Chapter 3
Mobility of Care: Introducing New Concepts in Urban Transport

Inés Sánchez de Madariaga

This chapter introduces a new concept in urban transportation, the 'mobility of care', which acknowledges the need to quantify, assess and make visible the daily travel associated with care work. We understand care work as the unpaid labour performed by adults for children and other dependants, including labour related to the upkeep of a household.

The notions of care work and of gender divisions of labour bring attention to the fact that activities needed for the sustaining of daily life, in the home and in the city, are actually work and differ from personal business and leisure. They do not receive economic compensation and are not included in the calculations of gross domestic product (GDP) – except when provided as paid services – but they require daily effort, time, ability and dedication. They can be considered as work as much as paid employment is.

This conceptualization of care work has significant implications for city and transport planning. Techniques and tools developed by the planning professions, embodied in planning institutions and practices, build on the notion of work narrowly understood as paid employment and often mistake care for leisure or personal interests.

In the early decades of the twentieth century the *Congrès International d'Architecture Moderne* (CIAM after its French acronym) and the ensuing Athens Charter coined the so-called main urban *functions* of *living, working, recreation and circulation*. Although long criticized for their simplified understanding of urban space, these categories continue to underpin planning practices throughout the world. They are still core concepts permeating planning thinking and planning techniques which effectively translate directly into built environments. For example, legally binding zoning regulations specifying land uses and building typologies result in homogenous, single-use urban landscapes, often in rather crude ways, where daily life can become difficult.

By *working spaces*, modern movement urbanism meant those locations where paid employment takes place. The urban *function* of *working* defined by the Athens Charter is the *economic activity* of zoning regulations and development plans, with its subcategories of *commercial*, *retail* or *industrial*. Planning policies, systems and practices typically invest great resources of all kinds in ensuring the proper development and accessibility of those spaces. Because supporting the

economy normally appears high on the agenda amongst the objectives of any city or regional plan, these generously provide for the physical infrastructures required to promote economic development.

Equivalent efforts are not deployed for the development of those urban infrastructures and facilities that provide support for everyday life, except for those care services that have become part of the formal economy in the twentieth century. As education, healthcare and others were formalized and became either publicly provided services or privatized economic activities, appropriate planning techniques were developed to accommodate them in urban space, mostly with the institutionalization of city-planning processes following World War II.

It is true then that modern city planning does recognize some care activities – mainly education and health, which have become now universal in some parts of the world – and also other activities related to people's well-being, such as sport and cultural services. However, services for the care of dependents – the old and the very young – are still not commonly provided and as a result planning systems, policies and plans do not integrate them into their routine operations. Only the Scandinavian countries provide universal cover for childcare and a wide range of facilities for the care of elderly people with different degrees of dependency.

Modern city planning acknowledges this care sphere of the service economy and provides the mechanisms for the creation of the facilities where they are provided. All European national planning systems incorporate different techniques and tools for the planning and development of such facilities. They are part of standard city planning and building in the developed world. Whether they are private or public, in addition to the location, the quality and extent of services depends on the political economy of individual countries.

Notwithstanding this, the vast majority of activities needed for the maintenance of daily life have not been formalized – many cannot be – into paid or publicly provided services. City and transport planning concepts, techniques and practices fail to recognize the urban and transportation implications of this other sphere of care work that has not been or cannot be formalized as private or public services.

When planning concepts and techniques consider domestic space and the activities that take place in and around the home in everyday life, they interpret it from the perspective of the personal experience of the (male) breadwinner who assumes only a small share of care work – the personal reality of most decision-makers in the field. They associate domestic space with a respite from paid labour, and see it mostly as a place for leisure. As a consequence, sometimes care work is confused with, or hidden within, personal- and leisure-related activities. The daily experience of those who take care of others is not seen and those urban design and planning solutions which could facilitate the tasks of daily living and caring for others are not included in the agenda.

This chapter applies methods of gender analysis to existing notions used in transport planning. It provides some insights on how to research travel behaviours and needs in a more gender aware way. This will increase the validity and

objectivity of the knowledge base on which to build more efficient transportation systems to the benefit of both men and women.

Building on earlier research on gender and transportation (Pickup 1988, 1985, Grieco, Pickup and Whipp 1989, Hamilton 1999, Turner and Grieco 1998, Wekerle and Rutherford 1987, Wekerle 1989, Hamilton et al. 2000) this chapter moves the framing of the problem away from seeing women mainly as victims – and therefore concentrating on various forms of exclusion – to a clearer perception of gender difference. Many of these earlier studies focused on transport disadvantage and social exclusion, looking at the specific circumstances of women, often within a wider research concern on the links between poverty, access to key services and economic and social exclusion (Lucas 2012). While an analysis of covariates such as age, ethnicity or income is obviously considered, my approach departs from this perspective to focus on a wider understanding of gender differences, whatever the income level or other specific additional forms of potential disadvantage, as a basis for policy-making.

