4	Older women and giving up driving	36
2.4	Safety issues	38
2.4.1	Safety of different modes for older women	38
2.4.2	Accidents of older female drivers	38
2.4.3	Accident types	39
3	**Discussion**	40
3.1	The reviewed literature	40
3.2	Femininity as a norm?	41
3.3	Heterogeneity	42
3.4	Methodological issues	43
4	**References**	44

Äldre kvinnliga trafikanter: en kunskapsöversikt

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Sammanfattning

Kvinnan betraktas som avvikelse i trafiken

I trafikforskningen framkommer att mannen ofta är normen i trafikstudier och att kvinnan studeras som en eventuell avvikelse. Det är också mer undantag än regel att begreppet ålder diskuteras. Begreppet trafik är däremot självklart och enkelt i de flesta av de genomgångna studierna. Ändå renodlas analyserna i allmänhet för skilda färdmedel såsom bil, kollektivtrafik och cykel.

Denna litteraturstudie visar att äldre kvinnor i trafiken har varit en osynlig grupp, trots att det finns en medvetenhet om att andelen äldre ökar i befolkningen och att majoriteten av de äldre är kvinnor. En anledning är att studierna i allmänhet är föga teoretiska och inte problematiserar begrepp som kön eller gender (de sociala aspekterna av kön). Genom att inte ta hänsyn till kön underskattas skillnader mellan olika grupper och förståelsen av dessa. Det framkommer att mannen ofta implicit är normen i trafikstudier och att kvinnan studeras som en eventuell avvikelse. Ett problem kan därmed uppstå ifall forskningen om äldre baseras och konstrueras på en minoritet och dess karaktäristika. Kvinnan som norm skulle vara mer överensstämmande med verkligheten. Även en sådan konstruktion skulle dock missa viktiga grupper och därmed väsentlig kunskap om äldre i trafiken. I denna rapport lyfter vi därför fram behovet av heterogenitet i forskningen om äldre trafikanter.

Förutom kön är ålder och trafik begrepp som med fördel kan problematiseras. I gerontologisk forskning är t.ex. diskussionen om olika åldersbegrepp central. I trafikforskningen är det däremot mer undantag än regel att begreppet ålder diskuteras. På ett liknande sätt ses begreppet trafik som självklart och enkelt i de flesta av de genomgångna studierna. Ingen reflektion sker över att fokus ofta ligger på olyckor samt att analyserna i allmänhet renodlas för skilda färdmedel såsom bil, kollektivtrafik och cykel. Alternativa analyssätt som t.ex. tar hänsyn till att en resa för en trafikant kan bestå av flera olika färdslag kan därför ge kompletterande kunskap. Det är exempelvis vanligare bland kvinnor än män att skifta mellan olika färdsätt på en och samma resa.

Den kunskap som finns om äldre kvinnliga trafikanter är i allmänhet kvantitativ till sin natur. Frånvaron av reflektion i många av de genomgångna studierna ger även upphov till metodologiska problem som är specifika för gerontologisk forskning och genusforskning. Trots de brister som ovan beskrivits framkommer att män och kvinnor reser olika. Kvinnors resande är i allmänhet begränsat till mindre geografiska områden och är mer beroende av sociala faktorer. Intressant är att dessa skillnader till viss del minskar med åldern. Det kan bero på upphävandet av sociala strukturer relaterade till arbetslivet i samband med pensionering.

Tänkvärt i sammanhanget är också att ålderdomen ofta betraktas som könlös. Förklaringarna till de minskade skillnaderna är troligen komplexa och kräver djupare studier. Som komplement till den nuvarande forskningen kan därför kvalitativa studier som är teoretiskt förankrade ge väsentliga bidrag.

Litteratursökningar för den empiriska delen i denna litteraturstudie gjordes under 1999 i transportdatabasen Roadline och den mer medicinskt orienterade databasen PubMed. Även universitetsbiblioteks databaser användes; LIBRIS (alla nordiska universitet) och HELKA (Helsingfors universitet). Ytterligare litteratur samlades genom att följa referenser i den funna litteraturen.

Older female road users: A review

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Summary

Women regarded in traffic as an abnormality

In traffic research, it appears that men are often regarded as the norm in traffic studies and that women are studied as a possible abnormality. It is also more the exception than the rule that the concept of age is discussed. On the other hand, the concept of traffic is evident and clear in most of the studies which have been examined. Nevertheless, analyses are generally confined to distinct modes such as cars, public transport and bicycles.

This study of the literature shows that elderly women in traffic have been an invisible group, in spite of an awareness that the proportion of elderly people in the population is increasing and that the majority of the elderly are women. One reason is that the studies generally comprise little theory and do not subject to critical scrutiny concepts such as sex or gender. Owing to the fact that gender is not considered, the differences between different groups, and the understanding of these, are underestimated. It would appear that men are often implicitly the norm in traffic studies and that women are studied as a possible abnormality. This may create a problem if research concerning the elderly is based and constructed on a minority and its characteristics. Women as a norm would be more in accord with the actual situation. However, even such a construction would miss important groups and thus essential knowledge concerning the elderly in traffic. In this report, we therefore highlight the need of heterogeneity in research concerning elderly road users.

Apart from gender, age and traffic are concepts that can with advantage be subjected to critical scrutiny. In gerontological research, for instance, discussion of different age concepts is of central importance. In traffic research, on the other hand, it is more the exception than the rule that the concept of age is discussed. Similarly, in most of the studies examined the concept of traffic is regarded as evident and clear. No thought is given to the fact the that the focus is often placed on accidents, and that analyses are generally confined to distinct modes such as cars, public transport and bicycles. Alternative methods of analysis which take into consideration, for instance, that a journey for a traveller may consist of several different modes may therefore provide additional knowledge. It is, for instance, more common among women than men to change between different modes on one and the same journey.

The knowledge that is available concerning elderly female travellers is generally quantitative in nature. The absence of reflection in many of the studies examined also gives rise to methodological problems which are specific to gerontological and gender research. In spite of the shortcomings referred to above, it appears that men and women travel differently. Women's journeys are generally

confined to smaller geographical areas and are more dependent on social factors. What is interesting is that these differences to some extent decrease with age. This may be due to the dismantling, on retirement, of social structures related to working life. It is also worthy of note in this context that old age is often regarded as genderless. It is probable that the explanations for the decreasing differences are complex and require deeper studies. As a complement to present research, qualitative studies with a firm theoretical basis may therefore make important contributions.

Searches of the literature for the empirical part of this study were made in 1999 in the transport database Roadline and the more medically oriented database PubMed. The databases of university libraries were also used; LIBRIS (all Nordic universities) and HELKA (Helsinki University). Further literature was identified by following up references in the literature found.

1 Introduction

In future, the populations of the industrialized world will be increasingly aged, and most of those aged will be women. Yet, in many research contexts, not the least in traffic research, older women have been practically invisible. The aim of the present report is to make visible and critically discuss the existing research on older women as road users. The report starts with a short introduction to the philosophy of science, as background for a presentation of the fields of traffic research, gender research, and gerontology, that may be useful for a reader not previously acquainted with these areas.

1.1 Theories of science

Whenever research is carried out it is based on theories of science. This process is largely implicit, based on a consensus within a given scientific society on how the phenomena are to be studied. On many well-established fields of research, the researchers seldom feel a need to justify their choices of scientific principles for a study. However, different scientific milieus use different paradigms, which sometimes are in sharp contrast with each other. With a paradigm we here mean different views on how to make science (Kuhn 1970).[1] These paradigms are for a period of time shared by scientific communities. Sometimes, as has been the case in traffic research, one paradigm may dominate the research area. In consequence, some important research questions, such as how gender may influence traffic behavior, or how gender-related value systems permeate the transportation systems, may have been underrepresented.

1.1.1 Natural science versus science of arts

A classical distinction between the natural sciences and the science of arts[2] was made by Dilthey in the late 19th century. He opposed the view that there is only one science – uniform, and founded on the principles of natural science. Dilthey argued that science of arts is independent and different from natural science. Humans are not only a part of the nature – they also are conscious, thinking, cultural and feeling creatures. That is why their behavior should be *understood* rather than just *explained* (verstehen versus erklären). Empathy is the prerequisite – and hermeneutics the method – of the science of arts (Lübcke, 1987a).

Within the context of natural science as the reigning norm, two traditions of theories of science have developed. The first one is called logical positivism and the second one critical rationalism. Logical positivists claimed they had found the solution, once and for all, to decide what was scientific knowledge and what was not. The answer was the principle of *verification*. This principle implied all scientific that statements had to be empirically observable, otherwise they were meaningless. Dreaming of scientific unity, the logical positivists even tried to argue for a unified scientific language. It was to be a language about ”things”, a language like that in physics. Later on, the logical positivists acquiesced to a principle of confirmation, founded on inductive reasoning[3], and they also

[1] Kuhn has used the concept of paradigm in many different ways. One critic claims that Kuhn has 21 different meanings for the word (Gilje & Grimen 1994). It can have the broad meaning of view of the world to the narrow meaning of good example, a scientific solution worthy of imitation.

[2] To Dilthey science of arts was everything from psychology, history, ethics, social sciences to cultural sciences.

[3] At this time logical positivism also was called logical empirism.

selectively accepted that theories, if carefully used, could be helpful in predicting future events (Gilje & Grimen, 1992). Still, criticism against this kind of thinking was harsh. One of the most debated points was that the paradigm took observations for granted without taking into account how theory always influences observations (for that sort of criticism today, see Chalmers, 1982; Alvesson & Sköldberg, 1994).

Critical rationalism, building on logical positivism, criticized the principle of verification. Karl Popper, the introducer of this movement, argued that there is no such thing as truth in scientific knowledge. Instead of verification we ought to be critical and try to falsify hypotheses. If a scientific statement is difficult to falsify, then we can accept it, but only for the time being (see Flor, 1987).

In spite of the different approaches on scientific knowledge, the dream of unity of science based on natural science persisted[4]. The two theories of science were based on a similar belief that science had to produce simple statements, which by empirical observation could be verified or falsified. In that view, theories were problematic, while observations were unproblematic. As their ultimate goal, both traditions searched for universal laws (Kjørup, 1999).

Logical positivism and critical rationalism had a great impact on most academic disciplines in natural science but also in the science of arts. For psychology, Leahey (1992) claimed that instead of ”penis envy”, psychology as an academic subject has suffered from ”physics envy”. Sociology, history, even anthropology were caught in the epidemic.

Kuhn is said to be the one who convinced the researchers that even natural science is a product of social conventions. But even he was focused on natural sciences and used mainly examples from that area. He believed that different disciplines could have different paradigms; the problem for the social sciences was the lack of The Paradigm. Seeing scientific evolution as a historical process, Kuhn claimed that social sciences were in a ”pre-paradigmatic” phase with several competing paradigms. That was why methodological questions and theories of science so commonly were discussed in these disciplines. An additional, more positive view was presented by Gilje and Grimen (1992) who proposed that social sciences could rather be seen as multi-paradigmatic. That is also the view adopted in the present study.

