

THE EFFECTS OF URBAN RAIL INVESTMENTS
ON THE MOBILITY OF
CAPTIVE WOMEN PUBLIC TRANSPORT RIDERS

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submitted by **BAHAR ERKOPAN ESER** in partial fulfillment of the requirements
for the degree of **Doctor of Philosophy in City and Regional Planning
Department, Middle East Technical University** by

Prof. Dr. Canan Özgen
Dean, Graduate School of **Natural and Applied Sciences**

Prof. Dr. Melih Ersoy
Head of Department, **City and Regional Planning**

Assist. Prof. Dr. Ela Babalık Sutcliffe
Supervisor, **City and Regional Planning Department, METU**

Examining Committee Members

Prof. Dr. Ali Türel
City and Regional Planning Department, METU

Assist. Prof. Dr. Ela Babalık Sutcliffe
City and Regional Planning Department, METU

Prof. Dr. Ayhan İnal
Civil Engineering Department, METU

Assoc. Prof. Dr. Serap Kayasu
City and Regional Planning Department, METU

Assist. Prof. Dr. Ebru Vesile Öcalır
Gazi Vocational College, Gazi University

Date:

I hereby declare that all information in this thesis document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last Name: Bahar Erkopan Eser

Signature:

ABSTRACT

THE EFFECTS OF URBAN RAIL INVESTMENTS ON THE MOBILITY OF CAPTIVE WOMEN PUBLIC TRANSPORT RIDERS

Erkopan Eser, Bahar

Ph.D., Department of City and Regional Planning
Supervisor, Assist. Prof. Dr. Ela Babalık Sutcliffe

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With this dissertation, it is intended to improve our understanding of the effects of urban rail systems on the mobility of women, their accessibility and their extent of experiencing the city they live in, that is their urban geography. The main aim is to understand whether women who live nearby an urban rail system and who use this system have higher levels of mobility and wider urban geography when compared with those who live in places without an urban rail access and those who do not use urban rail systems. In search for the effects of metro usage on mobility, as well as the factors affecting metro usage, the study is built on four main fields in transportation studies: mode choice theory, activity based travel theory, time-geography theory and women studies.

Women living on Ankara metro line and in Keçiören constitute the main case study in this thesis. With the help of a comprehensive questionnaire, applied on captive public transport women riders, it is assessed whether the Ankara metro has positive effects on the mobility of women living nearby the metro stations, whether women who use the metro have higher mobility and wider urban geography, and whether the

metro can be effective in enhancing the mobility and urban geography of women who are identified as particularly vulnerable in the literature. Understanding the factors, in cases where expected positive impacts on mobility have not been realized, is also important to contribute to the theoretical discussions that the study is built on.

Key words: Women Studies, Urban Rail Systems, Mode Choice, Mobility, Urban Geography, Activity Based Trips, Cognitive Constraints.

ÖZ

KENTSEL RAYLI SİSTEMLERİN ARABA KULLANMAYAN KADINLARIN HAREKETLİLİĞİNE ETKİLERİ

Erkohan Eser, Bahar

Doktora, Şehir ve Bölge Planlama Bölümü

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Bu tez çalışması ile kentsel raylı sistemlerin kadınların hareketliliği, erişebilirliği ve yaşadıkları kentleri deneyimlemeleri, yani kentsel coğrafyalarına etkileri hakkındaki anlayışımızın geliştirilmesi hedeflenmiştir. Temel amaç, kentsel raylı sistemlere yakın yaşayan ve bu sistemi kullanan kadınların, kentsel raylı sistemlere yakın olmayan ve bu sistemleri kullanmayan kadınlarla karşılaştırıldığında, daha fazla hareketli ve daha geniş kentsel coğrafyaya sahip olup olmadıklarını anlamaktır. Bu çalışma, metro kullanmanın, hareketlilik üzerine etkilerini araştırırken, metro kullanma sebepleri de dahil olmak üzere, ulaşım konusundaki dört çalışma alanı üzerine temellendirilmiştir: ulaşım aracı seçimi, aktivite temelli seyahat teorisi, zaman-coğrafya teorisi ve kadın çalışmaları.

Bu tezin alan çalışmasını, Ankara metrosu ve bu metro hattı boyunca yaşayan kadınlar ile Keçiören’de yaşayan kadınlar oluşturmaktadır. Toplu taşıma tutsak kadınlar ile yapılan kapsamlı bir anket çalışmasının yardımıyla, Ankara metrosunun bu metro hattına yakın yaşayan kadınların kentsel hareketliliğine olumlu etkilerinin olup olmadığı, metroyu kullanan kadınların daha fazla hareketli ve daha geniş

coğrafyaya sahip olup olmadıkları ve özellikle metronun, literatürde korunmasız olarak tanımlanan kadınların hareketliliklerini ve kentsel coğrafyalarını arttırıp arttırmadığı konusunda bir değerlendirme yapılmıştır. Beklenen olumlu etkilerin olmadığı durumlarda sebeplerin anlaşılması bu çalışmanın üzerine temellendiği teorik tartışmalara katkı yapması açısından, bu çalışmanın diğer bir temel amacıdır.

Anahtar sözcükler: Kadın Çalışmaları, Kentsel Raylı Sistemler, Araç Seçimi, Kentsel Coğrafya, Aktivite Temelli Seyahatler, Algısal Kısıtlar.

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Dedicated to my husband and daughters...

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CHAPTER 1

INTRODUCTION

There has been increasing investment in urban rail systems in most cities in the world, with the underlying expectation that improved travel time that these rail systems provide in public transport can bring about significant increases in mobility levels, affecting people's choices of destinations for work, shopping, leisure, etc. Most urban rail investments are justified on the grounds that they will contribute to a better quality of life helping people to travel more in frequency and further in distance and thus increasing their mobility levels as well as the "geography" they experience in their city. This understanding is shaped mostly by the mode choice theory, which has an explicit emphasis on the effect of cost, time and comfort and convenience of travel: urban rail systems have the potential of decreasing the generalized cost of travel by improving travel times as well as accessibility, connectivity etc., and hence can help improve mobility levels, particularly for captive public transport riders and also maintain comfort and convenience of passengers.

However, travel decisions are complex and various factors may be effective in shaping them. This complexity is particularly relevant for women travelers, whose household responsibilities, different activity patterns and possible cognitions regarding transport modes reveal other factors as important as generalized cost in their travel and mode-choice decisions. The study, therefore, intends to focus on the mobility of women with an emphasis on urban rail system's effects on their travel patterns.

The research intends to contribute to our understanding of how improvements in public transport conditions, resulting from a new urban rail investment, may affect mobility in the case of those that have significantly diversified activity patterns, as

well as special circumstances regarding their perceptions of travel, hence a high level of complexity in travel decision-making. In addition, the choice of women public transport riders as the main focus of the study reflects theories from gender studies that women are generally more vulnerable than men in terms of mobility, due to various constraints, caused by physical and psychological sensitivity and domestic responsibilities.

The study rests on four basis: the *mode choice theory* in order to understand reasons for choice of different transport modes; *activity based travel theory* in order to show that women's household responsibilities and relevant daily activities may have effects on their mobility and mode choice, while an urban rail system may also have an impact on activity types; *time-geography* studies in order to analyze whether urban geographies and travel distances are affected by mobility constraints; and *women studies* in order to focus on the mobility issues of particularly vulnerable women groups. Since the analysis focuses on the mobility of women; women's mode choice reasons, daily activity schedules with regards to their household responsibilities, their mobility constraints, cognitive constraints, etc., are intended be examined. These four fields of theoretical discussions together with a description of, and discussion on , the concept of mobility, are presented in Chapter 2.

Chapter 3 presents the methodology of the study, outlining the main aims and hypothesis as well as the research method. The main aim of the research, as stated before, is to assess whether urban rail systems help to improve mobility levels of women and expand their urban geographies. The focus is on captive public transport rider women, who may be considered more vulnerable in terms of mobility when compared to men and to those who have access to private cars. It is intended to further analyze the more vulnerable groups within these women, such as low income women, elderly, less educated, women with children, etc, and assess whether those who use an urban rail system can be more mobile with a wider urban geography. In the light of these discussions, the main hypothesis that will be tested in this study is; *“urban rail systems may increase the mobility, expand urban geographies, and even increase the participation rates of women to the urban life, due to system quality, and removing the effects of cognitive constraints”*. However, it is possible

that additional constraints may be created due to the particular technology of rail systems. Considering these various issues, the methodology chapter formulates the main research question as well as secondary questions. The case study research method and the questionnaire are also described in this chapter.

Chapter 4 presents the general mobility levels of women who have different socio-economic and demographic characteristics. An analysis is made to observe the effect of metro accessibility (living along the metro route) and metro usage on the mobility levels of different socio-economic and demographic groups.

Different trip types are assessed in Chapter 5, from the point of view of different women groups, particularly the ones which Chapter 4 revealed as vulnerable in terms of mobility. Metro's effects on the different type of trips of different women groups are also analyzed in Chapter 5.

Chapter 6 states the general evaluation of metro by different women groups, focusing especially on the evaluation by vulnerable groups. The general evaluation gives the cognitive and capability constraints of women regarding the metro. The effects of the cognitive constraints on the mobility of vulnerable women groups are also revealed in Chapter 6.

Finally, in Chapter 7 the research is summarized, its main findings are presented, and the hypothesis is revisited together with the answers to the main research questions.

CHAPTER 2

MOBILITY AND URBAN GEOGRAPHY OF WOMEN

2.1. INTRODUCTION

Urban rail systems are considered to be effective in increasing mobility, improving public transport quality and speed, widening the urban areas that can be experienced by public transport riders. These systems are discussed to have mobility benefits especially for women in terms of increasing accessibility due to being a safer, easily perceivable, understandable, and reliable mode. Furthermore, it is suggested that some women groups have more cognitive constraints than other women, and that urban rail access for these more vulnerable women may be even more important.

In this part of the study, firstly the concept of mobility is defined and discussed in relation to urban rail accessibility. Secondly the main theories that the study rests on are presented. The study is based on four theoretical backgrounds: **Mode choice, activity based travel theory, time-geography theory and gender and transport studies**. There are various studies undertaken by many researchers on each of the study areas. There are also studies linking two or more of these areas. Mode choice subject is mostly dealt alone or with activity based travel theory.