Care Work and Transportation

Time Use Surveys provide relevant information on the time men and women spend on care work, paid employment and leisure. The Harmonized European Time Use Survey codes time use into 49 categories and provides sex-disaggregated data on time usage within 15 countries. With care work defined to include activities such as childcare, household upkeep, cooking, laundry, ironing, cleaning, shopping and services, pet caring, informal help to other households, repairs, organization and travel related to the above, data show women spend much more time than men performing this sort of work. For instance, Spanish women aged between 20 and 70 years spent 4.5 hours per day in 2002 performing care work, as compared to 1.4 hours per day spent by men, while British women spent 4.1 and British men 2.2. Italian women spent 5.2 and Italian men 1.3 (HETUS 2002).

However, it is important to recognize that men's caring work has increased over time and that there are substantial geographical variations, with some countries showing considerably narrower gaps between men and women. For example, British fathers with children under age 5 spent an average of only 13 minutes on childcare in 1961; this increased to 120 minutes by 1999 (O'Brien et al. 2003). Finnish men spent 2.2 hours per day working in the home in 2002, while Finnish women spent 3.2 hours per day in that same year, as compared to 1.3 and 5.2 respectively for Italian men and women (HETUS 2002).

In all these five countries men spend significantly more time than women on paid employment and leisure activities. Differences are more significant in Italy, where men work 4.1 hours per day in paid employment and women only 1.5. Spain, with men dedicating 4.2 hours per day to paid employment and women 2.6, and the UK, with 4.1 for men and 2.2 for women, show a slightly reduced gender gap. Leisure time demonstrates similar patterns: Italian men spend 5 hours per day

in leisure activities while women only 4; a similar gap appears in the Spanish case, with 5.1 for men and 4.2 for women, while the proportion is slightly better in the UK, with 5.2 and 4.5 hours per day respectively. Only in Finland these differences are significantly smaller for both employment and leisure. In Finland men dedicate 3.5 hours per day to employment and women 2.3; Finnish men dedicate 5.5 hours per day to leisure activities and women 5.1.

The fact that women spend more time than men performing care work, and less time than men in paid employment and in leisure activities implies that consideration of care work is key to gender equality in transportation, as many tasks of care work require transport to access facilities or services located in different parts of the city.

Reconceptualizing Mobilities: Care, Employment and Leisure

The innovative concept proposed by this author, 'mobility of care' (Sánchez de Madariaga 2009, 2010) provides a perspective for recognizing and revaluing non-paid care work by evaluating the trips that women and men make when caring for others and the home. The insertion of this concept into transport surveys facilitates consideration of these trips into the planning of transit systems. This concept does not include trips performed as part of paid employment tasks in the care service sector, whether private or public. This is particularly important to bear in mind in the Scandinavian context, where a greater part of care activities have been integrated into the paid economy within the public sector.

The mobility of care, as a concept, is posed as a counterpart to the well-studied mobility of paid employment and as distinct from the mobility of leisure with which it is often confused – and obviously distinct from education-related travel. It includes all travel resulting from home and caring responsibilities: escorting others, that is, older and younger persons who cannot move by themselves; shopping for daily living, with the exclusion of leisure shopping; household maintenance, organization and administrative errands, as different from personal walks for recreation; visits to take care of sick or older relatives, again as different from leisure visits and so on.

Another relevant concept that has evolved from a gendered analysis of transportation is 'trip-chaining'. Normally a trip is described as a journey from a single start location to a single destination, utilizing a single form of transportation. The concepts of 'trip-chaining' and 'multipurpose trips' expand upon this definition by recognizing that trips often involve a sequence of destinations and are multimodal (Rosemblum 1989a, 1989b, Hanson 1980).

Research has shown relevant differences between men and women with respect to trip-chaining (McGukin et al. 1999, 2005a). A greater number of women than men make multiple-stop trips when travelling between their homes and workplaces. However, this observed sex difference is decreasing, mainly due to an increase in trip-chaining among men (between 1995 and 2001, the number of stops men

made while returning home from work increased by 24 per cent). Women make more short stops on the way to or from work than men to perform activities that sustain the household, such as shopping and family errands, and working women in dual-worker families were twice as likely as men in such families to pick up and drop off school-age children at school during their commute. The differences are most pronounced in households with young children: having a child under age 5 increases trip-chaining by 54 per cent among working women but only 19 per cent among working men. However relevant the concept of trip-chaining is to describe the mobility patterns of women and men, it is not yet commonly included in transportation surveys.