In a Dilthean spirit, one can claim that natural science and science of arts study different areas with different characteristics. The science of arts studies meaning; the social and human worlds are full of meaning, and our actions – e.g. building society, developing technical products and planning transportation system – are based on our intentions and interpretation of reality. The natural science, on the other hand, tries to study the material nature, without human involvement. Under the overall dominance of natural sciences, the characteristics of humans have appeared problematic even in social research. How should the researcher get rid of the fact that people interpret reality and even the researcher's intentions? The alternative approach is, o course, to turn this handicap into an advantage: social sciences have an advantage over natural sciences of being able to ask the “research objects” about their history and how they interpret their situation (e.g. Starrin, 1994). This also means that methods built on e.g. interviews, life stories,

[4] Later on Popper abandoned the idea of unity and said sciences of art might need different methods and theories of science than natural science (Gilje & Grimen, 1992)

narratives or interpreting symbols, which would be of little use in natural science, can be of interest.

Another way to describe the difference between natural science and the science of arts is to claim that natural science studies universal laws while science of arts studies the unique (Kjørup 1999). It is obvious that if it only were acceptable to study universal and general phenomena, science would offer rather a scanty representation of the world. As an example, how would it then be possible to understand, or even recognize, that the view of how we tend to look at women and gender has changed during history? Such questions turn our interest to the unique character of our culture, instead of comparing it with other cultures in order to find common characteristics eventually leading to universal laws.

1.1.2 Applying the science of arts in to "the natural world"

Instead of admitting that the empirical reality can be studied from different paradigms, some research areas have been preoccupied by just one or a few perspectives. One example of this is research about how we produce knowledge about nature. For a long time, this field it was dominated by an idealistic view, based on natural science, of researchers producing knowledge by well-founded objective procedures and methods. Kuhn opened the way for the sociology of knowledge, and opened the way for the quest of social factors hidden in knowledge. One famous but controversial example is the anthropological work "Laboratory Life" (Latour & Woolgar, 1986). Feminist theories also continue in a similar vein, pointing out that our knowledge and view of reality are permeated with sex and gender. A central recommendation based on this tradition is that the researchers should reflect upon why they choose certain methods, theories and perspectives, rather than taking them for granted (Alvesson & Sköldberg, 1994). In this spirit, we also believe it is important to reflect upon theories of science in relation to traffic research and our own research in the present study.

Technology is another example of an empirical domain that initially was entirely dominated by engineers and natural scientists. Disciplines from the science of arts were not, with just a few exceptions, represented in the field. One explanation is the belief Boel Berner (1999) has called the compulsion of artifacts. Technical products and development have been perceived as autonomous; they are not depending on human will, but rather develop independently, according to their own standards. Hence, it has been difficult to acknowledge that technology also is a product of social praxis.

In the 1980's, social constructivism arrived into the field of technology. Because of the success of social constructivism in many research areas, especially on the field of scientific knowledge, it was asked why this perspective could not also be used in the domain of technology. Historians of technology and sociologists of knowledge got together and published the classical book "The Social Construction of Technological Systems" (1989). This influenced other schools such as SCOT (the Social Construction of Technology), ANT (Actor-Network-theory) and a theory about technological systems (Pinch, 1996). Now it was possible to get answers on questions such as why the best technical solution does not always catch on, and how technical products change because of social influence (e.g. Kline & Pinch, 1996; Bijker, 1995; Pinch, 1996). Social constructivism is one example of an established perspective or even paradigm in science

of arts that has successfully—although only recently—been applied to the domain of technology.

Phenomenology is another paradigm with large application potential. Gerontological research has shown that older persons often are treated as objects both in the society and within research (Tornstam, 1998). Therefore, our knowledge about the own views of the elderly is restricted. Using a phenomenological approach, it is possible to bring out the personal meanings given to different aspects of the world by those aged. Phenomenology also calls the Cartesian dualism between subject and object into question. In the lived world, the lifeworld, we are intimately connected to the material world (Bengtsson, 1998; Lübcke, 1987b; Grøn, 1987). Technology makes us perceive, live and understand our lived world differently. The development of the transportation system, for example, has made our lifeworld geographically wider. We can now make daily trips, which for 200 years ago took months, even years, in one direction. Also, the phenomenological perspective has influenced research about our relation to the body – a field most relevant to gerontological research while older people often are categorized according to their bodily appearance e.g. physical fragility (Eklund, 1996; Arber & Ginn, 1991). Even popular but often controversial perspectives or paradigms, such as post modernism, can be useful through its focus on plurality, multiple voices, and small narratives and other often overlooked facets of reality (see Condor, 1997).

1.1.3 The foundations of traffic research

Traffic has traditionally been viewed as a technical area. This has also characterized traffic research, where natural science and its paradigms have dominated. Mostly, traffic research has used quantitative methods and focused on limited, well-focused questions. There has been little or no reflection on the social nature of knowledge on this field. Gender differences are a good example of this. Even when statistics have shown differences in traffic behavior or safety between the sexes, these have not been problematized. Efforts for deeper understanding have seldom been done and the social aspects of gender have not been recognized. One explanation is the one mentioned previously that social aspects have been seen as something dubious that should be eliminated from research, rather than something to explore scientifically, in this field dominated by the paradigms of natural science. An example of this is the question of the Swedish researcher Tengström, wondering why there are so few Swedish studies about the car as a social and cultural phenomenon when there is such a large literature on the car's technical evolution (Tengström, 1991).

In light of all this, it is not surprising that research on road users is a fairly new discipline. Even though transportation systems would be of little or no use if there were no road *users*, their appearance as objects of scientific study was slow. At the Swedish National Road and Transport Research Institute, road users only became a research area in 1970. Until then, research had mainly focused on technical factors, such as road construction. Today psychology, medicine, and economy, as well as more technical disciplines, are established areas in road user research. Still, many perspectives from the science of arts are missing, especially in the Nordic countries, in the UK and in the US. The situation is somewhat different in German-speaking countries where sociology of transportation is an

established field (for an overview of German sociological traffic research, see von Seipel, 1994).

Lately, there have been attempts to make traffic research broader. In Sweden there are university departments within science of arts that study transportation, e.g., the Tema Institute of University of Linköping and the Centre for Interdisciplinary Studies of the Human Condition at University of Gothenburg. They have conducted some anthropological and interdisciplinary social research about transportation (e.g. Hagman 1995, 2000; Sturesson 1998). Our current study, the present review, also represent an attempt to broaden traffic research through its selection of a research subject, older female road users, since both concepts, older and female, are heavily loaded with social constructions and surrounded by social practices.

A special characteristic of the traffic system is that it is both a technical and a social system. Hence, focus can be on technology, the interface between technology and society, or on social aspects. In our view, all these perspectives are needed. As social scientists though, we argue that the traffic system, as any other socially constructed system in the society, can be seen as a social scene or forum where the subjects perform their acts under certain normative as well as individual conditions. This social scene is dependent on the existing technology but the existing technological system also is dependent on social factors such as community planning, cultural values, and politics.

1.2 Gender

1.2.1 Definitions of sex/gender

When discussing the qualities of or differences between women and men, i.e., the feminine and the masculine, one is likely to use a conceptual system, which includes—either implicitly or explicitly—the terms ‘sex’ and ‘gender’. The distinction between these terms is both conceptual and theoretical, as well as somewhat historical. The concept of *sex* is usually used to refer to biological aspects, “the natural properties” of female or male, whereas term *gender* refers to social and cultural aspects (e.g. Hallberg, 1992). Even though terminologically the distinction sex-gender in feminist literature is rather young, from the early 70’s (Millett, 1971; Oakley 1972), this kind of problematizing can be traced to the classics. Plato regarded educated women as theoretically possible guardians in his ideal republic, if women just did not have their biological function as reproducers to fulfill, i.e., it was in theory possible to “manipulate” humans with education because the soul was separate from the body. Plato’s viewpoint can not yet be considered as a pro-feminist, though. Until the feminist revolution and the subsequent consciousness about the sex-gender distinction, a woman’s soul or psyche was not really conceivable apart from her body. The relation between sex—the body, and gender—the mind, can be viewed in many ways. In the following, we take a brief look on the history of constructing sex and gender.

The biological approaches on femininity (and masculinity) emphasize the physical and anatomical features that have a causal effect on the behavior. Historically this approach can be divided in the Aristotelian and modern periods, although both can be regarded as biological approaches. Before the Enlightenment in 18th century and the scientific revolution, the view on the women/men –relation was somewhat different from our time, and could be characterized as a theory about “one sex but two genders” (Laqueur, 1990). The relation between women

and men was purely a hierarchical one; women were incomplete men, as Aristotle had put it. The incompleteness was reflected also in bodily differences. Even incidents of sex changes were reported; tales about women who had taken one step closer to completeness by having their previously sunken male sex organs suddenly appear while performing some physical activity, such as hopping (Laqueur, 1990). After the Enlightenment, however, the emergence of a natural scientific reality offered a new approach the women/men –relation. Differences in sex organs, tissues, and later on chromosomes were thought to reflect on the psyche. The *natural difference* between women and men was emphasized and searched for. In the 19th century for example, it was stated that "a woman exists only through her ovaries" (Jozé, 1895). The biological tradition has been tenacious and even in modern science one can find similar efforts to demonstrate the *natural* distinction between women and men. For example, it is fully acceptable even now to discuss e.g. the "female and male brain" and their differences, and the causal effect these differences have on behavior. Women are also often seen as more connected to the process of reproduction (Annandale & Clark, 1996) and thus more tied to their bodies than men are. The feminist critique of the science has strongly criticized the biological approaches (e.g. Lambert, 1987; for a review see Hallberg, 1992), though there are also a few feminist biological approaches, stating the biological superiority of women (e.g. Montagu, 1999).

Another approach to the sex-gender -relation could be called simply sex/gender theory. It has emphasized the clear distinction between the two concepts. Philosophically, the approach can be traced to certain of Plato's ideas (the soul being separated from the body) or those of Descartes', who introduced the metaphysical dualism of an interplay between body and the mind, or form and consciousness. A more precise statement about the sex-gender relationship was made in the 18th century by Mary Wollstonecraft, an early feminist, who stated that the difference between women and men lies solely on the level of the physical body. She emphasized the importance of educating women and the society's impact in generating sex-differences (Wollstonecraft, 1792).

In the 20th century, the sex-gender distinction became clearer as the social sciences emerged and concepts such as 'sex role' were introduced. Empirical studies about, e.g., gender identity among children with ambiguous biological sex (Stoller, 1968) and sex/gender roles outside western culture (Mead, 1949 [1947]) made the concepts of sex as the biological aspect and gender as the social one more generally accepted. The relationship between sex and gender was stated to be more of a social origin and the differences between genders were reproduced upon the (social) prohibition of women and men to be the same (see Rubin, 1975). The sex/gender theory is clearly a more feminist approach than the biological approaches, even though it also carries traces of the idea of women and men as each other's complements.

A third conceptual viewpoint of the sex/gender –relationship is called performance theory. Performance theory can be seen closely connected to postmodernism. It focuses on the diffuse nature of the gender, that is, that gender is created in different discourses and is just matter of performance and style. According to performance theory, gender is unstable and continuous, even antinaturalistic. Performance theory at its utmost has perhaps been presented in the thoughts of Judith Butler (1990), who has been absolute in her views about deconstructing the sex-gender –relation (Rosenhaft, 1996). She has claimed sex to be

constructed upon gender, that is, body doesn't exist without culture (Butler, 1990).