For example, in the literature solely transportation mode choice studies are undertaken by many researchers like, Dong et. al., 2006; Johansson et.al., 2005; Manski, 2005; Beimborn et.al., 2003; Alpizar, 2001; Taeffe et.al., 1996; Black, 1995. There are some other studies relating mode choice with socioeconomics and gender studies, like Schawanen, Mokhtarian, 2005; Davidov, 2003; Carlsson-Kanyama, Linden, Thelander, 1999; Hanson and Schwab 1995; as cited in the study of Davidov (2003, 29): Bruederl & Preisendoerfer 1994; Diekmann, 1994; Erke 1990;

Molt 1990; Ben-Akiva & Lerman 1985; Held 1982; Hensher & Dalvi 1978; Domencich & McFadden 1975. Some other researchers have studied mode choice and activity participation, like Dong, et.al.; 2006; Gossen and Purvis, 2004; Jang, 2003; Frusti, Bhat and Axhausen, 2002; Hamilton, 2002; Bowman, 2000; Bhat and Koppelman, 2000; Bowman, Ben-Akiva, 2000; Lu, Pas, 1999; Vilhelmson, 1999; like Jeff, 1998; Bianco and Lawson, 1996; Ettema, Borgers, Timmermans, 1993; Jones, Koppelman and Orfeuil, 1993; Jones, 1979 (All of these researchers and their studies will be dealt in detail in Part 2.3). Gender studies relate are related with mode choice, transportation and activity participation. Time geography was put forward by Hagerstrand (1970) and then many researchers have studied and developed the term, such as Miller, 2004; Raubal, Miller, Bridwell, 2004; Primerano, 2003; Recker, Chen and McNally, 2001; Parkes and Thrift, 1980; and these researchers also linked the time geography with activity participation (These researchers and their studies are presented in detail in Section 2.3).

On the one hand, researchers like Williams, 2005; Hamilton, 2002; Peters, 1999; Buck, 2005; Bianco et.al., 1996; Carter, 2005; Whitley, Prince, 2005; Peters, 2001; have linked gender issues with transportation issues; on the other hand McGuckin and Murakami (2005); Levinson et.al., 1995; Nobis and Lenz, 2005; Rosenbloom, Hakamies and Blomqvist, 2006; Peters, 1999, 2001; Li et.al., 2005; Root et.al., 2000; Sarmiento, 1996; Wen et.al., 2000; Jang (2003), Lu et.al. (1999), Isabella (1987), Golob (1986), Kitamura (1985), Pas (1984), Adler and Ben-Akiva (1979), Ellegard (1977), Rosenbloom (1989) and etc. have studied three study areas jointly, transportation mode choice, activity participation and gender (These researchers and their studies are presented in detail in Section 2.3).

As a summary, time geography subject is dealt with mostly activity based travel theory and sometimes mode choice. Women studies are included more or less in all study areas but mostly activity based travel theory; mode choice considers women issues and women's mobility issues are studied in general. Some studies, although few in number, relate travel mode choice with activity participation and travel behavior patterns (Jang, 2003). This study brings together all four study areas, which

have not been studied together before, to the best knowledge of the author. In the following sections, each of these study areas will be dealt in detail.

2.2. DEFINITION OF MOBILITY

The mobility concept, as Walzer (1990) mentions, has four different types: geographic mobility, social mobility, marital mobility and political mobility. Although Walzer states that all the four mobility definitions are interrelated with each other, the focus of this study rests on geographical mobility geographical mobility. In this sense geographic mobility is described as the “*changes of residence and mobility in the form of transportation*” (Walzer1990).

Mobility concept entered transport policy and research after the 1990s (Jensen 2005). For over a decade now, transportation has been considered as not only a physical movement problem, but also a mobility problem containing different social, demographic and economical means (Jensen 2005). In this respect Walzer (1990) mentions that mobility levels of people differ due to some factors like age, sex, occupation health, etc.

In mobility studies, the terms mobility and accessibility are often used together although they mean different things. Accessibility is a more complex term than mobility and it includes the link between land use and transport (AIUS transport accessibility + mobility indicators (TAMI), April 2008). Accessibility is determined both by available transportation links and activity diversity and concentration, in other terms both by transportation opportunities and the state of the land use. Having convenient transportation infrastructure does not necessarily mean that one place is accessible; the location of that place in relation to city centers and major urban service areas, such as shops, schools, health centers, etc. also affects the level of accessibility. Therefore, measuring level of accessibility is a complex and a more comprehensive process; measuring level of mobility also involves complex issues but it can be simplified to mobility in terms of trip frequency and mobility in terms of distance, or the extent of urban geography covered. Considering the focus of this thesis, which is the effect of urban rail systems on mobility levels, examining the

impacts of land use diversity on accessibility is out of the scope of the study; and therefore the conceptual framework is concentrated on mobility.

In geographic terms

“mobility should neither be reduced to “transport” (or physical movement) as is often the case in existing mobility policies, nor should it be reduced to only an inferior expression of “accessibility”, as is a tendency seen in some of the conceptual and critical literature” (Gudmundsson; 2005, 123)

From the geographical point of view there are also different classifications of mobility. Recently in transport research mobility is handled not only the physical movement of people, but also as the virtual mobility. In this respect Urry (2000) classified mobility as corporate mobility (personal mobility), object mobility (freight transport), virtual mobility (information) and imaginary mobility (TV and media). This thesis deals with corporate mobility.

Freudenthal and Pedersen (2005) held geographic mobility from a different point of view. According to them mobility is related with the possibilities of doing anything in any time with any frequency. Therefore, mobility is not the actual mobility undertaken by a person, but also includes the potential of movement (Høyer, 2000).

Gudmundsson (2005) also discussed actual and potential mobility and he added other dimensions as in the followings:

- a) There are actual movements (trip frequency- related with trip time and duration) and potential movements (the potentiality that transportation system have, to deliver movement and the potentiality that people have [physical ability, driving skills, etc.-systemic potential-mobility resources]) (Gudmundsson, 2005): People’s capability constraints become important within this context, because they all affect mobility of people and particularly women are more affected in these terms. From the point of view of captive

public transport riders, being in the walking distance of a metro station is the mobility resource.

- b) There are supplied transportation infrastructure and demanded infrastructure (potency and tendency) (Gudmundsson, 2005): While potency is related with the “transport systems’ potential capacity to deliver movement” and “the individual appropriation of resources to utilize the system” (Gudmundsson, 2005, 113); tendency is related with “the need or desire to move”, which is affected from many socio economic factors such as the preferences, roles, lifestyle and activity patterns of individuals (Gudmundsson; 2005, 113). There are always differences between tendency and potency as Gudmundsson (2005) argued. In order to decrease the levels of mismatch three methods are given (Gudmundsson; 2005, 115): 1- Increasing the supply of transportation investment levels without considering the actual demand, 2- Increasing the usage levels of the existing infrastructure and transportation systems by making different types of arrangements like equipping public transport systems with wireless network etc. 3- Decreasing the travel demand by land use policies (increasing the density of urban areas etc.). The most important thing to determine is the tendency side, that is to say the demand for mobility, which is not only a transportation problem but a deeper one containing many socio-economic and socio-demographic factors of individuals and households. It is also important to note that investments and improvements in infrastructure (potency) can affect the demand (tendency). It is discussed, for example, that development of high quality public transport systems, such as a metro, can help minimize the potency-tendency difference.
- c) Qualities and quantities of mobility (Gudmundsson, 2005): With the quantities (travel, time etc.) of mobility are easy to identify and study the qualities of mobility (insecurity feeling, aesthetic qualities, etc) are difficult to capture. However, the latter can have a very important effect on the mobility of people.
- d) External and internal sustainability of mobility (Gudmundsson, 2005): “Sustainable development refers to maintaining conditions for the well-being of both present and future generations” (Gudmundsson, 2005, 118). There are three terms of sustainability: environmental, social and economic. Internal

sustainability is related with the systemic potential of the transportation system. In other words to be internally sustainable, transportation capacities should be controlled and maintained to reduce the gap between the actual movements and systemic potential. On the other hand, “*mobility sustains the wider economy and vice versa*”. To be economically sustainable, economic efficiency of the system should be established. Economic sustainability is also in close relation with social sustainability. Because while maintaining economic efficiency of the transportation system social fairness should be considered as well. Lastly mobility is related with the physical environment and it is affected by and affects the physical resources (air quality, energy, etc.). This case is related with the environmental sustainability. In order to be environmentally sustainable natural resources should be handled in a way to maintain conditions for both present and future generations.

From the point of view of this thesis, the first three are especially important. Because they are all related with household and personal characteristics of people. They are also closely related with mode choice, in which socio-economic characteristics of people, and qualitative aspects of transportation mode is very important from the mode choice reasons point of view.

Geographic mobility also has a social dimension, which is related with the social life and social relations perspective. In this respect, Freudendal-Pedersen related geographic mobility with “good life” concept, and argued that mobility makes people’s life better (Freudendal-Pedersen2005). Nielsen (2005) and Urry (2000) also mentioned that movements of people enable them to construct and reconstruct their social relations, and therefore mobility is not just a physical space change, but more than that. The Commission of the European Communities Report (CEC, 2007) also puts that mobility means personal independence and therefore people with low mobility levels, like low income and senior citizens, need and expect more affordable and higher quality urban transport and therefore mobility. Therefore to understand mobility patterns of people, one has to understand those social relations and social life of people (Nielsen, 2005).

When we examine mobility levels of different people, from the ‘good life’ perspective, the issue of equity becomes important. While people who have a private car access have higher mobility levels, people without access to cars (captive public transport riders) might suffer from low mobility levels as the side effect. Since today many cities are shaped by automobile, urban geographies are larger than in the past. In this respect public transport, and particularly higher speed systems such as rail, are strong rivals of automobile. Because “*citizens..... have the same right of mobility*” (UITP Report, 2005). Public transport should increase the mobility levels of all people and special services should be given to increase the mobility levels of “mobility-impaired” (UITP, 2001). In this respect public transport is very important due to enabling every citizen to access work places, shopping places, services and leisure activities (UITP, 2002). Nielsen (2005, 54) states that transport systems are both “technological constructions” and “preconditions of new patterns of mobility”. Therefore it can be said that, a fast, convenient, secure and easily perceivable transportation mode is very important in enabling people, who have narrower urban experiences, to enlarge their urban geographies. In this respect metro is often considered as a very important tool in increasing mobility and quality of life (UITP Report, 2003).