Many care trips are today not properly accounted for in transportation statistics. Care trips can be hidden under other headings when considering the purpose of trips, such as leisure, strolling, visits or other personal trips. Sometimes they are simply not counted, as frequently happens with trips made on foot and short distance trips of less than one kilometre.

Most significantly, these journeys are not seen as a whole, as a single category. Because statistics capture data on escorting, shopping, errands and so on as separate and unrelated reasons for travel, rather than as specific tasks within the wider work of social reproduction, the overall 'weight' of the mobility of care is systematically under-represented in any analysis of urban transport.

Additionally there are differences between the mobility of care and the mobility of paid employment. Often care trips are chained, as opposed to the commuter trips typical of employment. As trip-chaining is a concept which is rarely included to its full extent in data collection, this is another factor hindering a proper understanding of the mobility of care. The modal description of care trips is also limited as a consequence, as chained trips often rely on more than one mode of transport, because stages in the journey can be made by different modes: most often on foot and by public transport – bus, subway or taxi – sometimes by car, or as passenger being given a lift.

Care trips are usually arranged in a polygonal spatial pattern rather than that associated with commuting. They are shorter in comparison to employment trips and cover a smaller geographical area, closer to home. As discussed above they are made more often by women than employment and leisure trips, although the gap between men and women is slowly narrowing. They are also made using public transport and on foot more often than trips for employment. This correlates with the fact that women are the main users of public transportation systems around the world. In Sweden, among people in paid employment, a greater proportion of women (18 per cent) than men (14 per cent) use public transport (Sahlin et al. 2001).

A more accurate method for quantifying and describing all of these trips, together with combining them under one heading, would show how the mobility of care might represent a significant share of total trips that approaches employment in size and significantly outweighs those connected with both leisure and educational purposes. It would provide a much clearer and more precise

understanding of gender differences in travel, as well as a solid baseline for the design of transportation systems that are more responsive to users needs.

The purposes of trips are categorized in various ways by different surveys and organizations. For example, the Spanish national survey of metropolitan mobility uses the following categories: employment, study, shopping, leisure, strolling, escorting, visits, other (Ministerio de Fomento 2007). The regional survey produced in Madrid by the Consorcio de Transportes considers these: work, study, shopping, leisure, escorting, other (CTM 2004). The way purposes of trips are categorized in transportation surveys – and, hence, the way statistics are gathered and analysed frequently does not account properly for caring work.

Visualizing the Mobility of Care

The following graphs demonstrate how the concept 'mobility of care' reveals significant travel patterns otherwise concealed by gender assumptions embedded in data collection variables. The pie charts represent urban trips made in Spain in 2006-7. Chart (A) is a strict representation of data provided by Spain's national urban mobility survey of 2007. This way of conceptualizing data privileges paid employment by presenting it as a single, large category. Caring work, by contrast, is not named as such. It is divided into numerous small categories, hidden under other headings, such as escorting, shopping, leisure, strolling, visits, or not counted at all, since this survey does not count short trips on foot of less than 15 minutes or shorter than one kilometre.

Chart (B) introduces the concept 'care work' under the ad hoc assumption that certain proportions of trips described as 'escorting', 'shopping and so on were made for the purpose of providing care. Visualizing care trips in one dedicated umbrella category and giving them a name emphasizes the importance of non-paid care work.

This example is based on ad hoc and somehow arbitrary assumptions on the proportions of escorting (100 per cent), shopping (2/3), strolling, visits and other (1/3 each) that could be considered as care. Certainly these are coarse assumptions made by the author, from this particular source of Spanish data, in order to get a rough estimate of the size of the mobility of care and to be able to draw a chart illustrating and visualizing the concept. They do need to be checked against empirical data. A proper measurement of how many of these trips can actually be considered as care requires a specific survey, properly designed and implemented. To my knowledge no such survey has yet been undertaken.