Defining the sex/gender –relation is one way to conceptualize the feminine and masculine. In different discourses, the concepts are defined in different ways. Here we have emphasized the philosophical construction of these concepts. However, to the same picture can be placed also other ways defining women (and men) that may be more easily targeted from the everyday discourses. Sexes and genders can be constructed for example through polarities, that is, women and men are opposite, thus a woman is what a man is not (see Harding, 1987; Keller, 1985). Within this discourse, scientific as well as political and everyday conversational arguments can be made.

1.2.2 Different theoretical perspectives on gender in gender research

From the feminist point of view, overall research dealing with women and men holds methodologically many biases. Most of these are due to lack of theorizing or conceptualizing sex and gender properly. Also research dealing with humans or society but *not* dealing with women and men, i.e. gender issues, is likely to be biased since the social reality is a sphere of both women and men, though not always in the same way. The process of research becoming gender or feminist orientated[5] starts from the justification of the importance of gender in research. After this justification, research can move towards more a feminist orientation, by taking in more theoretical perspectives and moving ahead towards a more explicit gender focus. In the following, we demonstrate this process and discuss the perspectives on gender in feministic and gender studies. To avoid terminological confusion, we would like to emphasize the fact that as our field of research is behavioural science, or broadly social science, we are from now on focusing on the social and cultural aspects by using the term gender when discussing the conceptualization of feminine and masculine.

Gender in research has been of interest since the feministic revolution in the late 1960's. In gender studies, gender can be viewed in different perspectives. As Sandra Harding (1987) has detailed, three perspectives can be distinguished: gender-as-a-variable perspective, feminist standpoint perspective, and the postmodern feminism. The three perspectives and orientations have each been dominant during a specific historical era. They have, however, overlapped in time and each of them is still present in research.

The gender-as-a-variable perspective, or *feminist empirism*, which was dominant in the 1970's, views women as a relevant and unproblematic research category. In studies within this perspective, interest is dominantly on the differences between women and men, and the studies are based on the comparisons between these simple categories. The perspective originated from the notion that the research so far had not paid attention to the possible differences between women and men. Furthermore, women had often been poorly represented or even absent in studies. From this tradition stem the ideas of sexual equality and liberal

[5] The concepts of gender and feminist studies often overlap, though not being precisely the same. Gender studies are dominated by feminism, but, to be precise, gender studies cover a bit broader area as a whole. In many contexts the concepts can be used as synonyms and this applies to our text here. In order to avoid confusion, it should however be kept in mind that these concepts may have different connotations in different contexts where used.

feminism (e.g. Beauvoir, 1972). The gender-as-a-variable approach has been used in studies about equality and inequality between the sexes. The variable orientation is still used in some fields of natural science, and it is especially popular among the behavioral sciences. Increasingly it is also used by many not-so-feministic researchers. The methodological solution of "adding women" to enhance their visibility in research was not, however, a very comprehensive solution, and the critique of the gender-as-a-variable perspective pointed out the insufficiency of treating sex/gender as a mere variable (see e.g. Harding, 1987). First, as the sex/gender is categorized into two variables, the definitions of a woman and a man are fixed, and furthermore, they are treated as neutral without any dynamics or underlying qualities. This presumption about the nature of these categories is problematic, while being the only way to make statistically or scientifically sound comparisons.

The feminist standpoint perspective underlines the importance of more profound documentation and theorizing of women's experiences. This perspective was most dominant in research in the 1980's, and has also been called *gynocentrism*. While feminist standpoint perspective can be seen as a methodological approach, an ideological and political approach coming very close both temporally and on the level of assumptions is the radical feminism. Radical feminist theory has aimed to change the social structures from male-dominant into more female (see e.g. Daly, 1984), and the feminist standpoint perspective somewhat follows this line of thinking applying it to research. Within the feminist standpoint perspective, it was argued that since the spheres of women and men are qualitatively so different, downright comparisons between the genders are impossible. This argument also puts in question the methods used when studying women and men, even without comparison. If, for example, women are measured on a scale, how and with which population was the scale validated? Moreover, the traditional research was seen as patriarchal in its assumptions, research questions, orientations, viewpoints, and measurements. The feminist standpoint perspective is also pro-women in that it emphasizes the female experience. It is assumed that all women have something in common, that is, a general femaleness, which reflects the patriarchal structures of the social reality (Walby, 1991). The critique of the feminist standpoint perspective has, however, questioned the concept of "female experience" (e.g. Butler, 1990). Critique has claimed that when studying the generalized femaleness, many voices are silenced and the description of the world is thus flattened. Furthermore, the critique has pointed out that the structures of society which generate the "female experience" are not straightforward but very complex, affecting different individuals differently (see e.g. Mohanty, 1991). The critique against patriarchal structures has been applied to the gynocentric approach equally since it creates "a patriarchal woman", that is, emphasizes the value of women (often conceptualized in patriarchal way) without questioning the construction of the term "woman" (see Honkanen, 1996).

Postmodern feminism, building upon the criticism of the feminist standpoint perspective, has been most dominant in the 1990's, and questions the given two gender categories. According to this perspective, the unity of women and the universal femaleness does not hold over different cultural, racial and economical boundaries, or different generations (see e.g. Fraser & Nicholson, 1988). Postmodern feminism also points out the relativity of language when talking about women. The meaning of "woman" varies with the discourses in which it is used (Alvesson & Billing, 1997). The critique of postmodern feminism has, however,

claimed that the ideal of diversity and variations is exaggerated. On the one hand, gender has rarely been totally universalized, and on the other, some generalizations are relevant in order to say anything of any interest (see e.g. Bordo, 1990). The postmodern feminism(s) has/have also been claimed to be too intellectual and academic, loosing touch of real issues and concrete subjects (see Tong, 1989).

At present, the field of feminist research is wide, and the different perspectives often overlap. The perspective adopted in each study is to some degree dependent on the phenomenon studied and the concept of knowledge in that particular study. However, it is increasingly agreed that when dealing with gender in research, even as a variable, the concepts of woman and man should not be taken as plain, given and neutral categories.

1.2.3 Gender in traffic research

In traffic research, it is mostly adequate to refer to the social and cultural aspects (gender), and not the biological (sex). Confusion between these concepts is common, however; the term sex is often used without deeper biological connotations. We found a few studies within traffic research that had a clear flavor of biologism when describing the road user behaviour of woman and men (see e.g. Burns, 1999), but in an explicit form, the biological approach is hard to find.

There are some texts on gendered technology and gendering of an artifact, such as a car (see e.g. Berg, 1994; Berger, 1986; Mellström, 1995), and the gendered nature of mobility (see e.g. Andréasson, 1994; Leed, 1991; Wachs, 1987). Often however, even though understood as a social and cultural dimension in traffic research, in empirical studies, gender has been either neglected or treated as a mere variable. Social or cultural factors or gender theories have not often been taken into account when analyzing or describing the traffic behaviour of women and men, even though significant quantitative differences between the genders have been found. Some exceptions exist however; some reports on traffic behaviour and travel patterns hold a deeper perspective on women's and men's travel and traffic behaviour (also reviewed in this report, e.g. Bianco & Lawson, 1996; Cassel et al., 1993; Hjortjol et al., 1989; Polk, 1998; Rosenbloom, 1995a). Certain of them discuss important social factors, such as family relations and roles, employment rates, personal safety, and economic factors. However, they do not problematize the concept of gender. The postmodern view about creating gender has obviously not yet hit traffic research.

Ideally, traffic research should be sensitive to the heterogeneity of road users and be prepared to discuss the construction of the studied populations when relevant.

1.3 Aging and the aged

1.3.1 The definition of age and aging

In everyday conversation it is common to refer to a person's age in terms of her/his chronological age. The concept age has however more than just one dimension, and it is not clear how, for example, old age should be defined: by chronological age, functional age or major life events like retirement or widowhood (Arber & Ginn, 1991). Generally speaking, chronological age is a poor indicator of functional capabilities or life style. According to Birren (1964) and Birren and Renner (1977), there are three types of age: biological,

psychological and social. The different ages are usually, but not necessarily, related to each other. Biological age refers both to the physical condition of an individual, and the individual's present position relative to their species-specific life span. Psychological age refers to the adaptive capabilities of an individual (such as coping or intelligence), as inferred from behaviour. Social age refers to the individual's social roles and habits in relation to the expectations of the surrounding society. Social age can be inferred by observing its social manifestations, such as dressing or attitudes. In addition to biological, psychological and social age, also terms such as legal age and functional age have been discussed (Hayslip & Panek, 1989). Legal age refers to a category of people who either are below or above certain age, such as legally retired when over 65. Functional age refers to the physical capacity one has in relation to specified standards.

Not only in everyday language, but also in scientific and political contexts, aging (in later adulthood especially) is often understood as a process of loss and malfunction. When defining aging, as based on gerontological knowledge, one must however overcome this stereotypical labeling. Even though aging is characterized by changes, these changes are not solely negative, and more importantly, their appearance and magnitude varies extremely between different individuals. The heterogeneity of any population tends to increase with age. However, even though individual differences are highlighted in later life, regularities in the process of aging can be described. There are normative models of changes on various dimensions, and a large body of knowledge about how age-related chances appear *typically* and *on average* in an aging population. These changes can roughly be divided into psychological, social, and biological/physical.

Psychological aging contains several factors, such as cognitive functioning, psychomotor performance, and personality. Research has pointed out certain age-related changes in cognitive functioning and psychomotor performance. For example, psychomotor performance gets slower (see e.g. Gogging & Stelmach, 1990), sensitivity to certain stimuli decreases (see e.g. Hoyer, 1990), and dividing attention between several tasks becomes more difficult in complex tasks, such as car driving (e.g. Brouwer, Waterink, Wolffelaar & Rothengatter, 1991). Psychological aging, as all aging, varies greatly between individuals. Furthermore, it seems that many of the cognitive changes are more qualitative than quantitative in nature, that is, it is hard to say how actual performance is affected by such changes.

In terms of personality, several theorists have attempted to capture and describe systematically the typical psychological changes and development during the life span. To give some examples, Erikson (see e.g. 1980) who introduced his model of psychosocial developmental stages, and Bühler (1933, see Sugarman, 1996) with concept of life tendencies, have contributed to the field of psychology of aging. Both of these theories emphasize the life span's periodical nature, that is, that a person lives through different stages during her/his life. According to Erikson, at old age, an individual has –in the ideal development—a sense of completeness when reviewing her/his life. Bühler's approach similarly suggests that, when old, a person evaluates the lived life and, in an ideal situation, experiences a sense of self-fulfillment. A more recent approach, called process approach (e.g. Thomae, 1980; Hultsch & Plemons, 1979; Cutrona, Russell & Rose, 1985), emphasizes the role of various factors, such as self-concept, other

personality processes, and social support in the adaptation into older age. All major theoretical approaches to personality in old age, and especially those of process approach, emphasize the role of personality in coping with age-related changes; be they social or biological/ physical.

Social changes related to aging can be viewed on both the individual and the interpersonal level. At the individual level, the process of socialization goes on. Areas subjected to change are such as personal roles and attitudes. With increasing age, social roles usually change or are in transition; e.g. from parent to grandparent, from employee to retiree, and from married person to a widower. Old age has also been described as a "roleless" period, as very few roles with status are accessible to older persons (Rosow, 1985). As the personal roles change, the relationship to the surroundings changes too, and accordingly, attitudes and values may change. There are different theoretical perspectives on how the socialization process evolves in old age. Some theories have emphasized the individual's disengagement from the society and earlier roles (see e.g. Cumming & Henry, 1961), while others have emphasized the continuity of earlier life styles and roles (Atchley, 1971). Overall, despite heavy criticism on both, the continuity perspective has been somewhat more influential.