Following the above arguments that link high mobility to “good life”, mobility, in this thesis, is considered as a positive aspect of citizens’ lives that helps them to participate effectively in urban life. However, it should also be noted that in contemporary transport policy, decreased motorized mobility is generally seen positive from the point of view of controlled spatial development and decreased car dependency. Nevertheless, as Banister (2008, 73) states “*car dependence and the increased decentralization of cities are difficult processes to reverse- this is the transport-led future*”. In such a world being immobile becomes a serious problem from the point of view of equality. In transportation planning studies there are two fundamental principles, one of which is that “*travel is derived demand and not an activity that people wish to undertake for its own sake. It is only the value of activity at the destination that results in travel*” (Banister 2008, 73). However, people need to be mobile and free of certain mobility constraints to reach the activities that are on the destination points. Therefore in order to capture the “mobility for all” goal in

already enlarged urban geographies, which have been shaped by the automobile, particular attention should be given to increase the mobility of those who have low mobility levels, i.e. those who travel less frequently and over limited distances due to particular travel constraints.

This definition of mobility is the one taken as the basis of the research in this thesis. Mobility levels of people in this study are analysed and measured with respect to first, the frequency of their travel, and secondly the distance/geography of their travel with a particular focus on the activity at their destination points. Hence, in this thesis, “less mobile” are defined as those who travel with relatively low frequency and within a narrow geography (i.e. within a limited part of the city). Consequently, what is meant by “increasing mobility levels” is not increased motorization, but more frequent trips (that is more frequent rate of participation in urban life) and a wider geography (that is increased number of destinations/activities in the urban area). To emphasize again, these are the positive aspects of mobility that can help improve people’s lives.

The second fundamental factor of transportation studies, stated by Banister (2008, 73) is that “people minimize their generalized cost of travel mainly operational through a combination of the costs of travel and the time taken for travel”. For those with low mobility levels and limited access to car, generalized cost of public transport becomes particularly important. Indeed, improvement of public transport to help increase the mobility of less mobile people such as low income groups, senior citizens, and women, has become a major objective in many transport planning approaches. Most urban rail systems, such as metro and light rail systems, have also been justified on the grounds that they can improve mobility for disadvantaged groups. Particularly from the point of view of women, urban rail systems are often discussed to have mobility benefits in terms of increasing accessibility due to being a safer, secure, easily perceivable and understandable and a reliable mode. Women constitute one of the groups that have constraints in terms of mobility, and that improved public transport, such as a new urban rail system, may have positive effects. As mentioned in a report (ITS Berkeley, ITS Davis, ITS Irvine; Winter 2005-2006, 4):

“...women spend large amounts of their time taking care of the household- shopping, ferrying children, and the like- and that they spend much more time on these activities than the men they share their homes with...Women’s travel patterns are more complex than those of men, with a greater reliance on public transport and a range of different purposes for journey often requiring the use of different forms of transport in combination” (ITS Berkeley, ITS Davis, ITS Irvine; Winter 2005-2006, 4).

Furthermore, it is suggested that women have more cognitive constraints than men, and that the attributes of public transport is particularly important for women:

“Research has shown that many modes of transport are considered problematic for women after dark (including buses, trains, and walking) and many interchanges (bus/railway stations, bus stops and car parks) are considered unsafe. Aspects such as poor lighting, lack of visibility, lack of cleanliness, vandalism and poor maintenance can all have an impact on women’s perception of safety” (ITS Berkeley, ITS Davis, ITS Irvine; Winter 2005-2006).

Due to these reasons, actual movement -potential movement difference is also much more for women. (Capability and cognitive constraints of women will be dealt below). However, as mentioned before, an urban rail system can be expected to increase the mobility resources and therefore mobility tendency of women. With the help of a good quality public transport system, such as a metro, it is possible that actual movement-potential movement difference of women can be minimized, resulting in improved mobility levels. Within this general framework of mobility, the rest of this chapter introduces the four main theoretical backgrounds, which are essential for a study focusing on the mobility of women. These are the mode choice theory, activity based travel theory, time-geography theory and women studies.

2.3. MODE CHOICE

People use different transportation modes due to many reasons; their convenience for different activities, their money cost, time cost, etc. Mode choice studies state that there are different reasons for people in their selection of transportation mode. Mode choice studies have many different techniques to determine the mode choice of people. Ulberg (1989), studied 3 models in his report, and they are the most common models studied by other researchers:

- 1- Rational-economic models
- 2- Attitude-based models
- 3- Activity based models

1- Rational economic models: In fact the transportation mode choices made by individuals are related with individual's utility and some travel demand models are instituted on this personal utility. According to these models which are based on economic theory, people maximize their utility (**Ulberg, 1989**). People choose one travel mode from an available choice set, and the reason of this choice is related with the highest utility given to that mode by the decision maker (Dong et. al, 2006; Bhat, 1998, Taaffe et.al., 1996). Miller et.al. (2005) also put that mode choice models are mostly based on utility maximization theory). As Taaffe et. al. (1996, 342) also mentioned that:

“...The behavioral basis of individual choice theory presumes that all decisions are probabilistic, and that they are derived from a comparative evaluation of utilities. The probability or likelihood a specific alternative will be chosen by an individual is based on the utility associated with that alternative”.

Utility, in this respect, is related with two factors, observed and unobserved factors (Bhat, 1998). Unobserved ones are personal and social characteristics of people such as sex, lifestyle and culture and characteristics of the mode (such as comfort and

privacy) (Bhat, 1998). Observable ones on the other hand contain level-of-service characteristics offered by the mode for the individual's trip (Bhat, 1998).

Money cost and time cost of a mode have been dealt as the most important characteristics of the mode choice models, and *“interactions of the cost and out-of-vehicle time variables with other individual characteristics, and interactions of other level-of-service variables (such as in-vehicle time and frequency of service) with relevant individual attributes, are not explored extensively”* (Bhat, 1998, 496).

For example random expected utility models are used by economists and when we look from the point of view of travel mode choice the utility is related with travel cost and travel time (Manski, 2005). It was also claimed by many researchers that generally mainly two reasons have been considered as main determinants: Cost and time (Davidov, 2003; Black 1995, Alpizar 2001, Johansson et. al. 2005). In this respect when a person makes a choice between different transportation modes, he/she makes a comparison between different modes in terms of costs and level of services (The Institution of Transportation Engineers, 1992). Black (1995) claimed that, while developing models to estimate the travel demand a general assumption has been used, there is always a trade-off between time and cost; some people pay more to decrease the travel time and some travel longer to decrease the cost. Davidov (2003) put that the increase in income causes a shift in the preferences between time and money in mode choice; that is people would choose more expensive mode when compared with more time consuming one in case of an income increase. Asensio (2002;) and Rajamani et. al. (2002) also pointed out that while low-income people give more weight to travel cost and more sensitive about this variable, high-income people are more sensitive about travel or waiting time. In the same way Davidov (2003) stated that high income people use car more when compared with public transportation due to the velocity of that mode, therefore we can also say that value of time is higher for high-income people when compared with low income people.

On the other hand traditional consumer theory claimed only the travel time and the money cost as the main variables of transportation mode choice (Deaton&Muellbauer 1980; Maier&Weiss 1990; Varian 1984; mentioned in

Davidov, 2003, 28). Although both time and cost are important variables, time is a more important factor than cost in mode choice (Ulberg, 1989). Krygsman et.al. (2006) also put that travel time is generic coefficient of traditional mode choice models. Walle et.al. (2006) on the other hand mentioned that “*Notwithstanding the fact that numerous relevant factors have been identified, travel time remains a crucial aspect to explain mode choice decision*”.

In conventional travel demand modeling, there are four steps in the determination of travel demand (conventional four step models) and each step uses different models: ***Trip generation*** (calculation of the number of trip origins and destinations); ***trip distribution*** (calculation of the number of trips between the previously determined origin-destination pairs); ***modal split*** (distribution of trips between different available modes in a given route); ***network assignment*** (routing the interchanges on the network and calculating the flows on every link) (Black, 1995). In this thesis we will focus on the modal split models, which determine the demand for each mode.

The most important easiness of these models are being easily quantifiable and having attractive mathematical properties aspect (Ulberg, 1989), since they mostly deal with the travel time and money cost. However they lack the behavioral point of view of travel decision making and mode choice (Ulberg, 1989). For these models travel time and cost are the most important variables.

In this respect Becker claimed that socioeconomic aspects affect travel mode choice just indirectly as in the form of time limitations and earned money differences per hour and do not affect it directly (Becker, 1965; mentioned in Davidov, 2003). However there are other determinants of mode choice like socio-demographic and socio-economic factors (Domencich &McFadden 1975; Hensher & Dalvi 1978; Held 1982; Ben-Akiva &Lerman 1985; Erke 1990; Molt 1990; Bruederl & Preisendoerfer 1994; Diekmann, 1994; mentioned in Davidov 2003, 29; Carlsson-Kanyama, Linden, Thelander, 1999). In the same way, Cherchi and Ortuzar (2003) expressed that the utility value of the alternatives are related not only with the attributes of the choice, like time and cost; but also with the socioeconomic characteristics of individual.

Therefore since the 1960s some other models have been developed under the utility-based models to alleviate this negative aspect of those models (Ulberg, 1989). They have been called as “behavioral models” or “disaggregate models”. Although this study is not focused on the estimation of travel demand, the models would be useful in terms of variables, since they may affect mode choice; therefore we will briefly mention those models.

Disaggregate models are developed under the modal split models, which can be divided into two groups as aggregate models and disaggregate models. Aggregate models are traditionally used models, as mentioned below; they are deterministic in nature and divided into two sub-groups as trip-end models, and trip interchange models (Black, 1995). Trip-end models use automobile ownership, income, household size, age and occupation of passengers as main variables (Black, 1995).

Trip end models have a weakness in nature. According to these models the number of people riding transit does not change even if some improvements occur in transit sector that is the quality of service arises, such as a new line, mode or improvements in an existing line (Black, 1995). Therefore experts prefer trip interchange models in which people are categorized according to some socioeconomic characteristics like automobile ownership, income (Black, 1995). But Black (1995) suggested that using the both models would be more useful; trip-end models to estimate the number of people who don't own a car, and trip interchange models to split the remaining group, people who have a choice available between car and transit, into modes.

However, there are still problems with those models, due to their classification and aggregation of people; because aggregation causes an overlook in the variations; averaging the interzonal travel frictions; and not being sensitive to policy changes as Black (1995) has pointed out. In other words these models are very deterministic. Furthermore aggregate models are not sufficient in determining reasons of different travel patterns of different groups in society, formulating efficient and practical solutions to the problems of different groups, and determining the effects of different transportation policies on different groups (Hanson and Schwab; cited in Hanson, 1995).