Such a survey should contain clear, specific and detailed questions formulated to accurately separate trips arising from care work from those related to employment and from those to be properly considered as strolling, visiting or leisure shopping. To unveil stereotyped ideas contributing to the invisibility of unpaid care work, interviewers should be able to explain to the interviewees which sort of trips should be understood as care. This is particularly relevant in the case of middle-age women who tend not to see care work as such. This survey would also have

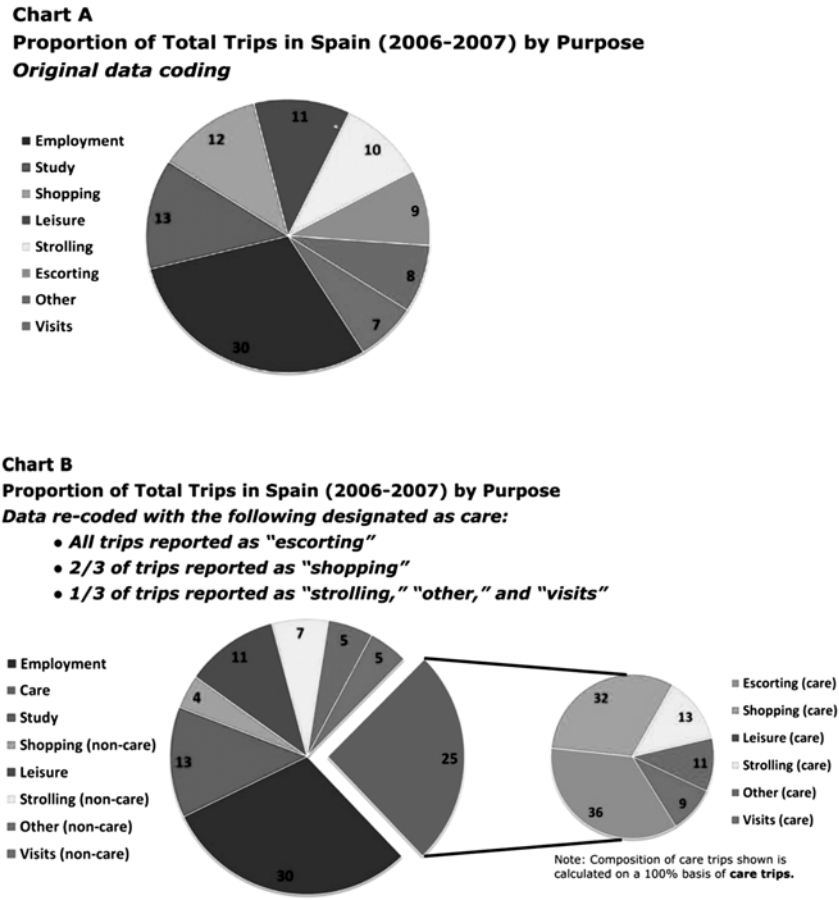

Figure 3.1 Visualizing the mobility of care

to count trips of less than 15 minutes and those shorter than one kilometre. Finally it should include the concept of trip chains and ask questions that accurately describe them, including the mode of transport for each segment, the direction of trips, timing of travel and the purpose of the stops.

Examining Gender Assumptions in Transportation

The innovative concept proposed in this chapter, 'mobility of care', allows for both an understanding and a visualization of previously hidden travel patterns derived from gender divisions of labour. 'Trip-chaining' is another concept that contributes to a better understanding of the gender dimensions of transportation.

Both concepts and terms are examples of how to apply the methods for sex and gender analysis developed by the EU-US Gendered Innovations in Science, Medicine, Engineering and Environment (Schiebinger et al. 2011). Gender analysis of urban transportation requires careful consideration of how concepts and terms are constructed and used, and often this will result, as in this case, in rethinking concepts, language and visual representations.

By examining gender assumptions underlying any field of enquiry, we can unveil unconscious gender bias built into concepts, methods or theories. This section shows a few more instances of gender bias that can still be found with a certain recurrence in transportation data and studies, although some countries and organizations can boast of better practice. Albeit slowly, things are changing and some examples I am pointing to no longer apply to many transport organizations across Europe. The best practice in Europe should be used more widely.

One example is the use of the terms 'housewife' and 'head of household' as binary opposites. When providing personal and socio-economic descriptions of people, some transportation surveys, such as the national survey in Spain Movilia, still use the traditional terms of housewife and head of household as polar opposites. Regional surveys in Madrid and Barcelona no longer use these distinctions, as well as many surveys in other European countries, such as the UK National Travel Survey.

Another biased concept is compulsory mobility, commonly used as an umbrella concept to designate all trips made for employment and educational purposes. This concept overvalues employment while undervaluing care mobility. It overvalues trips to the workplace, creating the impression that they are more important because they are 'compulsory' and required, while others might not be so. Implicitly, it conveys the idea that care trips are not necessary, that they are expendable, becoming less important for transportation policy-making. This concept further contributes to the appearance that the mobility of employment takes up an even more substantial share of the total, because educational trips are added on to it. This is particularly significant in graphic representations, as both are represented with very similar colours making them appear visually as one single, large category, close to 50 per cent of the total.