At the interpersonal level too, many areas undergo changes in older age. Changes in social surroundings and thus in social ties are common, as the person often transitions from, e.g., employee to retiree. Also the probability of loosing one's spouse or close friends increases in later life. These kinds of changes are major, and often dramatic in the individual's life. They often, but not always, imply losses: earlier relationships may have not always been satisfactory, and giving up of them may be emancipating (e.g. Öberg & Ruth, 1994; see also Carr et al., 2000).

Age-related biological and physical changes include bodily changes, e.g. changes in blood circulation systems, sensory systems, immune system, body mass, and muscles. Many of these changes affect the individual's capacity to function, and some of them predispose the individual to illnesses. Bodily changes are, however, subject to a number of factors that vary among individuals, such as environment, nutrition, genes and physical exercise. Attempts have been made in gerontological literature to define the nature of age-related changes more precisely in categorizing them as pathological versus normal. It is, however, difficult to draw the line between the two and keep them as "neutral categories", as the former holds a distinctly negative label. The heterogeneity of older populations also causes difficulties in categorization. To partly overcome this problem, Rowe and Kahn (1987) have introduced the concepts of usual and successful aging as subdivisions of normal aging. In successful aging, physiological loss is minimal or nonexistent. Rowe and Kahn suggest that external factors, such as nutrition, exercise, and social support have a great impact on the aging process, directing it towards a usual or a successful course.

1.3.2 Age and the aged in research

Despite the large body of knowledge about age, aging and the aged, and despite the societal demand for research related to aging, reflecting the absolute and relative growth of the aging population, many studies outside the explicit gerontological tradition are insensitive to age. That is, age is often not taken in as a variable, a co-variable, or even a possible factor when trying to interpret the

results. Even though old age and aging as concepts have many social and cultural connotations, studies in social science have often neglected later life (Arber & Ginn, 1991). The neglect of old age might be due to (often implicit) stereotypes and attitudes related to the aged, such as non-productiveness of the aged in socio-economical sense (Arber & Ginn, 1991), or the unconscious fear of physical malfunctions and closeness of death among older persons (see e.g. Baumann, 1992; Beauvoir, 1990[1970]).

The stereotypes and preconceptions concerning aging sometimes cause problems in research even when age is taken into account. In studies where age or aging has been a starting point or a variable, it has often treated and conceptualized in a problematic way. One of these problems is related to the question how to measure age; if chronological age is an overall poor measure, how should age be operationalized? Many researchers do not, however, problematize the use of chronological age, and in most studies age is used in a chronological sense without any perceived difficulty. This weakens the validity of research in many cases.

Another problem is the *ageism* in research; i.e., the conception and treatment of the aged as a homogeneous group (Arber & Ginn, 1991). Ageistic thinking tends to overlook the differences between individuals of, e.g., different gender, race, social class, and chronological and functional age. A widely used attempt to overcome this problem is to divide aged persons into subcategories by their age, such as “young-elderly” (65-74 years) and “old-elderly” (over 75 years) (Wells & Freer, 1988). This kind of solution however includes both the problem of chronological age and the homogeneity assumption. The distinction between “young-elderly” and “old-elderly” is usually made routinely on the basis of chronological age (Marshall, 1989), and it divides and categorizes individuals on the basis of socially constructed terms, even though age itself is often viewed as natural and biological quantity. The social and cultural construction of the category *old* has been emphasized by Pierre Bourdieu (1993). He argues that “Age is a biological quantity, which is manipulated socially”. In a similar vein, Arber and Ginn (1991) have suggested that similarly to gender, age should be treated as a sociological variable, not as a biological one. By this, they mean that for example poverty may correlate to poor health more than age *per se*.

In gerontological research, studies can be conducted within a cross-sectional, longitudinal or cohort design. Cross-sectional studies are the most cost-effective and therefore popular, albeit of limited validity. In a comparison of different age groups at certain point in time, any differences found may not be due solely to aging. They may as well originate in cohort effects or societal changes during certain periods of time. For example, when age-related changes in intelligence first were studied (see e.g. Jones & Conrad, 1933), huge differences were found between older and younger generations. Intelligence therefore was assumed to diminish drastically with age. Later on it was however realized that the difference was attributable to differences in education in different age groups, not to any intelligence-impairing aging process (Schaie, 1975). Cross-sectional studies may thus be useful in comparisons between age groups only, not in studies of the aging process itself. It should be also noted that cross-sectional design is most successfully used when the interest is not exclusively on comparisons, but on gaining more knowledge of some given group of interest.

In longitudinal design, either the same individuals or the same cohort are studied under a longer time, and several consecutive measurements of the same

variables are taken. This design is not widely used, due to the long time it takes: costs are high, methods tend to develop over time, and loss of subjects can be considerable. The longitudinal design is however the only valid method to examine age-related changes. Even this design, however, has some shortcomings. The questions about frequency of measurements, possible learning effects, and prospective vs. retrospective design have to be considered. Also the question about generalizability of the findings over different cohorts is an important one.

Cohort studies examine cohort effects on population by comparing people from different cohorts at the same chronological age. For example, the distribution of drivers' licenses among men and women at age 70 in Finland is different in cohorts born in 1917 and 1927 (Finnish Vehicle Administration Center, 1988; 1998). In cohort studies, differences between the cohorts can be explored and future developments to some extent predicted. The cohort design suffers from some of the problems of long time-spans too, such as long commitment and possible development of methods under time.

The fact that it is difficult to tease apart the effects of age, period of time and cohort is called the APC-problem (from the words age, period, cohort). Each of the designs described above offer their solution, but if a comprehensive picture is needed none of them is enough by themselves. Maddox and Campell (1985) have thus suggested an ideal study design, where all of the named methods could be used.

Both age and gender as concepts are predisposed to stereotypes, often neglected or mistreated in studies outside the gerontological or feministic research traditions, and both are too often conceptualized as biological variables. Age is even more often reduced into a biological quantity than gender. It seems, however, that the conceptualization of both age and gender are undergoing a transition over time; there is a dawning consensus about the socially constructed nature of these two concepts, and about the heterogeneity of the populations they define.

1.3.3 The aged in traffic research

Traffic research has mostly focused on driving, and especially so in the field of traffic gerontology. There are two main reasons for this. First, traffic research is born in the US where private cars are the most common and often the only available mode for transportation. Second, older drivers' safety was early represented as a public health problem.

Historically, research on aging and driving can be divided into different phases (for a more comprehensive review, see Hakamies-Blomqvist, 1999). In the 1970's, a first wave of intensive research focused on identifying an "older driver problem" (Hakamies-Blomqvist, 1999). As often happens, what was sought was also found; the results showed older drivers to have fewer accidents per capita but more per mileage (e.g. Finesilver, 1969). The older driver problem thereafter was viewed as an established fact. Later on, in the 1980's, the nature of the older driver problem was explored more thoroughly (Hakamies-Blomqvist, 1999). The outcome was that older drivers had also more accidents per distance driven than other drivers (Brorsson, 1989; Cerelli, 1989; Evans, 1987; Graca, 1986), and when involved in an accident they were likely to be the partly at-fault (McKelvey & Stamatiadis, 1989; Partyka, 1983; Verhaegen, Toebat & Delbeke, 1988; Viano, Culver, Evans & Frick, 1990). Also the overrepresentation of older drivers in

intersection accidents was established (Broughton, 1988; Cerelli, 1989; Hauer, 1988; OECD, 1985; Partyka, 1983; Stamatiadis, Taylor & McKelvey, 1991; Viano et al., 1990; Yanik, 1985). The were efforts towards explaining the relative growth of accident propensity and the specific accident patterns in old age largely referring to age-related functional deficits on an ad hoc basis (Hakamies-Blomqvist, 1999). Towards the 1990's findings on the field of cognition and aging brought deeper understanding to the discourse (Hakamies-Blomqvist, 1999). The older drivers' accident propensity also was questioned, as Evans (1991) showed that parts of the high rates in injury and fatal accidents were explained by the physical frailty of older persons. Mobility issues also made an appearance as research problems counterbalancing the traditional focus on safety only. In the 1990's, the focus in research also shifted from general accident proneness towards specified groups of older drivers with higher accident risk. Groups with certain illnesses, such as dementia, were of interest, and the heterogeneity of the older driver population finally was given attention. Work on different diagnostic tools for differentiating the fit drivers from the unfit ones intensified, even though age-related screening policies have also been heavily criticized (see e.g. Hakamies-Blomqvist, Johansson & Lundberg, 1996; Hakamies-Blomqvist & Wahlström, 1998). Along the heterogeneity perspective, there has also been a shift from "older drivers as risky drivers –perspective" towards "promoting safe mobility – perspective". Research has shown that the high risk of older drivers is largely due methodological biases (Hakamies-Blomqvist & Ukkonen, in preparation; for a synopsis, see Hakamies-Blomqvist, 1998) and that the private car has proven to be the safest mode of transportation for older persons (OECD, 1985). At the same time, the importance of independent personal mobility has been recognized (see Hakamies-Blomqvist, Henriksson & Heikkinen, 1999).

In this research field, however, a persistent belief that older drivers are most of all unsafe drivers comes up from time to time. It is probably related to the stereotypes about the aged mentioned before permeating much the research related to old age. Furthermore, the heterogeneity of older drivers is often understood as a classification into two categories: those who are sick and unfit to drive, and those who are fit to drive. Driving is, however, a complex task and an acquired skill related to many background factors. The older driver heterogeneity thus rather represents a variety of different driving performances than a population consisting of "good guys" and "bad guys".

A general methodological note can also be made about the study designs used in most traffic research on the aged. Most studies are cross-sectional but do not pay attention to the limitations of this design when generalizing on the basis of their results. The importance of cohort effects has been emphasized by some researchers (Evans, 1993; Hakamies-Blomqvist & Henriksson, 1999). In traffic gerontology, gender has also been an often mistreated and neglected factor. We will examine this closer in the following chapter.

1.4 Older women

1.4.1 Some general themes in being an older woman

Due to their greater longevity, women outnumber men in the older generations. Even though longevity can be seen as a success story, it brings along other related issues, such as widowhood, which can be seen as problems. If widowhood is a problem, it is predominately a problem of women. A study conducted in Finland showed that only 5 percent of Finnish women over 85 years were married, while among corresponding men the rate was 46 percent (Vannemaa, 1993). The situation is also similar in Britain and the US (Arber & Ginn, 1991). The women in the western industrialized countries tend to live approximately 6-8 years longer than men. However, even though women live longer than men and are as likely to assess their health as good as men are, they have a greater prevalence of illnesses. This paradox has been often discussed, and it seems that women, on the one hand, have illnesses that do not lead to death (Vannemaa, 1993), and on the other hand, are more willing to report their illnesses than men are (see Arber & Cooper, 1999). The statistical tendency of older women to be more often widowed and more often ill has effects on the economic resources of older women. While women are often in a poorer situation in retirement than men are (Arber & Ginn, 1991), their economic resources can decrease drastically when they are widowed (Tuominen, 1994). In addition, medical costs are relatively high for long-term illnesses, even in countries where the state or other insurance system covers a share.