Therefore another type of model, disaggregate models, enabling analysis according to the individual behaviors, and decisions by gathering information at the individual or household level, instead of zones as in aggregate models, and by taking into account causal relationships, have been developed (Black, 1995; Hanson, Schwab; cited in Hanson, 1995; Taaffe et. al. 1996). As Hanson, Schwab (cited in Hanson, 1995) indicated, disaggregate studies are people oriented and increasing the mobility of a particular group is one of the aims.

With the help of disaggregate models travel patterns of people are examined by gathering information on household, personal (income, age, gender, employment status, automobile availability, household size and composition, etc.), and travel characteristics (purpose, cost, waiting time, frequency, reliability, security, etc) (Hanson, Schwab; cited in Hanson, 1995). Although the traditional deterministic models consider behaviors of the individuals', disaggregate models are more detailed than the aggregate ones (Black, 1995); because these models deal with “...*what people do, where and when they do it, and what choices and constraints lie behind...*” (Hanson, Schwab; cited in Hanson, 1995, 166) or in other words they link the transportation attributes with personal characteristics and choices (Jang, 2003). They are also called as behavioral models, which use the utility as the major determinant of mode choice (Dong et. al., 2006; Manski, 2005; Sango, 2004; Black, 1995; Hanson, Schwab; cited in Hanson, 1995; Taaffe et. al. 1996, Black 2003). Utility, as mentioned before, has a value given by the individuals to each choice and individual chooses the one with most utility value.

As Dong (2006) et. al. stated, utility cannot be known certainly and therefore this constitutes a random variable with two components: one is *systematic utility, consisting of observable attributes of the alternative and characteristics of the decision maker that are assumed to impact the decision*, and the other one is *disturbance, representing the unobservable portion of the utility* (Dong, et.al., 2006, 165).

The figure below; which is developed from the findings of Taaffe et. al. (1996), Hanson and Schwab (cited in Hanson, 1995), Black (1995); shows the structure of mode split forecasting methods, their characteristics and the variables they use:

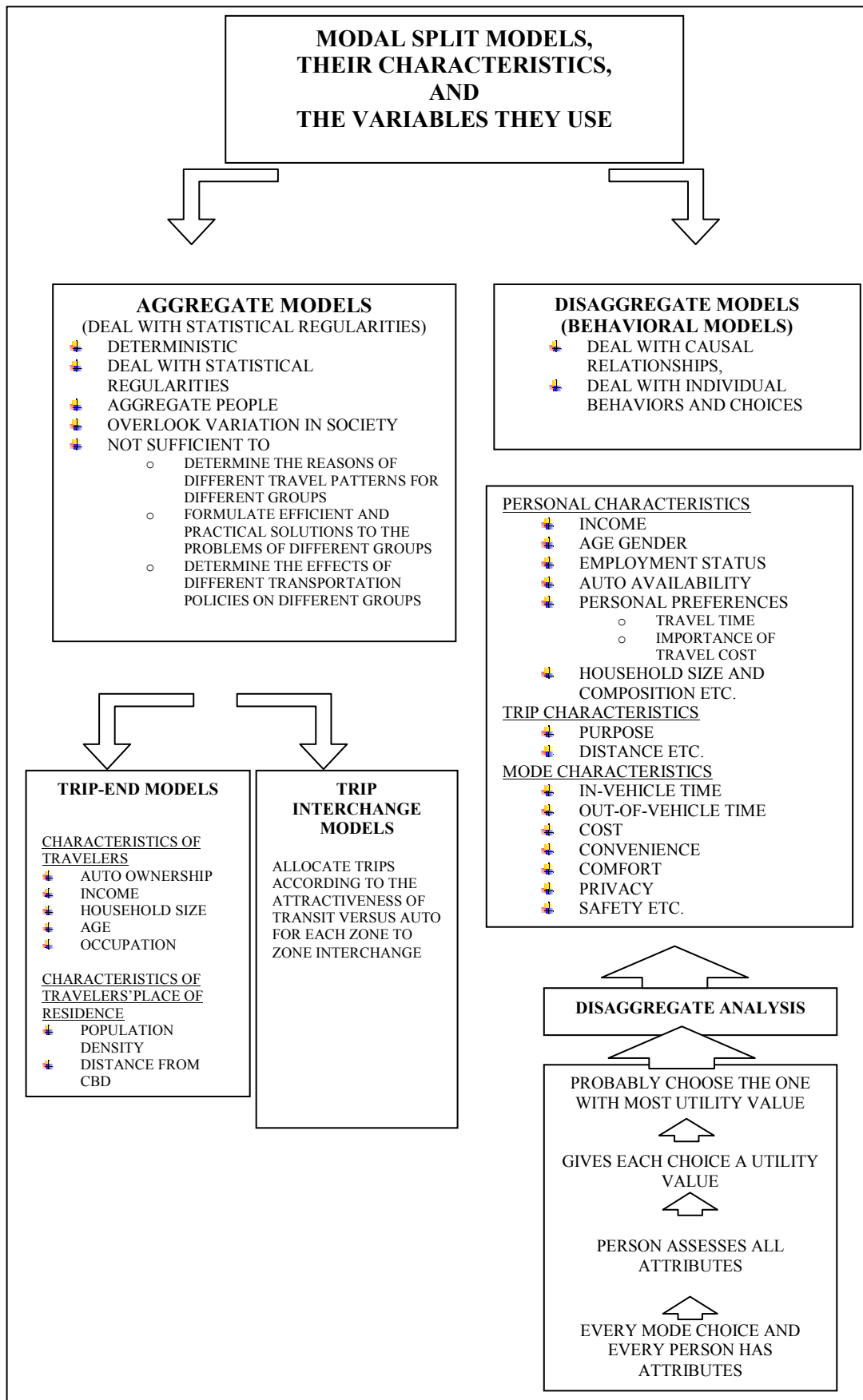


Figure 2.1 Modal Split Models

These models have many advantages like containing socioeconomic characteristics of the traveler; as trip aspects (purpose, time of day, etc), characteristics of the transportation system (speed, headway, prices, etc.); availability to adjust to anywhere with a relatively small data set; availability of a set of different models to use (Black, 1995).

Although they provide some improvement by adding socio-demographic variables and behavioral aspect into the model, they lack the cognitive factors in travel decision making and mode choice (Ulberg, 1989). Therefore attitude based models have been developed to overcome the mentioned problem.

2- Attitude based models: These are psychology based models and they take into account cognitive aspects (Ulberg, 1989). There are some important issues in the mode choice processes. *“perceptions of time and cost are more important than actual time and cost; qualitative variables are important, but they are interrelated and affect perceptions of time and cost; demographic variables are relatively unimportant except as they relate to mode accessibility...”* (Ulberg, 1989).

There are many different techniques under this heading: cognitive decision-making models (physical characteristics of the alternative modes, people’s knowledge and experience on the alternatives affect perceptions of people; perceptions affect preferences, but preferences are not determine the actual choice, but the constraints like automobile unavailability, the travel needs of household members, weather, etc determine the actual mode choice of people), psychometric (psychological measurement techniques) models (quantifies the perceptions of people, such as comfort; therefore more by the observing and studying the psychology of people utility based models are made more behavioral-based, but *“its weakness has tended to be in paying enough attention to the practical aspect of travel decision-making. That is where activity based models have made the most important contribution”* (Ulberg; 1989, 12) and this subject will be studied in the following part).

As can be seen from the recent developments, socioeconomic and demographic characteristics have been taken into account in travel demand analyses. Generally

socio-demographic characteristics differ among household members. Therefore each person may have different transportation needs. For example gender, age, working and marital status, etc. have different effects from the point of view of personal and household responsibility. Among all socio-demographic characteristics, marital status and gender have considerable and overwhelming effect on the transportation mode choice (Davidov, 2003). Gender is very important in determining travel needs, such as travel time, mode, pattern etc.; because men and women have traditionally different roles and responsibilities, mobility needs and desires (Schwanen, Mokhtarian, 2005; Carlsson-Kanyama, Linden, Thelander, 1999; Pas, 1984).

From the point of view of gender differentiation, many researchers state that women use public transportation more when compared with men (Davidov, 2003). According to Davidov (2003) if a family has one car, the one who earns more income generally uses the car because earned money per hour is the most in amount for him/her, therefore time is more important for him/her and usually this is the men, because men still mostly earn more income than women.

We can examine household members from another point of view, in travel demand types: captive and choice riders (There are two types of commuter groups: Captive riders, choice riders. On the one hand captive riders are the people who have no choice other than using a certain transportation mode, on the other choice riders are people who have the opportunity to choose). These two can be connected mostly with the household income level. Captive riders are people who have no access to a car either because they do not have a car or someone else in the family uses the car or because they do not have a driving license. These are mostly people with low income. As Black (1995) pointed, choice riders mostly use public transportation in journeys to CBD for working purposes, due to parking problems, traffic jam and etc (Black, 1995). Besides captive riders, Black (1995) also mentioned that there are captive car riders who have very poor public service or no service available, need automobile during the day, or have to make two or more transfers when using public transportation; and therefore cannot use public transport; but in this thesis study we will deal with captive public transport riders.

Although this study is not a gender study, a particular focus is placed on women, because their travel needs are very different from men due to their traditional household role as mentioned above. Among women especially captive women riders are important because they are obliged to use public transportation and therefore their urban geography may be more dependent on public transport.

Besides considering the needs of women different from men, we can also add that factors affecting travel types of women may be different from men's. Therefore the general assumptions of mode choice theory, that is to say money and time costs are the major determinants of mode choice, may not always be valid for women. As other theorists who wrote about the mode choice theory stated, socio-economic and socio-demographic characteristics may be important determinants. This subject will be dealt in detail in the research Chapters 4, 5 and 6.