Implicit gender assumptions can also lead to omission and the overlooking of issues of greater relevance to women. Examples of this tendency are short trips, trips on foot and part-time employment. Short pedestrian trips or of less than 10/15 minutes or of less than 1 kilometre are frequently not counted. These trips are intentionally omitted in many transport surveys because they are not considered to be relevant for infrastructure policy-making. However, they are important to a proper understanding of the mobility of care and of women's travel, as these trips are more frequently made by women in their daily routines attending to the family and the home. They are also important for an accurate understanding of trip-chaining because this sort of trip usually involves at least one segment on foot.

Many transportation statistics do not collect information on part-time employment. Because women represent a greater share of those employed part-

time, this omission limits analysis of the correlations between travel patterns, paid employment and other covariates which would otherwise provide a better description of women's travel.

Gender bias is also common in visual representations of transportation data. Perspective, volume, use of colours, relative position and size of graphs, categories represented and titles used are common sources for visual misrepresentation of quantitative information (Tufte 1983). They are also common sources of gender bias in the representation of transportation statistics. Pie charts are frequently used, often shown in perspective and with volume. Perspective and volume distort the information because those segments of the pie that come to be located in the foreground occupy more space on paper than is proportionate to their real share of the total, by the added surface volume. Data that is located in the foreground is perceived to be larger than it really is. Because visual comprehension is so quick and powerful, the choice of which data which is to be in the foreground is not a neutral issue. Sometimes trips to the workplace are located in this position, as in the original visual representation of the example provided above (Ministerio de Fomento 2007).

Relevance of Sex Analysis and of Covariates

Gender divisions of labour are the main source of differences between men and women in transportation. However, biological sex is also a relevant variable when physical strength and height have to be taken into account in the design of vehicles and facilities. Analysing sex differences in designing steps and railings, the positioning of control buttons and so on includes rethinking standards and reference models and also the recognition of pregnancy as a normal physiological state.

A full understanding of the mobility of care requires the consideration of covariates, particularly those relevant to a better representation of women as a diverse group, as women are not one single category, but a very complex and differentiated group of people. The main relevant intersecting variables that need to be taken into account are the following: age, race and ethnicity, income, job situation (including whether employment is full or part time), marital and family status, physical capacity and responsibility for children under 18 or for handicapped or older non-autonomous relatives.

Universal design principles have been now developed for several decades in the US and in Europe to provide built environments that are equally accessible to everybody regardless of physical condition and ability (Audirac 2008). This concept is relevant to a sex and gender analysis of built environments, as design features developed according to the principle of universal design, by improving physical accessibility for anyone who does not fit common standards and reference models –normally those of an adult male – also improves accessibility for women.

In London (Transport for London 2007), for example, public space and transportation facilities design improvements have been carried out. These include: step-free access to trains, subways and buses, wide aisle gate access to transportation and level access from platforms to trains. Transportation authorities are removing steps from streets to platforms to accommodate baby carriages, luggage, wheelchairs and similar devices. Transport for London had a policy of encouraging walking and before the recession started to fund a series of public realm improvements. Public realm improvements are included in the public transport accessibility (PTAL) evaluation which has to accompany every major planning application in London.

Other factors affecting women's mobility relate to sex and its interaction with gender. Women self-limit their movements in the city by not going to certain places at certain times of the day or night (Cavanagh 1998). Although the presence and behaviour of women in public space has dramatically changed in the last decades and is occasionally becoming indistinguishable from that of men (see Marion Roberts' chapter in this book), safety concerns and the fear of sexual assault continue to be an issue for the mobility of women in cities.

New design features have made transportation safer (Wekerle et al. 1995). These include designated waiting areas, transparent bus shelters, proper lighting, only-women buses, emergency intercoms and surveillance mechanisms and alternative services and routes, such as request-stop programs and allowing users to disembark from the bus at locations closer to their final destination at night (Schulz et al. 1996). The city of Quebec has developed systematic programs both for the identification of unsafe places in transit systems and for the redevelopment of subway stations with design features improving safety conditions (Sánchez de Madariaga 2004). The city has implemented a systematic plan for the redevelopment of subway stops to improve visibility, physical accessibility, lighting and other means to improve safety.

Designing public transport systems to consider the mobility needs of older adults supports safe mobility for older people who have ceased driving for various health reasons (Currie et al. 2010, Hakamies-Blomqvist et al. 2003). Gender also interacts with age in the context of driving cessation (Bauer et al. 2003): researchers found that 'older females were more likely than males to have planned ahead [for cessation], made the decision themselves, and stopped at appropriate times' (Oxley et al. 2011). The correlation between gender, age and geographic location is a major challenge in supporting the mobility of older people: more elderly people live in rural areas than do younger people (O'Neil 2010).