The women's role as caregivers often continues in later life. In Finland, less than 10 percent of women over 75 years received care from their spouses, whereas among men, the rate was 40 percent (Vannemaa, 1993). There are similar findings from the US (see Lynch, 1998). It is often forgotten that older women are not just consumers of welfare services, but also a large (albeit invisible) resource in caregiving. Older women tend to care for and help not just their spouses, but also their grandchildren, friends, and neighbours (Vannemaa, 1993). Arber and Ginn (1991) have noted that older women play an active role in sustaining the kinship system outside the nuclear family. Depending on the strength of the caregiver role, the transition from caregiver into receiver of care can be a crisis for a woman (Nordhus, Isaksen & Waerness, 1986). When women themselves need care, they most often wish to receive it from the welfare system, whereas men wish it more often from their spouse or children (Vannemaa, 1993).

The societal roles of older women do not have high status. In western society, an aging woman often has to face double discrimination (Fuller & Martin, 1980), encountering the stereotypes and prejudices related to both female gender and old age. These in combination create a double standard of aging; that is, aging means different things for women and men. A man can retain his attractiveness up to a very old age, in form of achievements, money or power, whereas a woman—valued mostly through her physical attractiveness and the ability to reproduce—is socially devaluated after the first half of her life (see Arber & Ginn, 1991). The attitudes towards older women are not shared by men; the older woman can also be cut out from the community of "normal aged" women (see McDonald, 1984).

Older women have, however, generally speaking been found to experience and describe aging more positively than men (Ronkainen, 1993). This positive experience might be due to women's larger social networks and greater participation in leisure and social activities, such as church-related activities (Vannemaa, 1993). It

is interesting, however, that in Ronkainen's study, physical malfunctions and changes and the experienced loss of physical attractiveness were experienced as the most negative things among older women (Ronkainen, 1993). This supports the claim that the aging body is gendered, as noted above. As women also suffer from long-term diseases in later life more than men do, body and physicality may play a more important role in women's late adulthood.

1.4.2 Older women in research

In 1980, Fuller and Martin noted in their edited review anthology of research on older women that this group has largely been ignored in research literature (Fuller & Martin, 1980). Over ten years later, Arber & Ginn emphasize the same phenomenon and raise the question of why feminist studies have paid only little attention to the stage of life in which women massively outnumber men (Arber & Ginn, 1991). Despite the fact that old age is predominately a period of life that women get to experience, paradoxically, women's studies have often been insensitive to age, and gerontological studies to gender. Gerontologists could probably come up with explanations why old age is easily ignored as a research topic, just as feminist/gender researchers could offer reasons why women are often silenced in studies. As noted earlier, both topics—old age and women—are ignored or mistreated in many scientific discourses, and thus, when combined, either silence or "misery research" is to be expected.

When older women appear as research topics it is often within a misery perspective. It is bad to be a woman, it is bad to be elderly, and thus it is even worse to be an old woman. Older women are older than men, poorer than men, more often living alone than men, and more ill than men. This is often the implicit or explicit starting point or outcome of many studies. In order to develop social policies, this kind of descriptive studies about the stratification of population are needed, but it should be noted that it is highly discriminative to view some group's life and characteristics as solely negative and problem-filled. This can constitute a biased starting point in research, and naturally also affects the findings. The issue is complex, but there should be an effort to differentiate the different conceptual levels. As an example, findings of poor economical situation or loneliness in older women might give an impetus for developing social policies, but they should not be used as reasons to study older women in the upcoming studies as poor and lonely *a priori*.

Furthermore, the "misery" of older women found in statistics is not unambiguous: there is a disparity found between the "objective" and "subjective" well being in older women. That is, even though older women are poorer and sicker than other people are, they however consider their lives mostly satisfactory (see e.g. Vannemaa, 1993). Due to this disparity, it would be scientifically and ethically questionable to claim that older women and their life are dominantly problematic or miserable.

In research, the heterogeneity of older women should also be taken into account. If only large statistics are viewed, individual voices of women are silenced, and the variety within the group is ignored. Depending on the issue, the variability among older women might however be interesting and important. In some cases, ignoring the heterogeneity results in incomplete data, and moreover, strengthens some of the stereotypes about older women.

Recently, older women have become more visible in research, and more cultural and social aspects of their life have been encompassed by research (e.g. Vakimo, 1995; Trossholmen, 1994; Reid & Hardy, 1999). In the following, we focus briefly on how older women have been presented in traffic research.

1.4.3 Older women in traffic research

Despite the growing research interest in older road users, older women have been rather invisible in traffic research. There are several reasons for this. First, most of the traffic gerontological research focuses on car driving, and women drivers have so far represented only a minority in the older driver population. Thus, research subjects have predominately been male. Moreover, the older women drivers have been a very selected sample of their cohorts and thus easy to leave out from the study samples—in order to get reliable and representative data. In future, however, older women will be the fastest growing subsample of the whole driver population (Hakamies-Blomqvist, 1994), and will eventually outnumber old male drivers (Burkhardt et al., 1996; Rabbit et al., 1996).

Another way to make women invisible in traffic gerontological research has been the pooling of women and men together in data sets. It can be only speculated why this has been so popular; but when ignoring all gender related differences the data are gendered, as the majority of subjects are male. One possible explanation for ignoring gender differences is that car driving has been seen as a task or performance that requires mostly resources in which women and men do not (in politically correct discourses) differ, such as cognitive capabilities. An additional explanation could lie in an ignorance of the importance of gender in traffic, possible even in the general uninterest in older women.

In future, a growing interest in older women as road users can be expected. At present, the traffic behavior of older women and the extent and quality of their participation in traffic in the future can be only speculated upon. Since cohort effects along with gender effects tend to create a rather complex picture, the estimation and prediction of the phenomenon is difficult. Thus, more research on the older women (and women in general) in the traffic system is needed.

1.5 Summing up

Traffic research has been dominated by a few paradigms. We believe that this represents a problem since many aspects of the empirical reality are most fruitfully viewed by using different perspectives in research (Alvesson & Sköldberg 1994). The domination of natural science in the domain of transportation has led to a situation where many methods, perspectives and paradigms from science of arts are missing, and, consequently, important perspectives as well as research questions have been ignored. It has however been well demonstrated that science of arts can be applied also to fields that have a status of being part of the ”natural” reality, such as technology or transportation.

Both women and the aged are social groups. Both are concepts that are defined differently in different discourses, and, moreover, the definition or the construction of these concepts is often implicit. In research in general, gender and age are often not just conceptualized problematically, but also mistreated or even neglected. Both concepts have also been stereotyped, used as discriminating labels, sometimes even idealized. These problems are robustly present even in the field of transportation research.

Research on older women carries the burden of the stereotypes related to both women and old age. In traffic research, older women have so far been rather invisible. In February 1999, when we started to plan this report, a search in Roadline, the largest database for transportation research in the Nordic countries, gave no hits for the words “women” and “elderly”. Older women are however a fast growing road user group, and thus in near future this group will probably gain more attention from the researchers in the field. Under the influence of the large accumulated body of knowledge about older *men* as road users, there is however a risk that older women will be studied from a male-centered perspective. Yet, the most interesting findings may not be accessible by only searching for patterns that have been found in men’s travel, by making comparisons to men, or by ignoring what is special in older women and their travel. This review is one attempt to overcome “a biased start” by means of both problematizing the issue and the concepts related to it and of summing up the research done – and not done.

2 Older women as road users in literature

In the following section, we will examine the appearance of older women in traffic research by reviewing studies dealing with older women, travel, and traffic. Due to the very small amount of literature related to *older* women and travel, especially other than car driving, we have included some texts describing women's travel in general. In this review we address the issue through different themes, starting from a short look at the historical basis for female travel, then describing the general travel patterns of women, and finally moving towards the description of older women's traffic behavior and safety issues. We present the findings of the existing studies within each of these themes, and comment briefly general issues related to these studies, such as their methodological choices and interpretation of the findings.

The reviewed literature was primarily collected using the databases Roadline and PubMed on the Internet. Roadline is a large database on literature related to transportation, whereas PubMed is a more medically orientated journal database, though it contains abstracts from articles from various fields. We also used the university library databases in Finland (University of Helsinki; HELKA) and in Sweden (all Nordic universities; LIBRIS). Additional literature was found following the references in the studies available. The literature was primarily collected in 1999, although some publications have been included later on.

2.1 Historical basis for female travel

The different travel patterns of women and men have their historical roots, shaped by the society's norms. The history of female road users as well as their situation today can be viewed in the context of the overall history of women's status, roles, and liberation. Women's travel patterns (e.g., short distances, limited use of private car), discussed further below, can be seen as an outcome of historical processes related to gender and travel. The short distances traveled, "reproductional" purposes of travel, and modal choices building upon them can be all seen as reflecting society's control upon women. Freedom and mobility have largely been attributed to men's life but not women's (see Leed, 1991). Thus the history of women's travel culminates in some extent in the history of women as car drivers because car driving represents the dominating mode of travel in today's society (that is, the *whole* society) but has clearly from the very beginning belonged to *men's* sphere.

When the automobiles appeared into the streets of the US, in the early 1900's, driving was transit for the rich and thus mostly for men. Women who wanted to drive were seen as radicals and almost abnormal. Yet there were so few of these reckless women—and they were, after all, only women—that no direct concern was raised (Wachs, 1987). The same phenomenon was seen in Europe somewhat later, in the 60's, when the car was established as a general transport mode. At that time, the private car was dominantly a man's vehicle and women were seen as passive in the transport context. At this time, it was considered highly humorous—and of course highly dangerous—if a woman wanted to drive (Andréasson, 1994). When the private car came within the reach of all social classes and not just the uppermost ones, driving became part of normal life and travel. In America, this happened in the 20's and 30's, and in Europe in the late 60's and 70's. At this point, the car was marketed for women in terms that used and even strengthened the traditional gender-roles. The car was enabling the

women to carry out their work in reproduction: as caregivers and the "geniuses of home" (Wachs, 1987; Andréasson, 1994). Also the still persisting stereotypes of women drivers were created at this time: women were thought to be poor and overcautious drivers. Nowadays women still have their special travel patterns and the "myth of the female driver" is strong (Polk, 1998).

2.2 Overall patterns of female mobility

When the aim is to produce a descriptive overall view of female travel patterns, certain problems appear. Travel patterns are often described in literature by different measures like mileage traveled or licensing rates and statistics based on these. This is mainly due to the general interest—and thus the methodological choices and orientation—of travel studies. In general, methods for gathering information of travel are mostly quantitative to their nature; they are often conducted as large population-based surveys and thus the findings can often be somewhat shallow for a reader interested in the travel of some specific group. Moreover, when focusing on women's travel, it is notable that women are often described as road users in terms of men's travel, and female travel patterns are presented as differences from the male travel. This is a common way of describing women in general, as has often been stated in feminist literature (see e.g. Harding, 1987).