As a summary, many researchers make many categorizations on mode choice reasons to determine the travel demand of each mode. Below figure, which is a combined structure of many different categorizations of many different researchers, would be a useful one for this study, and in the following parts the first and the third column will be used for the research of this study:

<p>CHARACTERISTICS OF THE TRIP MAKER Income: Low income people mostly use public transportation (Black 1995, http://www.fresnocog.org/ppt1/tsld012.htm, 23.03.2005); however people living in suburban areas are both relatively middle or upper middle income class and using railroads or subways (Wilson, 2003; Black, 1995) Gender: In the off-peak period women use public transportation more, due to their role in the family (Wilson, 2003; Black 1995, http://www.fresnocog.org/ppt1/tsld012.htm, 23.03.2005) Age: Working class age (21-55) more likely to use public transportation since most of these services made for working trips. (Black 1995, http://www.fresnocog.org/ppt1/tsld012.htm, 23.03.2005) Automobile ownership: Absence of automobile increases the probability to use the public transportation (Beimborn, 2003; Wilson, 2003; Black 1995; http://www.fresnocog.org/ppt1/tsld012.htm, 23.03.2005; http://rideshare.511.org/research/pdfs/travelmodechoice_cp03.pdf, 21.03.2005). Occupation: White collar workers use public transportation more than blue collars due to job concentration of former's in the CBD. The latter's jobs are mostly spreaded in places where transit services are not sufficient of absent (Wilson, 2003; Black 1995) Knowledge: The knowledge of people is a very important factor affecting the usage of public transportation services (Beimborn, 2003). Race and ethnicity: Minorities are likely to use public transportation more (Black 1995)</p>	<p>CHARACTERISTICS OF TRIP Purpose: Trip purpose is a very important factor for the mode choice (Black 1995, 2003; http://www.fresnocog.org/ppt1/tsld012.htm, 23.03.2005). For example since public transportation is made mostly for work and education trips (Black 1995), for shopping purposes, since there are much to carry, using public transportation would not be very pleasant (Black, 2003). Travel Time: Public transportation has been preferred mostly in peak hours of day; on weekdays because of working and school days, and in certain places in Saturdays, too; and highest in winters, related with the purpose of trip (Black, 1995) Travel Distance: Travel distance is another factor affecting mode choice especially among suburban commuters (Asensio, 2002) Location and direction: Public transportation is chosen mostly for trips to CBD due to parking restrictions, costs, crowdedness of CBD during rush hours and because of the receipt of best service of CBD due to the radial aspect of most public transportation routes (Black, 1995, http://rideshare.511.org/research/pdfs/travelmodechoice_cp03.pdf, 21.03.2005)</p>	<p>CHARACTERISTICS OF TRANSPORTATION MODE Cost: Cost is one of the major factors in modal choice (Black, 1995; Alpizar 2001, Johansson et. al. 2005; http://rideshare.511.org/research/pdfs/travelmodechoice_cp03.pdf, 21.03.2005 http://www.fresnocog.org/ppt1/tsld012.htm, 23.03.2005). Out-of-pocket costs (fare for transit, tolls and parking for automobile) (+) hidden costs (depreciation, maintenance, and insurance) (these costs are belong to private car usage category and travel overlooked) (Black 2003, Wilson, 2003; Black, 1995) Travel Duration: Generally it is considered that all public transportation modes cost more time than automobile due to their relative speed, frequent stops, and relatively short length of trip (Black, 1995; http://www.fresnocog.org/ppt1/tsld012.htm, 23.03.2005). In-vehicle time (+) out-of-vehicle time (time needed to reach transit stop, to transfer between modes, to reach to destination from the last stop) are the other major determinants in mode choice. Out-of-vehicle time is more important than in-vehicle time, therefore car usage has more advantages since out-of-vehicle time is considered as zero (Black 2003, Wilson, 2003; Black, 1995, Taaffe et. al. 1996, Asensio, 2002; http://rideshare.511.org/research/pdfs/travelmodechoice_cp03.pdf, 21.03.2005). Accessibility: Accessibility to public transportation services is a vital factor to choose this mode (Asensio, 2002, Beimborn, 2003). In this sense absence of practical public transportation options cause a selection against public transportation http://rideshare.511.org/research/pdfs/travelmodechoice_cp03.pdf, 21.03.2005) Usability: There should be no physical disability to use the transit system (Beimborn, 2003) Connectivity: People could be transported from origin to destination when they need (Beimborn, 2003). Condition (Comfort, amenity and relaxation): Two of them are important; getting a seat and having air conditioning in hot weather (Black 1995, Black 2003; http://www.fresnocog.org/ppt1/tsld012.htm, 23.03.2005). Therefore people who have the choice to prefer choose private car to travel http://rideshare.511.org/research/pdfs/travelmodechoice_cp03.pdf, 21.03.2005) Security: Unless an important occasion affecting security occurs transit users don't consider this factor much (Black, 1995; Beimborn et.al., 2003). From the point of view of women security factor is very important to use the public transportation or not (Hamilton, 2002; Bianco 1996). Reliability: To rely on a public transportation one must know that the mode will serve in its regular times, without no delay; or available when needed (Black 2003).</p>
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Figure 2.2 Mode choice reasons

As Ulberg (1989) mentioned, comfort and convenience are variables which are easy to measure. However when we consider the personal perceptions of those factors, the measurement becomes more complex and difficult. Qualitative variables like convenience, comfort, reliability, safety and privacy are interrelated; but measuring them is a significant problem and there is no standard way to measure and forecast them (Ulberg, 1989). However they still need to be considered in mode choice models; because they are critical variables (Ulberg, 1989).

Ulberg (1989) also mentioned that the most important factor affecting mode choice is accepted as auto ownership and demographic factors like income, gender, social class etc, have taken into consideration less than auto ownership factor in mode choice studies.

However, people's psychology and psychological needs' satisfaction should be considered in mode choice researches (Ulberg, 1989). And demographic factors might affect the psychology of people, especially gender factor. Although psychological needs are quite important when people choose a mode, there is not much study on this subject (Ulberg, 1989). Psychology is directly related with people's perceptions, which develops cognitive constraints (this subject will be studied in detail in Section 2.5). Therefore Ulberg (1989) recommended in his study that besides the actual time and cost variables, mode choice models should take into account the perceived time and cost. Perception is directly related with personal and household characteristics. This is a very important recommendation from the point of view of women who are accepted to have more cognitive constraints than men in the literature (which will be mentioned in part 2.5 and 2.6).

For example security is an important cognitive factor, dealt in those models, affecting mode choice. Ulberg (1989, 33) reported that "*in a survey of 225 elderly people at senior center in Philadelphia, Patterson (1985) found that fear of crime on buses and bus stops was a significant deterrent to using the bus*". People's perception of safety in this respect is very important because "*people perceive public transportation to be more dangerous than it really is and speculate that ridership has suffered as a result*" (Ulberg 1989, 33).

As a summary we can say that there are two generations in mode choice modeling, conventional and new generation ones to determine the travel demand and mode choice of people. Both of them have advantages and disadvantages. In practical terms conventional mode choice models, which accept money cost and time cost of the mode as the factors with priority, are mostly preferred. For example as Ulberg (1989) mentioned when explaining travel mode choices of people, researchers mostly use travel time and cost. However these are not the only factors affecting mode choice. Because sometimes people choose a mode although it is not economical and travel time and cost are not sufficient to explain travel decisions and mode choices of people, therefore psychological factors are needed to be considered also (Ulberg, 1989).

Although new generation models take into account the social factors, they are not as practical as the conventional ones. In this respect Davidson, Donnelly, Vovsha, Freedman, Ruegg, Hicks, Castiglione and Picado (2007) mentioned the following:

“Conventional four-step models have been associated with extensive development of transport system by construction of new infrastructure facilities. These models are less oriented to policy issues or demand management measures. Although the theoretical advantages of the new generation of travel demand models are well known, the practical advantages in the context of planning decisions have rarely been discussed or documented”

So, we can say that although recent mode choice approaches put attention on socioeconomics and socio-demographic structure of people as well as travel cost and time; the calculation burden caused the main variables of the used models to be the money cost and especially travel time, when we consider the mode choice of captive women public transportation riders, money cost and time cost might not sufficient to explain the mode choice reasons. Socioeconomic, demographic structure and psychological needs of people should also be considered. However, as mentioned above, there are still some deficiencies of the travel demand analysis models

mentioned above, and activity based models have been suggested by many researchers as the best way to deal with travel demand determination and mode choice. This is the third model approach within mode choice models; however, due to its centrality for this research it is examined separately in the below section.

2.4. ACTIVITY BASED TRAVEL THEORY

Activity based models among the mode choice models which have many different techniques to determine the mode choice of people, as mentioned in the previous section. The most important difference of activity based travel theory and other conventional mode choice models is that; traditional methods used in mode choice theory, base their studies mostly on trips in the determination of travel demand, in which “where” and “how” questions are important. Miller et.al. (2005) also put that traditional mode choice models are trip-based, for one specific purpose. However, as Miller et.al. (2005) mentioned that much researchers criticize the need to integrate socioeconomic and demographic characteristics into the mode choice models, on tour bases but not trip. Therefore, recent travel demand analyses are more related with activities and in this approach travel demand is accepted to be derived from individual activities (Davidson et. al., 2007). Activity-based travel analysis, consider “why” question *including the needs, preferences and habits of individuals and households* besides “where” and “how” questions (Frusti, Bhat, and Axhausen, 2002, 2). Therefore as Jang (2003) put this method deals with the interrelations among trips and between trips and activities, this means that it is not trip, but tour based. Therefore we can say that activity based travel theory is a theory trying to explain the travel behavior of people (Jang, 2003), *“unlike the conventional travel demand modeling that is based on individual trips (i.e., trip-based paradigm), the activity based approach analyzes travel as daily or multi-day patterns of behavior”* (Shaw, Wang; 2000, 163).

There are 2 main elements in this theory, the first is related with the production of activity structure (temporal, spatial, travel, personal contexts of activities), and the second is related with the time allocation for different activities, (Bhat, Misra; 1999). In other words at the first place travel demand is created by activity demand (Dong,

et.al.; 2006; Frusti et.al., 2002; Bhat and Koppelman, 2000; Bowman, Ben-Akiva, 2000; Lu, Pas, 1999; Vilhelmson, 1999; Ettema, Borgers, Timmermans, 1993; Jones, Koppelman and Orfeuil, 1993; Jones, 1979) and realized only if “*the net utility of the activity and travel exceeds the utility available from activities involving no travel*” (Bowman, et.al. 2000, 2). Secondly, people’s travel and activity decisions are bounded with time and space and when actualizing an activity and deciding a trip, people are faced with *capability, coupling* and *authority constraints* as Hagerstrand (1970) mentioned (Frusti et.al. (2002, 2) also related activity participation decisions with time and space, but with a different categorization: *location of activity, times of day for possible or desirable trips and availability and cost of vehicles or other means of transportation*). “*As a result, the observed travel patterns of an individual reflect the various choices made by the individual in the context of space, time, and other constraints*” (Shaw, Wang; 2000, 163). The second subject is related with Hagerstrand’s time-geography theory and this will be mentioned in the third part of this chapter.