The presence of children – particularly young children – increases the number of caring trips and the need for routes to accommodate these needs (Crane 2007). In the United States, use of public transportation differs by both sex and self-reported race/ethnicity; however, race and ethnicity more strongly correlate with public transport use than sex (Doyle et al. 2000). Urban characteristics such as density and income levels also matter. In Spain, only women living in suburban upper-middle-class low-density areas have patterns of access to private cars

that are very similar to men's, while women living in compact, more traditional neighbourhoods rely significantly more than men on public transportation, and overall, women are the main users of public transit (Sánchez de Madariaga 2005).

Implications for Transport Policy

Current transportation planning considers paid employment as its main focus of interest because most trips appear to be made for this purpose. Education and leisure follow as smaller, but also significant areas for transportation planning. Then a number of far less relevant purposes for travel appear – shopping, personal business, strolling, visits, escorting and so on. As these appear to each represent a small share of the total, they are not given great priority when decisions on investment are made. Mobility related to care work is either not visible, as it is hidden and scattered under these other various small categories, or not properly measured, as trips on foot of less than 15 minutes or one kilometre are not counted, and chained trips are not included in statistics.

When we introduce the idea of 'mobility of care', a different picture emerges. Care and employment appear as the main purposes for travel, with the mobility of care representing a roughly similar share of all trips other than that of employment. When these data are further disaggregated by sex, care appears today as the single and foremost purpose of travel for women, in much the same way as employment is the main purpose of men's travel. In Scandinavian countries, where comparatively a greater part of care work has moved into paid employment, it is possible that the weight of the mobility of care for women is closer to that of employment. However, data need to be collected to properly understand geographical variations.

Under this model, I propose additionally to use the concept of 'leisure', again as an umbrella notion, to loosely group all remaining smaller purposes having to do with personal well-being and recreation – strolling, visits, leisure shopping, personal business and so on – neither related to employment nor care. This would leave us with four main categories to be used in transportation data gathering for a better understanding of the travel needs of women and men: care, employment, leisure and education. Care and employment would be bigger and similar in size. Care and leisure would be umbrella concepts to be further disaggregated into smaller categories.

This radically challenges the current priorities of transport policy-making whereby employment is considered to be the main and most important purpose for travel, because it appears that the majority of trips are made for this purpose. New empirical evidence generated using these concepts will demonstrate this is not the case. Employment is not the single main purpose for travel, but only one of two main purposes. This carries the implication of making significant changes in the priorities of policy-making.

The innovative concept 'mobility of care', captures significant travel patterns, and can be used to render public transportation more responsive to users' needs.

Building on this concept, transport policies can be designed to better respond to travel associated to care work, redefining priorities in resource allocation and investment which today disproportionately favour employment-related mobility.

As Sánchez de Madariaga argues in another chapter of this book, an increased presence of women in the transportation sector and in city planning departments can improve sensitivity to gender dimensions in transport policy-making, as they may be more sensitive to these issues through personal experience. However, this is not always the case for various reasons, and a critical mass of women in decision-making positions, as well as alliances with sympathetic men, are needed for substantial changes in professional and/or institutional agendas to occur. Substantive knowledge of the gender dimensions of transportation is required by both women and men. This knowledge is not yet provided by universities, so professional training would also be required for both practitioners and academics.

Additionally, three other issues deserve attention here. The first one addresses some inherent risks in focusing on care work issues in transport policy. The second one draws attention to the need for considering transportation in the wider framework of urban and regional planning policy. The third one addresses the links between gender and environmental sustainability in transportation.

Bringing attention to care work emphasizes what continues to be the central life experience of many women, and is mainly carried out by women by reason of the gender division of labour. This contains the risk of an oversimplified and essentialist understanding of the problem which could lead to an equation of care work with women's work and ultimately of gender with sex. This problem is always present in gender research and policy-making when specific women's issues derived from their traditional gender roles are brought into focus. It demands a vigilant attitude to prevent the real trap of equating sex with gender, an issue exposed and questioned by gender research in the first place. It demands vigilance with regard to the continued evolution of gender roles and to the diversity of situations experienced by actual women and men.

Because transportation is a field of policy intertwined with city and regional planning, the links between these three realms of public policy – transport, gender, urban and regional planning – need to be strengthened. Transportation planning needs to be better integrated with spatial planning instruments at all scales, from local land-use planning to the city level, to the regional, more so than is current in most European cities. A wider consideration of gender dimensions in cities and regions, at all scales, has to be taken into account, and proper methods, techniques and processes for gender mainstreaming have to be integrated into the whole.