Travel patterns are often viewed through numerical *measures of travel*, often described as "exposure", of different road user groups. Such measures are in general collected through surveys, and variables differentiating the groups are, e.g., gender, age, or residential area. Another complementary way of viewing travel is the analysis of *trip patterns*, focusing on question such as modal choice and purpose of travel. Trip patterns also are often studied through surveys yielding quantitative findings. Travel patterns are affected by *availability of transport* and possible *mobility problems*. Such factors can be examined by viewing, e.g., nation-wide statistics (when available) or by asking people directly. It is not trivial how the data are collected, and the researcher must make some methodological choices also when trying to explore the travel patterns. Statistics are perhaps the most reliable source for things like licensing rates of certain groups, or number of cars in certain area, but the data from such sources do not give answers to all interesting questions.

2.2.1 Travel and trip patterns

Women travel less than men and the amount of travel decreases with age in the elderly. Travel patterns are affected by one's life situation (e.g. work, children). Both the traveled mileage and the number of trips decrease with age after retirement. It also seems that the gender differences diminish in the retired population.

In 1994, Swedish women traveled 2.8 person trips per day in comparison to men's 3.0 trips per day. Moreover, the difference in the traveled distances was larger. Women traveled on the average 31 kilometers per day whereas men traveled 50 kilometers (Polk, 1996). Older women have been found to make relatively even more short trips than women in general do. For women aged 75-84, 75 percent of all trips were less than 5 kilometers long (Nynabb, 1995). In Norway, women in urban areas (Oslo) were found to make shorter and fewer trips than men, but the higher educated the women were, the more their trip patterns resembled to those of men's (Hjorthjol et al, 1989). Similarly, in Finland

(Ukkonen et al, 1998), among persons aged 55-74 and 75+, women were found to make fewer trips than men, and older women (75+) made fewer trips than younger women (55-74). Women's trips were also more often directed to the close surroundings and this tendency was stronger in the older women. In this study, besides gender and age, health was related to trip rates.

Women and men make different modal choices. Women in all ages use more public transit and walk and bike more than men do. Most importantly, women drive less and travel more as passengers in a car than men do. The mileage driven by women is significantly lower than that driven by men (see e.g. Cassel et al, 1996; Chipman, 1993; Hakamies-Blomqvist & Ukkonen, 1998; Polk, 1998; Rosenbloom, 1995a; 1995b). Private car is a dominating transportation mode for both women and men nowadays (e.g. Cassel et al, 1996; Polk, 1998), but some patterns—such as sharing the wheel, and purpose of travel—partly explain the differences in driven mileage. First, women travel more as passenger whereas men drive. This pattern has been found in Sweden (Nynabb, 1995; Polk, 1996; 1998), Norway (Hjorthjol et al, 1989), in the UK (Cassel et al, 1996), and in the US (Rosenbloom, 1995a). A Swedish observational study also showed that when a woman and a man were traveling in a private car, the man was driving in 89% of the cases (Cedersund, 1990). Second, women in general drive shorter distances than men do. While total mileage is lower for women, women and men have often been found to have less dissimilar trip rates (e.g. Hakamies-Blomqvist & Ukkonen, 1998; Rosenbloom, 1995a). This means that the mileage per trip is lower for women, i.e., women drive shorter distances.

Men and women make trips for somewhat different purposes. In Sweden, while men's trips are mostly work-related or leisure trips, women make trips related to household errands (shopping, children) and visiting friends and relatives (Nynabb, 1995; Polk, 1996; 1998). This pattern seems relatively stable: between the years 1978 and 1995, in Sweden women's and men's trip purposes have not changed much; except for a moderate increase in the proportion of work-related trips for women (Krantz, 1997).

Complexity is a special feature of women's travel, which probably is strongly related to purpose of trips. Women do trip chaining, that is, combine several tasks within a trip. For instance, they leave and pick up children in day-care and do shopping on the way to somewhere else (Hjorthjol et al, 1989). Such complexity as a special feature of female travel will be discussed below with more detail.

2.2.2 Availability of transport and problems in mobility

Travel patterns as discussed previously are, naturally, affected by travel opportunities. Opportunities for travel and individual mobility can be viewed in several ways (for a discussion, see Polk, 1998). Often they are defined and measured as availability of transport. This side of mobility has been examined among different age-sex groups, but also among different residential groups. Such studies are often done by analyzing existing archival data (e.g. censuses, license registers) or by asking people directly using surveys or interviews.

In the modern society, and especially in the US, the availability of transport often refers to the availability of private car. Despite increasing concern for the environment, private vehicles have become the dominating transport mode for most people, both women and men. Some gender-related differences do exist, however. Women hold relatively fewer licenses, have problems with access to a

car, and seem to have more limited overall resources for travel than men do. The phenomenon is surprisingly universal regardless of country and specific travel culture. Overall, the licensing rates of populations in industrialized countries are high and still increasing. In the US, automobilisation has a longer tradition, and licensing rates are higher than in Europe for all age-sex groups. Especially the American elderly population is more likely to be licensed as drivers than their European counterparts are. Europe is, however, leveling the situation in the next decades as the baby-boomers age.

Despite the domination of private car as personal transport mode in both America and Europe, licensing rates for women are not as high as for men. In the US, women in younger generations are almost as likely to be licensed as men are, but in the age groups 50 years and above, the licensing rates for women decrease. In the age group 81-85, the licensing rate for women in the US in 1990 was only 47% while it was 81% for men in the same age group (Rosenbloom, 1995a). In Europe, a similar pattern is found. For example, in Sweden a majority, 80%, of the population aged 18-84 is licensed as drivers, but the licenses are not evenly distributed; older persons and women are less likely to hold a license. 75% of those who do not have a driver's license are women and only 25% are men. Generally speaking, of those who do not have a license, the majority is older women (Polk, 1996). In addition, besides the uneven distribution of licenses, women also are less likely than men to *use* the car—even if they have a license. The family's car is predominantly used by the man (Cassel et al, 1996; Polk, 1998; see also Cedersund, 1990). Hjorthjol et al. (1989) have noted a similar situation in Norway and furthermore pointed out a paradox in urban travel issues from the gender perspective. They claim that public transit overall is mainly designed and developed by men and it serves mostly male-like travel patterns regarding the routes and timetables. However, as they point out, the complex travel patterns and needs of women discussed earlier, that is, trip chaining and travel outside rush hours, do not meet the supply in the public transit system. While men however mostly occupy the private cars, women are expected to use public transit.

Area of residence also affects the availability of travel options. In rural areas, public transit is less covering, and on the other hand, the typical trips are longer. This makes the rural residents more dependent on private cars. This is reflected in results of an American study by Cutler and Coward (1992), where the rural elderly were found to have access to personal transportation (that is, private vehicle) more often than the urban elderly. However, in all areas, older women were less likely to live in a household with access to personal transportation than men were. In this particular study, the term personal transportation was used to refer to private vehicles and other modes were not considered. In the US, access to a private vehicle may indeed be an adequate measure of mobility. Another study about the elderly and transportation in the US (Rosenbloom, 1995b) found that in urban areas, 86.8% of women and 89.9% of men over 65 made their trips in private vehicles. Residents in rural areas were even more dependent on cars: 93.1% of women and 95.0% of men made their trips in private vehicles. Being a licensed driver had a strong effect on the number of trips performed, especially for women. In Europe, differences in mobility and access to transportation related to area of residence seem to follow the American pattern, even though the issue has for the most part not been studied. A Finnish study on the travel possibilities of the elderly found that rural residence was a major predictor of mobility loss if the

person didn't have access to a private car (Sirén & Hakamies-Blomqvist, in press).

One important aspect of mobility (and mobility problems) is the *personal experience* of being able to travel freely. In a Finnish survey, persons aged 55+ were asked about their travel. In this study, women were found to experience more difficulties in meeting other persons than men were. Women aged 74+ also reported that they felt less secure when being outside than the other age/gender groups (Ukkonen et al, 1998). The experiences of these older women might reflect problems in mobility. The personal experience of free vs. limited travel is not widely (if barely at all) studied as an aspect of mobility, even though it is the aspect most intimately related to the road *user* and the traveler. This might be a reflection of the quantitative, empiricist research paradigms dominating the field of traffic research.

Mobility is sometimes measured as various factors affecting the amount of travel. For instance, navigation problems have been found to decrease the driven mileage (Burns, 1999). Older women have been found to have most problems with way finding, and thus with mobility. However, drawing the conclusion that women have poorer mobility because they have more problems with navigation can be an instance of circular reasoning. Women drive less, which itself means less mobility, and little driving experience can entail navigation problems and problems in way finding.

2.2.3 Special quality of female travel patterns

The reports describing female travel patterns show that there are some special qualities and characteristics typical to women's travel. These special qualities are features that differ qualitatively from men's travel. Seen in this light, women's travel seems to be affected by the restrictions, roles, and tasks that exist in the society's overall gender structure. These are, for example, caregiving, reproduction, and concerns about personal security while traveling.

Women's travel has been found to be more affected by certain social factors, e.g. the presence of children and marital status, than men's travel (Rosenbloom, 1995a). American women with children made more trips than women or men without children or men with children. Single women with children aged 6-15 made the greatest number of trips of all age groups. In a Finnish study, female drivers aged 24-39 and 65-69 were most likely to have more than one passenger (Hakamies-Blomqvist & Ukkonen, 1998). It seems fair to think that these passengers not seldom are the women's children (for the younger age group) and grandchildren (for the older age group). In very old age, women are less likely to have any passengers, perhaps because they often are widowed.

The trip patterns also reflect women's role as caregivers. In a study conducted in the state of Oregon (Bianco & Lawson, 1996), and in a cross-cultural study between the Netherlands, the USA and France (Rosenbloom, 1989), women were found to do trip chaining more than men were. Women combined tasks/trips such as picking up/dropping off children, and shopping. Women also often reported being a primary caregiver for someone and that they were responsible for someone else's transportation (Bianco & Lawson, 1996).

Concern about personal security also is reflected in women's travel patterns. When the modal preferences of the academic faculty staff were examined in Oregon, it was found that women more often than men expressed dissatisfaction

with security on the campus area and were more influenced by concerns for security in their modal choices than men (Bianco & Lawson, 1996). Similarly, English women have reported enjoying car driving, but often not enjoying it on motorways or unfamiliar roads when alone. Public transit also was avoided in the night among women much more than among men (Cassel et al., 1993; see also Atkins, 1989).

2.3 Traffic behavior of older women

As pointed out earlier, there are plenty of studies on the traffic behavior of older road users, but only a few on the traffic behavior of older female road users. Most traffic gerontological studies so far have viewed gender as a trivial variable and examined the older road users in general by pooling the genders; some studies have included only men. Other studies have acknowledged age and gender as variables, but forgotten the multi-dimensional nature of these concepts. In such studies, women and men are simply compared, often from a gendered viewpoint, i.e., posing male-centered research questions and describing women in terms of *differences in relation to men*. The androcentrism in traffic gerontology is, however, for some parts "innocent", and external to the researchers. The proportion of older women as drivers is still so small and selected (in most European countries at least) that the ones accessible for scientific study are not a very representative sample of their cohort. This sampling problem will more or less disappear within next few decades, and it remains to be seen whether future traffic gerontology will be less androcentric as a consequence.

In the present context, the term 'traffic behavior' includes modal choice, driving habits and patterns, driving-related experiences, and giving up driving. We focus rather much on driving, since it has been the main area of interest within traffic gerontology, and thus most of the literature deals with driving. In research on traffic behavior, mail surveys have been a popular method. The studies reviewed here have used survey methods almost exclusively, though there are also a few studies conducted with focus groups or personal interviews. The limitations of the chosen methods are seldom problematized in the research reports.