Firstly we will briefly review the activity demand that creates travel demand. Activities are created by people’s need to satisfy their basic necessities in their daily lives on many different locations; as Shaw and Wang (2000) and Vilhelmson (1999) mentioned; like working, shopping, eating. Many researchers categorized those activities in different ways. For example while Ellegard, Hagerstrand, and Lenntorp (1977, 127) categorized them as *production activities, consumption activities* and *physiologically necessary activities*; Reichman (1976, cited in Wen et. al. 2000, 6) categorized activities in terms of different needs as in the followings:

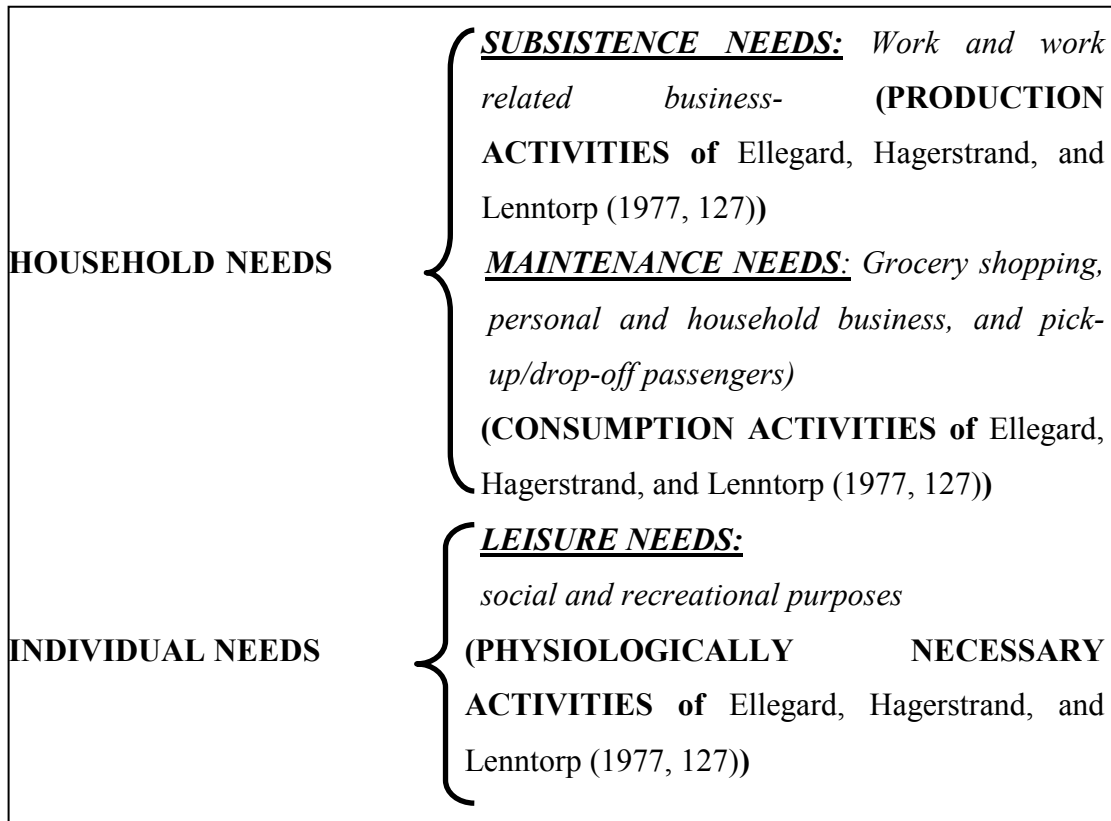


Figure 2.3: Activity required need types

Jang (2003) introduces another classification as *obligatory activities* (work and school eg.) and *discretionary activities* (personal business, shopping and social purpose, etc.), which affect one another. This classification is based on whether flexibility does occur on the choice of time, location, duration and joining. The interrelation between the two types of activities put that “...*the presence and number of obligatory activities influence the presence and number of discretionary activities...*” (Jang, 2003, 16).

Since those mentioned needs are satisfied at different locations, a demand for traveling from one point to another occurs. Therefore people may choose among modes for fulfilling different types of activities. In that sense Jang (2003) mentioned that activity type and mode choice have a reciprocal effect on themselves and

transportation mode also affects the linkages of the activities. Some of the activities created by needs are for all household members and some of them are for individuals. For example when satisfying maintenance needs, all the members of households are served, therefore household members might share these activities among themselves (Wen et. al. 2000). This means that, other activities for individuals are not shared and only undertaken by the responsible individual. The types, time and sharing of those activities shape personal *activity schedules* and therefore *travel patterns* (Wen et. al. 2000).

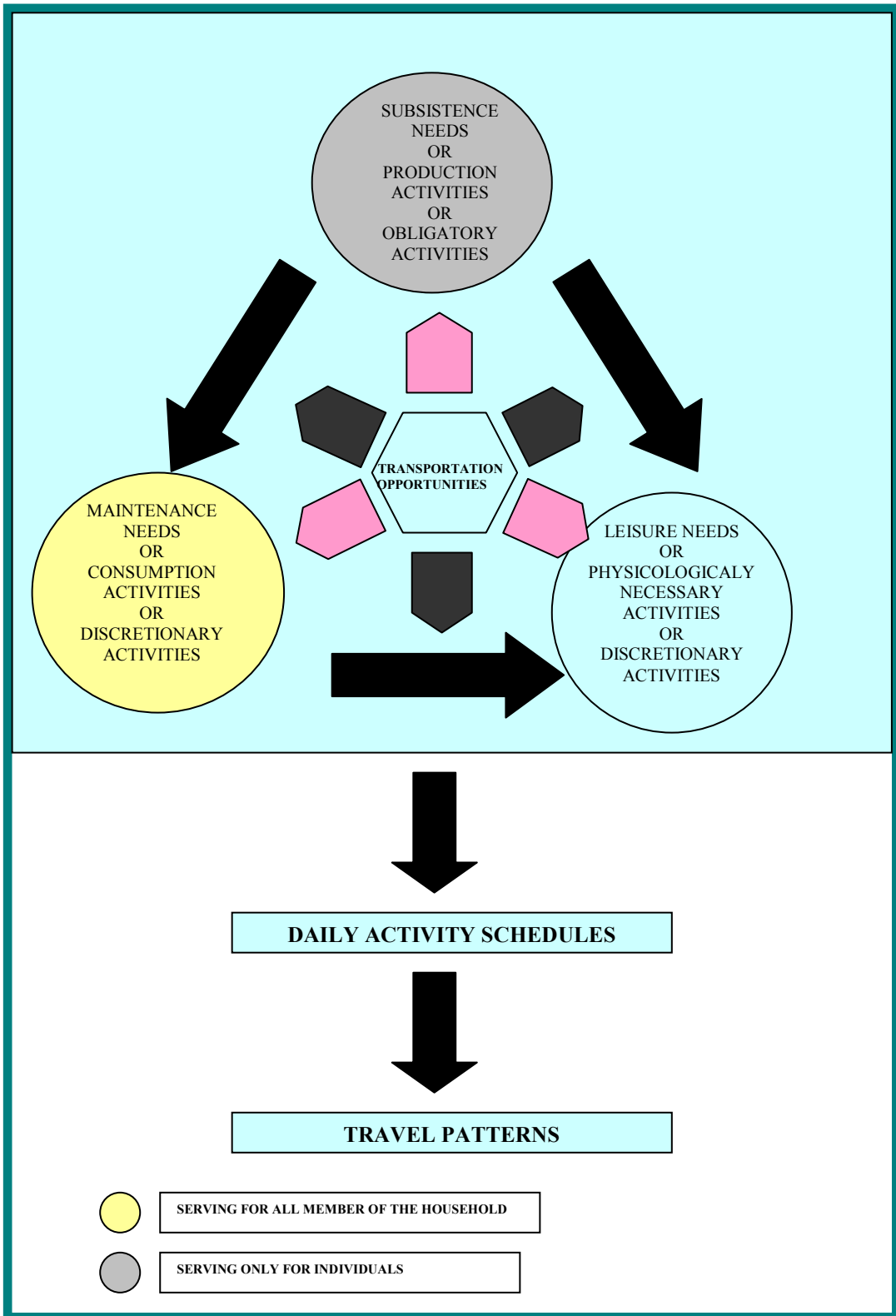


Figure 2.4: The formation of travel patterns

Although many researchers made many different categorizations as mentioned above, we will use the following one, which contains subsistence, maintenance and leisure needs categorization.

Employment status, working hours, income, mobility, residential and workplace location and auto ownership, and some other factors like individual and household characteristics (e.g. lifestyle which reflects the set of choices of people in terms of living conditions like job, place of residence, place of work selection; and lifecycle describing *the progress of households through stages of development and aging*), and accessibility measures (daily pattern and tour structure for generated stops) all determine the types of subsistence needs of individuals (Wen et. al.(2000, 8).

Since necessities require traveling from one place to another as mentioned above, and since subsistence needs affect maintenance needs, trip number and trip types for maintenance needs and therefore maintenance stops are generated dependently on subsistence needs, and as in the subsistence needs, lifestyle-lifecycle and accessibility measures affect this process; an increase in the number of children in a house mostly increases the maintenance stops and probably the number of autos they have (Wen et. al. 2000). Maintenance stops are for whole members of household, instead of individuals, which means that the assignment of serving household members to maintenance stops and also autos can be shared among household members and brings the share of maintenance stops according to the age, gender, employment status, lifestyle, lifecycle and accessibility (Wen et. al. 2000). For example a person with no job, or a female, or a part time worker, can fulfill these activities easily when compared with respectively the other person with a job, or a male, or a full time worker, or if both of the adults work, the maintenance stops would try to be included into the daily activity schedule and travel patterns of households would change (Wen et. al. 2000).