Finally, there is evidence that women's mobility is environmentally more sustainable than men's (Carlsson-Kanyama et al. 1999). Although differences by income level and other variables such as age and labour market position are significant and must be taken into account, as a whole women travel shorter distances, walk more often, make less use of private cars and more of public transport systems. As a result, women's mobility accounts for a smaller proportion of contaminating emissions to the atmosphere than men's. Because urban and

metropolitan transportation represents a very significant share of all contaminating emissions contributing to the greenhouse effect, it is relevant to acknowledge gender differences in transportation when considering climate change and environmental sustainability policies.

However, the more sustainable travel patterns of women are partly the result of their underprivileged position in society. As women's socio-economic position increases, as their income levels and participation in paid employment rise, accordingly their travel patterns become more similar to men's. A gender analysis of transportation should lead us to question whether the current status of men's mobility patterns should continue as the standard reference, as the model towards which policy, planning and investment coalesce. A transportation system that is both more environmentally sustainable and more equitable for everyone challenges the privileged status of able employed men's transportation patterns as the norm for policy-making. To this end, concepts such as the mobility of care can be of great use.[1]

References

Audirac, I. 2008. *Universal Design and Accessible Transit Systems: Facts to Consider when Updating or Expanding your Transit System*. Washington, DC: Project Action.

Bauer, M.J., Rottunda, S. and Adler, G. 2003. Older Women and Driving Cessation. *Qualitative Social Work*, 2(3), 309-25.

Carlsson-Kanyama, A., Linden, A-L. and Thelander, A. 1999. Gender Differences in Environmental Impacts from Patterns of Transportation: A Case Study from Sweden. *Society and Natural Resources*, 12, 355-69.

Cavanagh, S. 1998. *Making Safer Places: A Resource Book for Neighbourhood Safety Audits*. London: Women's Design Service.

Consorcio de Transportes de Madrid. 2004. Encuesta de movilidad de Madrid EDM, Madrid: Consorcio de Transportes de Madrid.

Crane, R. 2007. Is There a Quiet Revolution in Women's Travel? Revisiting the Gender Gap in Commuting. J*ournal of The American Planning Association*, 73(3), 298-316.

Currie, G. and Delbose, A. 2010. Exploring Public Transport Usage Trends in an Ageing Population. *Transportation*, 37(1), 151-64.

1 I coined the concept 'Mobility of Care' as a result of a research project on gender and transport funded by the Spanish Ministry of Public Works (Sánchez de Madariaga 2009). In this project, I analysed several Spanish urban transport surveys from a gender perspective. Two graduate students collaborated, Alejandro Manteca and Inés Novella. The concept 'mobility of care' was incorporated as a case study in the Gendered Innovations Project (Schiebinger et al. 2011) with Addison Arlow and Sarah Newman as research assistants.

Doyle, D. and Taylor, B. 2000. Variation in Metropolitan Travel Behavior by Sex and Ethnicity, in *Travel Patterns of People of Color: Final Report*, edited by the United States Federal Highway Administration. Washington, DC: United States Department of Transportation, 181-244.

Grieco, M., Pickup, L. and Whipp, R. 1989. *Gender and Transport: Employment and the Impact of Travel Constraints*. Aldershot: Avebury.

Hamilton, K. 1999. Women and transport: Disadvantage and the gender divide. *Town and Country Planning*, 68(10), 318-19.

Hamilton, K. and Jenkins, L. 2000. A Gender Audit for Public Transport: A New Policy Tool in the Tackling of Social Exclusion. *Urban Studies*, 37(10), 1793-800.

Hakamies-Blomqvist, L. and Siren, A. 2003. Deconstructing a Gender Difference: Driving Cessation and Personal Driving History of Older Women. *Journal of Safety Research*, 34(4), 383-8.

Hamilton, K. 1999. Women and transport: Disadvantage and the gender divide. *Town and Country Planning*, 68(10), 318-19.

Hanson, S. 1980. The Importance of the Multi-purpose Journey to Work in Urban Travel Behavior. *Transportation*, 9, 229-48.

Hanson, S. 1980. Spatial Diversification and Multipurpose Travel: Implications for Choice Theory. *Geographical Analysis*, 12(3), 245-57.

HETUS 2002. Harmonised European Time Use Survey, Eurostat. Available at: https://www.h2.scb.se/tus/tus/.

Lucas, K. 2012. Transport and social exclusion. Where are we now? *Transport Policy* 01-013.

McGuckin, N. and Murakami, E. 1999. *Examining Trip-Chaining Behavior: A Comparison of Men and Women*. Washington DC: U.S. Department of Transportation.