2.3.1 Older women's modal choices

According to the existing literature, in old age as well as generally speaking, men seem more dependent on private cars whereas women more often use other modes instead of or in addition to private car.

In the US, the NPTS (Nation-wide personal transportation survey) study from year 1990 showed that the modal choices of older women and men are similar, but not the same (Rosenbloom, 1995a). Women and men both depend on the private car for most of their trips, but women are more likely to use other options: to walk, or to use public transit and taxis. Women in urban areas were more likely to use alternatives to private car (probably because better availability of alternatives), but the difference between women and men was more distinctive in rural areas. Men's mobility (number of trips) was also more severely affected than women's mobility by the absence of driver's license. Similar phenomena were found also in a study concerning the older citizens in Finland (Siren & Hakamies-Blomqvist, in press).

A similar pattern has also been found outside the US and Europe. In Japan, women used a larger choice of different transport modes than men (Nagayama &

Yasuda, 1996). Among Japanese women, 58.6% of those over 65 without license, and 28.5% of those over 65 with license walk daily. For men over 65 these percentages were 38.8 and 18.7, respectively. As to time spent using different modes daily, older women without license spent most of their travel time walking (15.2 min. of total 26 min.). Licensed older women shared their time almost equally between walking (13.8min. of total 48.5 min.) and private car use (13.4 min. of total 48.5 min.). Older men without a license spent most of their travel time walking (14.3 min. of total 36.7 min.) or in a train (10 min. of total 36.7 min.). Licensed older men spent most of their travel time in a car (25.4 min. of total 57.6 min.) and shared the rest between walking or traveling in a train (10.8 and 10.7 min of total 57.6 min.). An interesting finding about the elderly and cycling was also made: women without license cycled much less than men (6% in respective to 17.2%), but among the ones with license the difference was, for some reason, reverse (women's 9.5% in respective to men's 7.8%). When comparing the older women to their younger counterparts in this Japanese data, it was seen that younger women without license choose a larger variety of different transport modes, such as train or bicycle, besides walking. For some reason, the use of alternative modes was limited among older women.

The findings about women's modal choices can be interpreted either as women's greater willingness to use alternative modes, or as women's smaller likelihood to get access to a car even if they have a license. What seems to be missing from the present literature is a deeper and more qualitative analysis about the reasons why women choose their modes differently from men. Without a more comprehensive picture of the modal choices of women, it is impossible to say to what extent the choice really is a free one reflecting personal preferences.

2.3.2 Older women's driving habits

Older drivers' driving habits and behavior resemble those of female drivers generally speaking. In addition, the "age-typical" driving patterns are shown earlier and with stronger impact among women than among men. While older drivers in general drive less than younger drivers do (e.g. Rosenbloom, 1995b; Hakamies-Blomqvist & Ukkonen, 1998), older women drive less than older men do. Older women have found to drive significantly fewer miles (Bishu et al, 1991; Rosenbloom, 1995b), and shorter distances than men (Hakamies-Blomqvist & Ukkonen, 1998). The trips driven also tend to be shorter and driving speeds lower (Hakamies-Blomqvist & Ukkonen, 1998). The tendency to modify one's driving with age is stronger among women: older women both decrease their mileage and avoid certain stressful conditions to a larger extent than men do (Gallo et al, 1999; Forrest et al, 1997; Kington et al., 1994). Older women also are more likely to give up driving than men are (Gallo et al, 1999; Hakamies-Blomqvist & Wahlström, 1996; 1998) and have been found to do it for less pressing reasons (Hakamies-Blomqvist & Wahlström, 1996). However, one study showed that most of older women drivers, in US rural areas at least, continue driving even at very advanced age (Forrest et al, 1997).

The purpose and pattern of driving trips have been found to be rather similar for older women and men: mostly shopping trips, starting and ending at home. For women, however, the trips were less often related to work (Hakamies-Blomqvist & Ukkonen, 1998).

Most studies on older women's driving habits have focused on the amount of driving, change of driving patterns with advancing age (mainly by comparing different age groups), self-reported problems, and driving style. Some of these studies suffer from the limitation described above: the number of motorized older women is still so small that having a representative sample of the cohort or making any future-oriented conclusions about older women's driving is very difficult.

2.3.3 Older women's experiences while driving

While drivers over 65 in general experience an increasing amount of problems in traffic (Bishu et al, 1991), older women have been found to experience more problems in certain traffic situations than older men. Women have reported more difficulties in left turns, signalized intersections, and stop sign intersections, and problems with vision and driving postures (Bishu et al, 1991). Women also experience several traffic situations as more stressful than men do (Hakamies-Blomqvist & Wahlström, 1996; Hakamies-Blomqvist & Ukkonen, 1998) and have higher overall stress levels while driving (Simon & Corbett, 1996). The experienced stress might well be connected to risk perception and risk taking in traffic; women rate perceived risks higher in traffic situations (Caird & Hancock, 1994) and show less risk taking behavior than men (Sivak et al, 1989b). The tendency to perceive situations as more risky and to take fewer risks has been found to increase in older age groups, for both women and men (Sivak et al, 1989; Sivak et al, 1989a). The experienced stress might also well be related to quantitative and qualitative driving experience, which could partly explain the age/cohort-gender –related differences.

A classical finding is that when drivers are asked to assess themselves as drivers, most of them rate themselves as better than average drivers (Svenson, 1981). Older drivers have, however, been found to have less illusory self-assessments than younger drivers when comparing themselves with their peers at the same age (Matthews & Moran, 1986), or if driving experience is controlled for (Sivak et al, 1989b). Compared to men, women rate themselves less positively, but these differences seemed to disappear in advanced age. Older women drivers have also been found to assess their own driving as "smooth" more often than other driver groups (Groeger & Brown, 1989). These gender-related differences may well be due to the different driving experiences of average older women and men drivers, since the mileage driven and frequency of driving have been found to be strongly related to self-assessment of older drivers (Marottoli & Richardson, 1998).

Studies suggest that women—especially older women—experience higher stress when driving, take less risks while driving, and assess themselves as cautious drivers (though overall with less positive ratings than men). However, these studies have used certain scales to measure stress, risk taking etc. There may be a validity problem if women and men are compared using scales that have been tested and validated with predominately male populations (e.g., older drivers).

2.3.4 Older women and giving up driving

Several studies have shown that female gender is a strong predictor for giving up driving. Women are more likely to give up driving and also to reduce their driving with advancing age. The predictors and reasons for driving cessation in general, as

well as some of the consequences, have been examined in several studies (e.g. Campbell et al., 1993; Gallo et al., 1999; Jette & Branch, 1994; Kington et al., 1994; Marottoli et al., 1993; Marottoli et al., 1997; Rothe, 1994). These studies have found that certain medical and psychological conditions and demographic features are associated with driving cessation. However, most studies have not differentiated the female and male subjects in such way that it would be possible to determine whether the *same* conditions and features are associated to driving cessation in both women and men. This kind of approach would be appropriate, because there are some studies (see below), which strongly suggest that the process of giving up the car is different for women and men, at least in the cohorts studied so far. For example, women's decision to give up driving seems not to be as much influenced by health factors as men's are. Women's driving cessation seems more related to social factors, such as limited driving experience and poor financial situation (Eberhard, 1996; Hakamies-Blomqvist & Siren, in preparation). Also, compared to men, it seems that car driving has different personal meaning for women. However, while men show quite a clear pattern in driving cessation, that is, keeping on driving into old age and giving up mostly due to poor health, women's behavior is less clear. More knowledge about both the predictors and consequences of older women's driving cessation is needed.

Older women have also been found to give different reasons than men for giving up driving. The most common reason for Finnish women to give up their license was that they were not driving anymore, while for men it was poor health. Women also mentioned financial constraints and fear of traffic more often than men did. Moreover, women mentioned poor health significantly less often as a reason than men did (Hakamies-Blomqvist & Wahlström, 1996; 1998). A US study showed, however, that women were more likely to have personal reasons for driving cessation while men were more likely to blame external reasons (Burkhard et al, 1996). Furthermore, an increasing number of medical conditions have been found to be related to decreasing driving—also among women. Fractures, angina, diabetes and self-reported poor vision were related to driving cessation in older women (Forrest et al, 1999).

In a Finnish study those women who gave up driving were more often found to be married than those who continued (Hakamies-Blomqvist & Wahlström, 1996). In contrast, in Canada, married older persons of both genders were more likely to drive (Chipman et al, 1998). Another Finnish study also showed driving cessation and widowhood to be related among older women (Hakamies-Blomqvist & Siren, in preparation).

Personal driving history is related to driving cessation. In a UK study, those women who had started their driving career later were more likely to give up. The difference among women was, however, not as clear as among men (Rabbitt et al, 1996). Similarly, an active driving career has been found to predict driving continuation in old age among older women (Hakamies-Blomqvist & Siren, in preparation).

The consequences of driving cessation can be very undesirable, as e.g. Rothe (1994) notes. It often implies loss of mobility and decreasing activity (see Marottoli et al., 2000), and this is especially true in the US, where the possibilities for obtaining mobility without private car are very limited (Burkhard et al, 1996). Bonnel (1999) studied the losses and experiences of older women after giving up their car and found, besides mobility losses, various range of things given up in connection with driving cessation; these included visiting friends, attending

church activities, and a feeling of general independence. The driver license seems to have societal importance as part of a person's social and personal identity. Older women who were retired from driving have been reported to be more often aware of their age, their aging, and their isolation from others (Eisenhandler, 1990).

2.4 Safety issues

Traffic safety as a research field, or at least as a secondary research aim, has a long tradition within traffic research. Safety issues have also traditionally been emphasized in traffic gerontology and there is ample literature published on road safety. Gender has not, however, been very visible in the safety research, and when it has, it has mostly been included as a mere index variable.

2.4.1 Safety of different modes for older women

Private car has been found to be the safest mode of transportation for older road users. Older women, as women in general, are, however, less likely to be licensed drivers and to have access to a car. This suggests that they may run the greatest risk as road users.

When studying the safety of certain modes, both accident data and exposure data have to be matched to get a reliable view of the risks. There are some studies exploring the risk of different modes to different road user groups for example by age. Gender has usually not been taken into consideration in such analyses.

In the US, the safety of bicycling has been assessed in relation to gender, and it was found that bicycling is slightly more dangerous for women (Li & Baker, 1996). Also in Japan, walking and bicycling were found to be particularly dangerous for older women (Nagayama & Yasuda, 1996).

2.4.2 Accidents of older female drivers

For male drivers the involvement rate per driven kilometers is high among young drivers, then falls from the age of 20 and rises again from the 65 years age. For females, the shape of the curve of involvement rate is similar, but with young females exhibiting only half of the rate of their male counterparts and with older female drivers exhibiting nearly twice the rate of older male drivers (Chipman, 1991, Li et al, 1998). Older women are overrepresented especially in non-fatal accidents (Massie et al, 1995).