Below figure, showing the progress of daily activity schedules and travel patterns of people is developed from the findings of Wen et. al. (2000, 8). This figure is also related with the activity categorization of different researchers above. When we examine the figure, on the left column we see the determinant factors and among

them the one on the upper level affect the below one and the one in the below level is conditioned to the upper one. A daily activity schedule and stop allocation like *the number of tours, the assignment of stops to tours, and the choices of mode and destination of stops in tours* is organized according to those three determinants (Wen et. al. 2000). All of the three determinants are affected also by other exogenous variables: *Individual and household characteristics (e.g. lifestyle and lifecycle), transportation and system performance and land use patterns.*

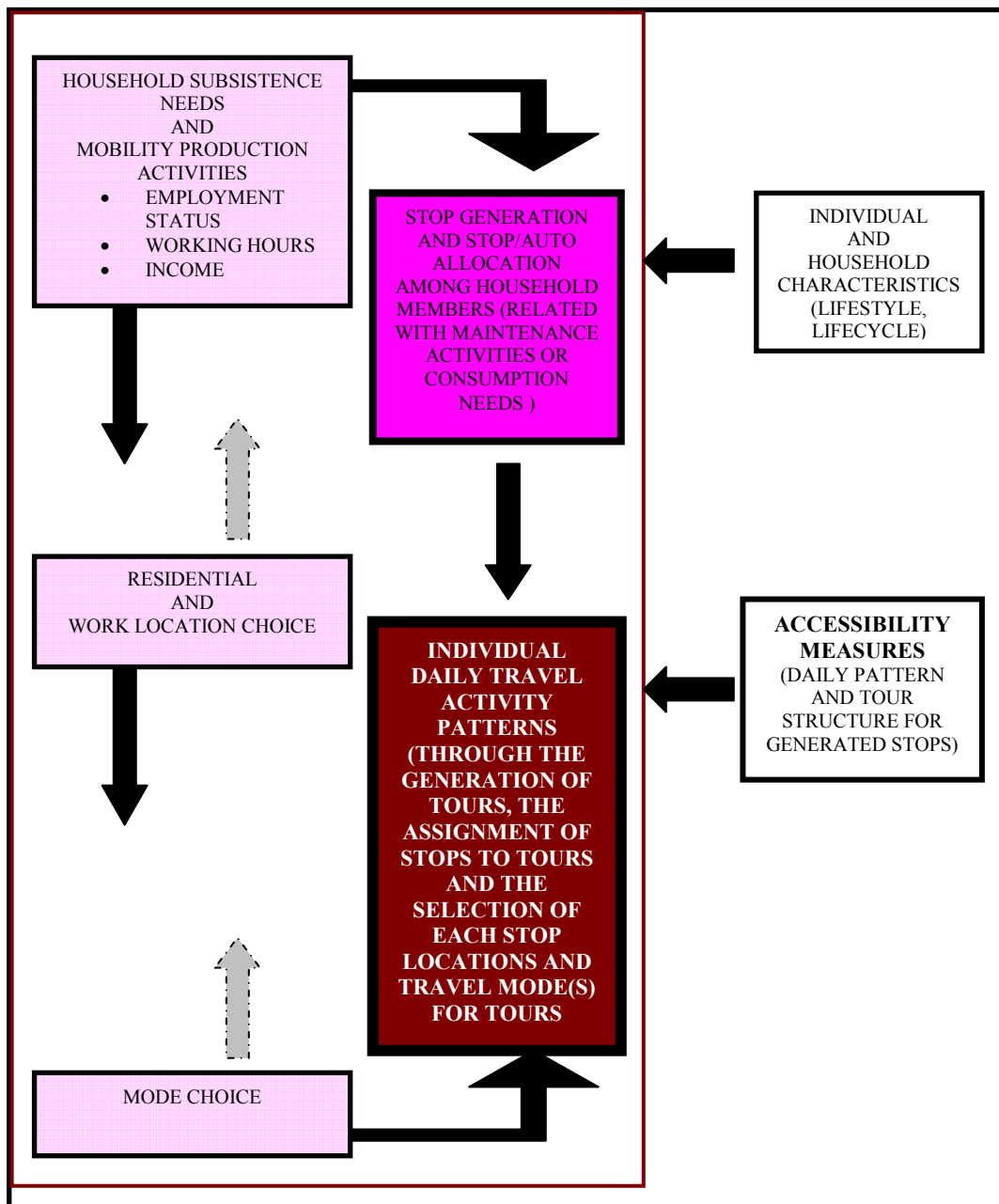


Figure 2.5: Progress of Individual's Daily Travel Activity Patterns

Female's traditional role in a household is very different from a male. Women fulfill the maintenance activities and stops more when compared with men. Therefore gender is a very important factor influencing the maintenance activities. Furthermore, although it changes case to case according to having employment

status, age, education and maintenance stop allocation; women use autos less when compared with men in a family (Wen et. al. 2000). This means that women use public transportation more than men, and to fulfilling the maintenance needs by using public transportation becomes an important problem for women.

Leisure needs are different from the other two types in terms of time and gender. Those needs are mostly fulfilled in times remaining from the other two needs, and people mostly satisfy their leisure needs on weekend and men's portion in the leisure related travels are more than women due to their traditional role and some other reasons, which will be mentioned in detail in Chapter 5.

As we stated at the beginning of this part, activity based travel theory examines travel behavior of people on tour bases, which means multiple related trips. And if we examine the daily activity schedules and travel patterns it means that we will deal with the tours that individuals make through a day or multi days. Therefore firstly we need to understand what the tour means. When making a tour, a person starts from a point and passing through a stopping point or multiple points once and then returns to the starting point at the end. *A tour ... is characterized by spatial and temporal properties of stops, such as purpose, timing, duration and location* (Wen et. al. 2000, 10). Tour formation, that is the decision of the number and location of stopping points in tours are conditioned to subsistence and maintenance needs and determined according to marital status, gender, if present, the number and the age of children, employment characteristics, lifestyle and lifecycle. Therefore Wen et. al. (2000) used individual and household demographics to determine the effects on the determination of maintenance activities, stops and auto assignment and conditionally tour formation and stop allocation in tours in his empirical study. Furthermore they emphasized that including stop locations, travel mode choice for tours, and the choice of time of day would improve the study, and provide much more information. In this respect Wen et. al. (2000,11) declared that:

“Accessibility measures for multiple-stop tours are represented by composite indices including the sum of the generalized cost of travel to each location in tours and the attributes of stop

locations serving each purpose. Individuals choose the number of tours and the assignment of stops to tours to satisfy a variety of personal objectives (e.g. minimization of travel time and cost) and constraints (e.g. scheduling convenience and store's hours opened). Mode and destination choices are affected by the transportation system characteristics, location characteristics and land use patterns, which determine composite accessibility measures that may influence the choices of the number of tours and the assignment pattern of stops in a tour. When individuals would like to group more stops in the tours, they may choose the stops which have higher accessibility as well as attraction.”

All of those needs and related travel behavior should be predicted for transportation investments. In order to determine the travel behavior of people, activity based travel theory also uses some modeling techniques. There are many techniques, but commonly used two are econometric models and hybrid simulations (Bowman, Ben-Akiva; 1996). Among them we will briefly discuss the econometric model, which is based on utility maximization theory.

Bowman, et.al. (1996, 2000) mentioned that there are 3 systems under the econometric modeling: trip-based systems, tour based systems and daily schedule systems or day and week models. *Trip based models* are the earliest models and designed for San Francisco in 1970's. It deals with one trip type, eg. work trips, and takes the travel as a one way trip that it deals with only arriving to a destination. The most important weakness of this system is that it does not deal with the combination of different trips and tours, therefore is lacking spatial and temporal aspects of activities.

Tour-based models designed firstly in the Netherlands in the late 1970's and 1980's, and then developed recently, this model is based on the idea that every trip is round in nature and returns to a home base for reproduction, people make tours for a primary activity and destination (Buliung, 2005; Bowman, et.al., 1996, 2000). This model lacks the integration of multiple tours in a day and therefore the spatial and

temporal linkages between all tours undertaken in a day are ignored (Bowman, et.al., 1996, 2000).

Daily schedule systems have been developed to alter the lacking parts of the other two models. Therefore these models deal with all decisions of activity and travel of a person in an entire day. As Kawakami and Isobe (1990, 185; mentioned in Shaw, Wang; 2000, 163) mentioned “*travel-activity scheduling behavior may result from multi dimensional decision-making, which consists of decisions on temporal dimensions (e.g., time-of-day or duration of activities), spatial dimensions (e.g., location of activities) and qualitative dimensions (e.g., types of activities or travel modes)*”).

There are also many models developed by many researchers under the daily schedule systems. One of them is the day activity schedule (DAS) model system, which was firstly proposed by Ben-Akiva in 1996, and practiced firstly in Boston and then developed by many other researchers like Bradley and Bowman (1998), and refined by Bowman (1998) (Dong, Ben-Akiva, Bowman, Walker; 2006). There is a primary activity for travel purpose and secondary activities are placed around the tour made for the primary activity and people’s preferences determine the primary and secondary activities (Bowman, et.al. 1996, 2000). By this way all activities undertaken within a day time are interrelated (Dong, et.al.; 2006). Frusti et.al.’s (2002) approach is a different one, in which people’s activities are classified according to being “fixed” or “flexible”; or placed in blocked periods and open periods. Fixed activities’ place and time cannot be changed, however “flexible” activities are not so.

The most developed model seems to be the *daily schedule systems*, and when we look from the point of view of socioeconomic and gender differentiation with considering DAS Models, determination of the primary and secondary activities would be very different, regarding marital status, having child or not, number of children, income, working status. Therefore many researchers have studied the linkage of the activity participation with personal characteristics (like age, gender, working status, income, etc.) as Jang (2003), Lu et.al. (1999), Isabella (1987), Golob

(1986), Kitamura (1985), Pas (1984), Adler and Ben-Akiva (1979), Ellegard (1977). Rosenbloom (1989) also studied the different travel patterns according to gender.

People's activity and travel decisions and stop, auto allocations are affected from the household characteristics; like gender, marital and employment status, having children or not, the number of children, etc (Pas 1984). On the other hand Vilhelmson (1999, 178) put that activities of individuals are related with the "*composition, roles and tasks of the household he or she belongs to, e.g., the lifecycle stage of the household*". Ellegard et. al. (1977) also put that activities are distributed according to the temporal and spatial aspects of them like age, household composition, transportation possibilities and etc. Especially roles and tasks of the household are closely related with the household characteristics mentioned by Pas (1984) like gender, marital status, etc.

Modal choice, too, gives attention to socio-demographic characteristics, but in practical models, travel behavior and mode choice of people are related with time and money related variables. Mode choice studies state that the most important reasons for mode choice among society has been the time and cost variables; but when looking from the point of view of women other factors might also be important. As mentioned previously, many researchers argue that women have more domestic responsibility than men, like caring for children, taking them to and from day care, taking care of elderly adults, shopping, running errands and etc (Buck, 2005; Transport Journal, 2005; Gossen and Purvis, 2004; Hamilton, 2002; Jeff, 1998; Bianco and Lawson, 1996; Pas, 1984). In another words women are mostly responsible from maintenance needs. These responsibilities bring a time limitation and when they travel, the trip chaining need might occur, which means the combination of multi stops and tours. On the other hand the time limitation might mean, in most cases, a decrease in mobility levels, especially for leisure purposes.