Ministerio de Fomento 2007. *Encuesta de Movilidad de las Personas Residentes Movilia 2006*. Madrid: Ministerio de Fomento.

McGuckin, N. and Nakamoto, Y. 2005a. *Differences in Trip-chaining by Men and Women. United States National Research Council*. Research on Women's Issues in Transportation Report of a Conference, Vol. II: Technical Papers. Washington DC: Government Publishing Office (GPO).

O'Brien, M. and Shemilt, I. 2003. *Working Fathers: Earning and Caring*. Manchester: Equal Opportunities Commission.

O'Neil, D. 2010. Deciding on Driving Cessation and Transport Planning in Older Drivers with Dementia. *European Geriatric Medicine*, 1(1), 22-5.

Oxley, J. and Charlton, J. 2011. Gender Differences in Attitudes to and Mobility Impacts of Driving Cessation, in Women's Issues in Transportation: Summary of the Fourth International Conference, October 27-30, 2009, Irvine, California, Volume 2, edited by S. Herbel and , D. Gaines. Washington, D.C.: United States National Research Council (NRC) Transportation Research Board, 64-73.

Pickup, L. 1988. Hard to Get Around: A study of women's travel mobility, in *Women in Cities-Gender and the Urban Environment*, edited by J. Little, L. Peake and P. Richardson. New York: New York University Press.

Pickup, L. 1985. Women's Gender-Role and Its Influence on Travel Behavior. *Built Environment*, 10, 61-8.

Rosenbloom, S. 1989a. Trip-Chaining Behavior: A Comparative and Cross-Cultural Analysis of the Complicated Travel Patterns of Working Mothers, in *Gender, Transport and Employment*, edited by L. Pickup and M. Grieco. Aldershot: Gower Publishing.

Rosenbloom, S. 1989b. The Transportation Needs of Single Salaried Mothers: A Critical Analysis. *Journal of Specialized Transportation Planning and Practice*, 3(3), 247-76.

Sahlin, M. and Rosengren, B. 2001. Regeringens Proposition 2001/02:20 – Infrastruktur för ett Långsiktigt Hållbart Transportsystem. Stockholm: Regeringskansliet. Available at: http://www.regeringen.se/content/1/c4/21/02/bd3b3165.pdf.

Sánchez de Madariaga, I. 2005. Infraestructuras para la vida cotidiana, *Ciudades* 8, 101-33.

Sánchez de Madariaga, I. 2009. Vivienda, Movilidad, y Urbanismo para la Igualdad en la Diversidad: Ciudades, Género, y Dependencia. *Ciudad y Territorio Estudios Territoriales*, XLI (161-2), 581-98.

Sánchez de Madariaga, I. 2010. Housing, mobility and planning for equality in diversity: Cities, gender and dependence, in *Social Housing and City*, edited by L. Moya, Ministerio de Vivienda, 177-97.

Sánchez de Madariaga, I. 2004. *Urbanismo con perspectiva de género*. Fondo Social Europeo- Junta de Andalucía, Sevilla.

Schulz, D. and Gilbert, S. 1996. Women and Transit Security: A New Look at an Old Issue, in Proceedings of the Women's Travel Issues Second National Conference, 25-27 October, Baltimore: Transportation Research Board Publications Office.

Schiebinger, L., Klinge, I., Sánchez de Madariaga, I. and Schraudner, M., eds. 2001. *Gendered Innovations in Science, Health and Medicine, and Engineering* (launched 2001: genderedinnovations.stanford.edu).

Transport Studies Unit 2002. Women and Transport. The Research Report. London: University of East London. Available at: http://dl-ami-dev.uel.ac.uk/womenandtransport/audit.htm.

Transport for London 2007. *Gender Equality Scheme*. London: Group Publishing.

Tufte, E.R. 1983. T*he Visual Display of Quantitative Information*. Connecticut: Graphics Press.

Turner, J and Grieco M. 1998. Gender and Time Poverty: *The Neglected Social Policy Implications of Gendered Time, Transport and Travel*, Paper presented at the International Conference on Time Use. Luneberg: University of Luneberg. Available at: http://www.geocities.com/margaret_grieco/womenont/time.html.

Wekerle, G. 1989. Single parents in the suburbs: Journey-to-work and access to transportation. *Journal of Specialized Transportation Planning and Practice*, 3(3).

Wekerle, G. and Rutherford, B. 1987. Employed women in the suburbs: Transportation disadvantage in a car-centered environment. *Alternatives: Perspectives on Society, Technology, and Environment*, 14(3-4), 49-54.

Wekerle, G. and Whitzman, C. 1995. *Safe Cities: Guidelines for Planning, Design, and Management*. London: Van Nostrand Reinhold.