Accident rate per distance driven, however, is a biased measure (see Hakamies-Blomqvist, 1998). Group comparisons using this measure provide an accurate picture only if the annual mileage is approximately the same in the groups (Hakamies-Blomqvist, O'Neill & Ukkonen submitted). This puts older female drivers at double disadvantage, since both age and female gender are related to decreasing yearly mileage, and low-mileage groups get inflated risk estimates in comparisons using accidents per distance as measure of risk. Women in general drive shorter distances, and in more dangerous environments, e.g., in urban streets, which increases the risk of being involved in an accident (Chipman et al, 1993). The "frailty bias" (Hakamies-Blomqvist, in press) also affects older women's accident rates more than those of older men's.

2.4.3 Accident types

Older drivers have a higher proportion of intersection accidents and fewer single-vehicle accidents than other drivers (Hakamies-Blomqvist, 1994; Stamatiadis, 1991). Older drivers also are less often alcohol intoxicated when involved in accidents than drivers in other ages (Hakamies-Blomqvist, 1994). The main immediate cause leading to fatal accidents of older drivers has been found to be attentional problems (Hakamies-Blomqvist, 1994).

For older women the effect of "age-typical" accident characteristics, e.g. increase in the proportion of intersection accidents and decrease in single-vehicle accidents, is stronger and starts earlier than for men (Hakamies-Blomqvist, 1994; Stamatiadis, 1996). The proportion of intersection accidents has been found to rise after age of 55 while for men the increase begins after 65 (Hakamies-Blomqvist, 1994). Older women are more often at-fault in the accidents in which they are involved (Stamatiadis, 1991). Attentional problems as main cause of accidents get a dominant role in women already in the age group 45-54 and onwards, while in men the effect does not show in statistics until the age of 65 (Hakamies-Blomqvist, 1994).

It is important to note, however, that acquiring the typical older-like accident picture is not necessarily a sign of a group's becoming more risky drivers. The often-described increase in the proportion of intersection accidents also reflects a corresponding decrease of other accident types such as overtaking accidents or single vehicle accidents. The older-like accident involvement probably reflects both strengths and weaknesses, i.e., older drivers have mainly those accidents left that cannot be avoided with cautious driving.

The role of driving experience is important. It has been suggested that women's different accident patterns are due to quantitatively and qualitatively different driving experience (Hakamies-Blomqvist, 1994). In any skilled performance, high level of expertise, in other words large experience, is an effective buffer against the effects of age-related functional decline. There are some indications that this also applies to aging and driving (Hakamies-Blomqvist et al, 1999). The importance of driving experience highlights the importance of the concept of cohort, since there are large cohort differences in the driving experience of women. Recent findings suggest that younger cohorts of older drivers may be aging later as drivers than older cohorts, as indicated by their accident patterns (Hakamies-Blomqvist & Henriksson, 1999).

3 Discussion

3.1 The reviewed literature

There are some findings concerning the literature on older female road users that we want to emphasize. First, it was scarce. There were not even fifty articles or reports dealing with the issue, or even mentioning older *women* in the study. This is indeed a small amount, as reflected to the overall literature about older road users: in October 2000, the search database Roadline gave 717 hits for words "old people", and medically oriented database PubMed 298 hits for "older drivers". Second, the methods used were predominately quantitative and there were no observable attempts to deeper understanding in most of the reviewed studies. The reviewed literature mainly focused on descriptions of the differences between the genders, mostly without any visible critical approach towards the methodology of comparative studies in general. However, the descriptive studies gave us the chance for the third important observation: women and men do indeed travel differently—even though the findings are affected by the methodological critique presented above. The women's travel is in general limited to geographically smaller areas and it is more influenced by social factors than men's travel. The finding is indeed interesting from the researcher's point of view: both the underlying reasons as well as the consequences of the finding are much to be explored. Our fourth point is that the gender-related differences mentioned above diminish with age. This may be due to retirement and decrease of the work-related trips that men are more likely to do, but possibly also due the underlying attitudes about the "sexless" old age and the social construction of old age as "age of no gender". This phenomenon is also an interesting challenge to the researchers on the field. Our fifth and final point is that the nature of gender differences in travel and traffic is hard to define. It is not easy to explain why women and men differ so much. The reasons thereof do not seem to be salient, and the relation between different factors probably very complex. Hence, future research should aim at a deeper and more comprehensive understanding.

As to the theoretical level of the research reviewed, a few remarks can be made. The level of (explicit) theorization and conceptualization was often poor and one-sided. The concepts of traffic, gender, and age were in general treated as unproblematic and unambiguous. The concept of traffic especially was uncontroversial, even though it has rarely been defined. The traffic system was mostly seen as a system of it's own: a stable, natural establishment, where the road users were just performing their travel under the laws of this system. There were some exceptions, however: the texts dealing with the historical travel patterns (Wachs, 1987; Andreasson, 1994) emphasized the cultural and social aspects of traffic and travel behavior. Of course, many studies have made laudable efforts in including important cultural and social background factors (e.g. Hjortjol et al., 1989; Polk, 1996), but the phenomena itself, that is, travel and travel behavior, is seen as something straightforwardly measurable. Sometimes travel was measured with the accuracy of 0,1 minutes (see Nagayama & Yasuda, 1996). In such a quantitative perspective, only a small range of phenomena is qualified as "belonging into the field of traffic research".

Gender was conceptualized quite straightforwardly in the reviewed studies. The studies did not theorize or speculate around the process of constructing gender in traffic, and gender was seen as a variable without (at least explicit) further connotations. A general justification for studying just women without

comparisons to men seemed to be missing, with some exceptions though (see Bonnel, 1999). Furthermore, the special features of women were discussed only to some extent; when describing the travel by younger women, some social aspects were included, but when the women got older, they seemed to "loose" their gender. The postmodern view that gender is unstable was not found in any of the reviewed studies. This kind of theorizing might however offer fruitful aspects for the research of the cultural and situational aspects of the car and the traffic system.

The definition of aged, elderly, older or old wasn't theorized or discussed in the studies. Age usually referred to chronological age, and often all those above 65, 70 or 75 were pooled together as "aged". Specific methodological problems related to the study of aging were not often mentioned, as if a silent consensus reigned about them. It should be noted, however, that as the volume of research related to aging is expected grow extensively, not all the new researchers in the field will share basic knowledge about gerontology and its methodological problems. Therefore, some explicit notion should be given to the issue.

3.2 Femininity as a norm?

The male road user has predominately been the norm in traffic research and traffic gerontology. At the language level, the bias originating from the male norm can be seen in phrases like "women's limited use of car" (whereas men use it in the *normal* way). It is, however, questionable whether men's travel and traffic behavior should indeed be seen as a norm, especially since women outnumber men in the older generations. Men may be on the road more than women are, but on the population level; the male way of travelling is an exception rather than the norm. Such a perspective of femininity as a factual norm is missing from the studies so far.

The male norm created in the field of traffic studies, and especially in traffic gerontology, can cause several methodological as well as practical problems. Methodologically, it is problematic if the norm of travel behavior is created upon the minority of road users. And to be more accurate, it is problematic if a norm, created upon any group, is dominating the field in such ways that it steers the methods and the questions posed. The problems present themselves at the most distinctive way when results obtained from exploration of some sub-group (say, men) are generalized to a whole population; this issue we have discussed also earlier in this text. A more invisible bias is created when the problem of the male norm dealt with by "adding women" to studies (see e.g. Harding, 1987). The bias is still present, because the ways of defining travel and the methods for inquiry still have their roots in the male norm created earlier. The latter bias is an issue requiring most attention during the upcoming years. The visibility of older female road users in research will most likely increase as their share of the older drivers population increases, but if no attention is paid to methodological issues and the dominating male norm, women will most likely be just "added" to the research.

The consequences of research biased by a male norm are reflected on practical level, in policy making and community planning. Many of the policies concerning traffic and travel are made on the basis of research outcomes, and if the outcome represents only the visible minority, leaving out the invisible majority, the policies made will be based on a biased view of reality. Thus, for example in the case of traffic gerontology, community planning will be made in terms of older male road users, ignoring a larger population of female road users.

3.3 Heterogeneity

Heterogeneity is a term repeatedly emphasized in this review. It is an important concept when dealing with any of the main concepts discussed here; gender, age, and traffic. In terms of gender, the main way in which the idea of heterogeneity can be applied to research is the notion of more than one existing gender. As previously noted, the discourses created within traffic research often avoid the whole concept of gender due to an assumption that traffic behavior is almost biological or, at least, based on basic cognitive abilities in which the genders do not (can not) differ. Thus, a comparison between the genders would not be politically correct. It is, however, relevant to examine traffic and travel by gender. Travel patterns and the traffic system are filled with social and cultural aspects, gender *does* matter, just as it does in the society as a whole. Once gender differences are established as an important issue the traffic research, the principle of heterogeneity can be connected with gender in more sophisticated way. This includes the arguments of postmodernism, of gender being unstable and various. At the traffic research level this means that the categories women and men are heterogeneous and should be treated as such. One way of fragmenting the categories is to examine women and men at different ages, but there are several other possibilities too, such as looking at different life styles, life situations, cultures, physical environments, and so on.

Heterogeneity connected with age has been a popular topic during the last years, but as mentioned earlier, often in terms of diagnosing or classifying people to well and ill, capable and incapable. The heterogeneity of the aged could be understood in a much wider perspective, though. Since people live longer lives and the population over 65 (the classical point which segregates the elderly and "the normal aged") will grow extensively in the near future, it is evident that this population will be very heterogeneous and that the heterogeneity will not only be related to health, but also lifestyles, roles and life histories. In addition, the postmodern idea of performance and gender, that is, the idea of doing gender, could be applied to age as well. The idea of "doing age" could be fruitful in future traffic research.

The heterogeneity connected with traffic and travel also is an important point. Traffic research often focuses narrowly on the one travel mode above others, that is, private car driving. Similarly, there is one phenomenon in traffic more interesting than others, namely accidents. It is fully understandable that these issues gain attention and resources, and the societal and economical weight of them is indisputable. Still, the other aspects of traffic also exist, and their exploration is important and interesting, especially as the societal pressure for more environmental safe modes gets stronger. It is also an unavoidable fact that people do mix and combine travel modes and that the view on travel from the road user's perspective may not match that of a researcher. As already mentioned, research too often sees travel as a performance, not as a part of everyday life. A Swedish researcher Tora Friberg (1998) has examined women's travel as part of everyday activities. Maybe seeing the road user with many faces, i.e., the heterogeneous road user, will also add heterogeneity to the research activities on the traffic field.

3.4 Methodological issues

On the basis of this review, it seems that a need for more deep and qualitative understanding about older women's travel is needed. It is encouraging that there is so much knowledge about the basic patterns of women's travel, and to some extent, even of *older* women's travel. From this basis, it is easier to continue with a more applied and qualitative approach. In the sample of publications reviewed here, many questions remained unanswered, such as why women travel less, why women choose different modes, and why women experience traffic differently than men. The nature of these questions associates methodologically to a more qualitative approach, since the *why* questions have been said to produce more comprehensive and qualitative knowledge than the *how* questions (Alasuutari, 1994).

It would also be important and useful to problematize more the concepts used in traffic studies. Future research efforts therefore should also be directed towards discussing their theoretical foundations and methodological choices when studying older women as road users. The issue is multidimensional and complex, and very challenging. In this report, we have tried to give some critical insights to the issue and raise consciousness about the underlying theoretical, methodological and empirical foundations.

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