In his study Jang (2003) divided the travel pattern into two: **simple travel and complex travel**; and put that on one hand private car is used for simple travel patterns, requiring only home to work and work to home trips, on the other dominantly public transportation with other types of transportation modes is used for complex travel patterns which require trip chaining. Trip chaining is the linkage of

different purpose trips in a home based tour. Trip chaining is required by multi-purpose trips rather than single-purpose trips (Lee et.al., 2007). In trip chaining, work activities are related with non-work activities during the work commute or home commute, or before, between and after commute trips (Bhat, 1999; Bhat and Singh, 2000; Wallace et al., 2000). At trip chaining points people participate activities (Hubert and Toint, 2002, mentioned in Walle et.al., 2006).

Women trip chain more than men due to having those responsibilities more than men., Although total trip chaining rates among men has been rising in recent years, when compared with women men's trip chaining rates are still lower, and men's trip chaining reasons are different (Li et.al. 2005; McGuckin and Nakamoto, 2005; Li, et.al. 2005; Levinson and Kumar, 1995) While women trip chain for household responsibilities like children's needs, shopping etc., men mostly trip chain for social and recreational purposes, like having a coffee or meal. For example it was stated by many researchers that women more trip chain than men especially on the way to work from home, or to home from work (Strathman and Dueker, 1994; Al-Kazily, Barnes and Coontz, 1994, Rosenbloom, 1988; Rosenbloom, 1989; all mentioned in Sarmiento, 1996, 42), reflecting the primary activity of the day is going to work place and secondary stops to home or work as being day care center, school, shopping and etc. for household needs.

Trip chains are divided into two types: simple chains and complex chains; "*chains between different anchors (e.g. home and work) consisting of more than one trip, or chains between two like anchors (e.g. home and home) consisting of more than two trips*" (Al-Kazily, Barnes and Coontz, 1994, mentioned in Sarmiento, 1996, 42). Sarmiento (1996) also added that the probability of the occurrence of complex trip chains increases with decreasing member number in a household, and when the number of household members increases the responsibility share could be able and therefore every member may make simple chains; and from the point of view of gender, complex trip chains are mostly undertook by women mostly regardless the member number in a household.

Household characteristics are important in understanding trip chaining behavior, because increasing household responsibilities may cause increase in trip chaining behavior (Lee et. al., 2007). Strathman et. al.(1995), in this respect, related trip chaining with socio-demographic characteristics of trip maker and they used U.S. Nationwide Personal Transportation Survey Data (NTPS, 1990) for their research. According to their study starting from the women entrance into the workforce, work trips and trip chains have become more complex (Strathman et. al.1995, Raad voor Verkeer en Waterstaat, 2001; Levinson and Kumar, 1995). Krygsman et.al. (2006) put that in the past three decades the social and economic role of women has changed and therefore travel behavior has also changed and trip chaining increased in amount.

Hamed et.al. (1993), and Lu and Pas (1999) also put that socioeconomic and demographic variables affect trip-chaining. They showed that increasing household responsibility, and especially having children, increase the possibility of trip chaining; and when the number of workers increase, the number of chains decrease because of responsibility share.

Krygsman et.al. (2006) also mentioned that among all socio-demographic factors for serving passenger/goods on work tours, gender is the strongest and the most significant one. Because female are more likely to undertake such activities than male and women make more complex tours and trip chaining. Also Lee, et.al., (2007) put that increased household responsibility, especially for people who have children, directly results in an increase in trip chaining behavior.

In other words women's household responsibilities continue overwhelmingly when compared with men; although their share in the working forces increase. This also affects the mode choice of people. Private modes give flexibility in performing different daily activities inserted in home based work tours (trip chaining) as Krygsman et.al. (2006) mentioned; that is to say they enable a temporal and spatial flexibility for people. Therefore if anyone has the chance to choose among all transportation modes, they would tend to choose private modes. But since in this thesis study we deal with captive public transport riders, women who are studied are people who have no other choice than public transportation. Therefore in that case

their mobility could be restricted and activity participation rates decreases, which has been less than men currently, because public transport riders are more dependent on the fixed public transport network (Krygsman et.al. 2006).

Usually one more transportation mode has to be used in combination to the final destination, mostly with children. The responsibilities of women have brought a strong constraint on women's time use and therefore mobility. Since women's main activities would continue to fulfill the subsistence and maintenance needs of the household members; their mode choice, travel time and routes has to be taken, have been affected automatically. Furthermore the space usage patterns are also affected due to this time constraint. In order to evaluate this we need to look at the time-geography theory.

2.5. ACCESSIBILITY AND TIME GEOGRAPHY

Accessibility is an abstract concept and there are many definitions on it. Dong et. al. (2006, 164) gave a definition of The U.S. Department of Environment (1996): "*the ease and convenience of access to spatially distributed opportunities with a choice of travel*". But still this concept is an abstract concept because measurement of the accessibility is very difficult. This is because the "*the ease and convenience*" terms mentioned in the definition changes from person to person in many different trips and activities. Primerano (2003, 2) widens the definition of accessibility as "*the ease with which people from specific locations can travel to participate in activities at a destination using a mode of transport at a specific time*", and he links accessibility with people's priorities, related with socio-economic characteristics, upon activity types; because a primary activity participation may affect the following activity participation, thus the accessibility of that activity. Also the mode choice of a previous activity could affect the mode choice of the other following activities (Primerano, 2003). Accessibility determines whether an individual joins an activity or not, moves to another location or not. The probability of owning an auto increases when an individual moves to another location, where the activities that he/she can join decreases in number, (Wen et. al. 2000).

In terms of time-geographic concept, accessibility, developed by Torsten Hagerstrand (1970) claims that people's reachable areas in space are not only a function of reach, but also a function of time, that is to say there is a space-time framework. The basic assumption of this space-time framework is as the following: *individuals can only experience or participate in activities at a single location in space at a single point in time* (Primerano, 2003, 5). According to Hagerstrand (1970) if a person cannot allocate time for an activity in a place, spatial proximity is not meaningful for that person to visit or to join that activity, that is to say that activity is inaccessible for that person.

In time geography theory Hagerstrand (1970) developed many concepts as space time path, space-time stations and space time prisms. Space-time path is the way gone through among activities in the space in a certain time interval. Miller (2004, www.geog.utah.edu/~hmliller/papers/travel_exclusion.pdf) also put that space time path is the trace followed by an individual in space with respect to time. Space-time stations are called for places where people satisfy their needs (subsistence, maintenance and leisure) like eating, shopping, working and etc., and *if the path is vertical, the person is conducting a stationary activity. If the path is not vertical, the person is moving between stationary activities...The path can never be horizontal: this would indicate a perfectly efficient transportation system* (Raubal, Miller, Bridwell, 2004, 248). The more acute the angle of the path, the more efficient the transportation system, because the less time the trip requires.

On the other hand space time stations are called as locations like home, shop, work, school, which are available in certain times at certain places in space, and in order to participate an activity the individual must allocate time at its specific location (Miller 2004, www.geog.utah.edu/~hmliller/papers/travel_exclusion.pdf).

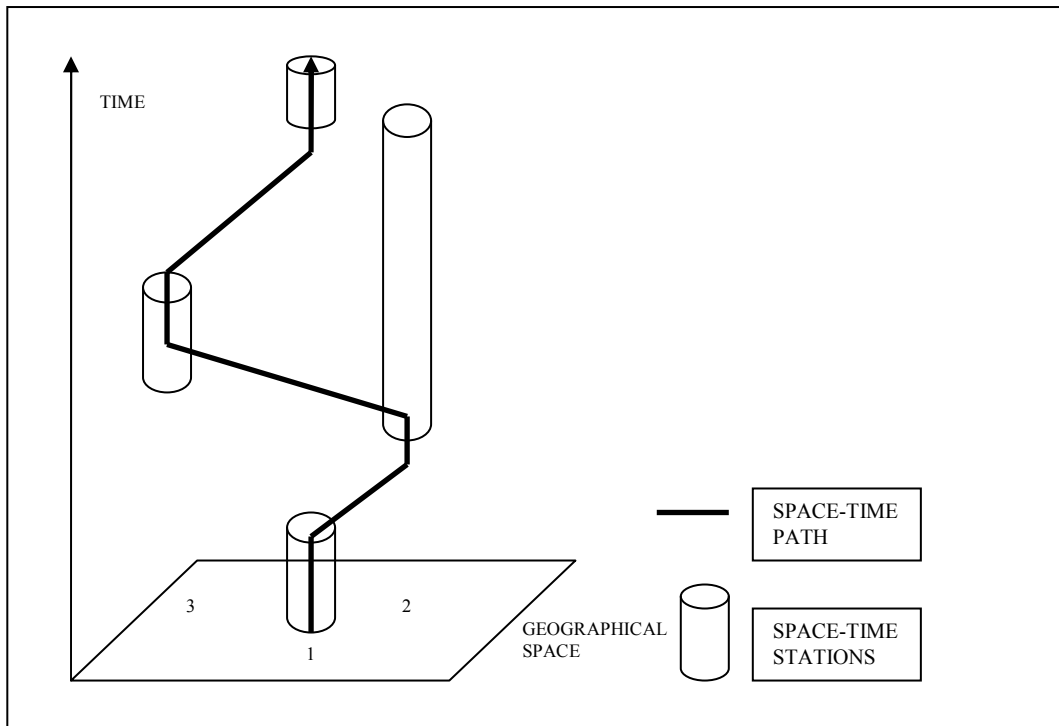


Figure 2.6: Space-Time Path and Stations (Raubal, et. al., 2004, 248)

As stated in the article of Raubal et.al. (2004), Figure 2.6 shows an example of the space time allocation of a person for his activities during a day. For example a person first arrives at station 1 right on time, and then goes to station 2 earlier than it is available; therefore he has to wait for it. This causes a delay in the arrival time to station 3 and therefore he has to spend less time in station 3 than required. At the end person returns to station 1 earlier than required. This means that person cannot allocate his time efficiently to activities. Therefore person can go through the station 3, after station 1 although it is farther than station 2, because it is available for a shorter time and station 2 is available for a longer time interval. The more efficient transportation services means an acute angle therefore more time can be allocated to stationary activities, that is to say efficient time allocation for activity space.

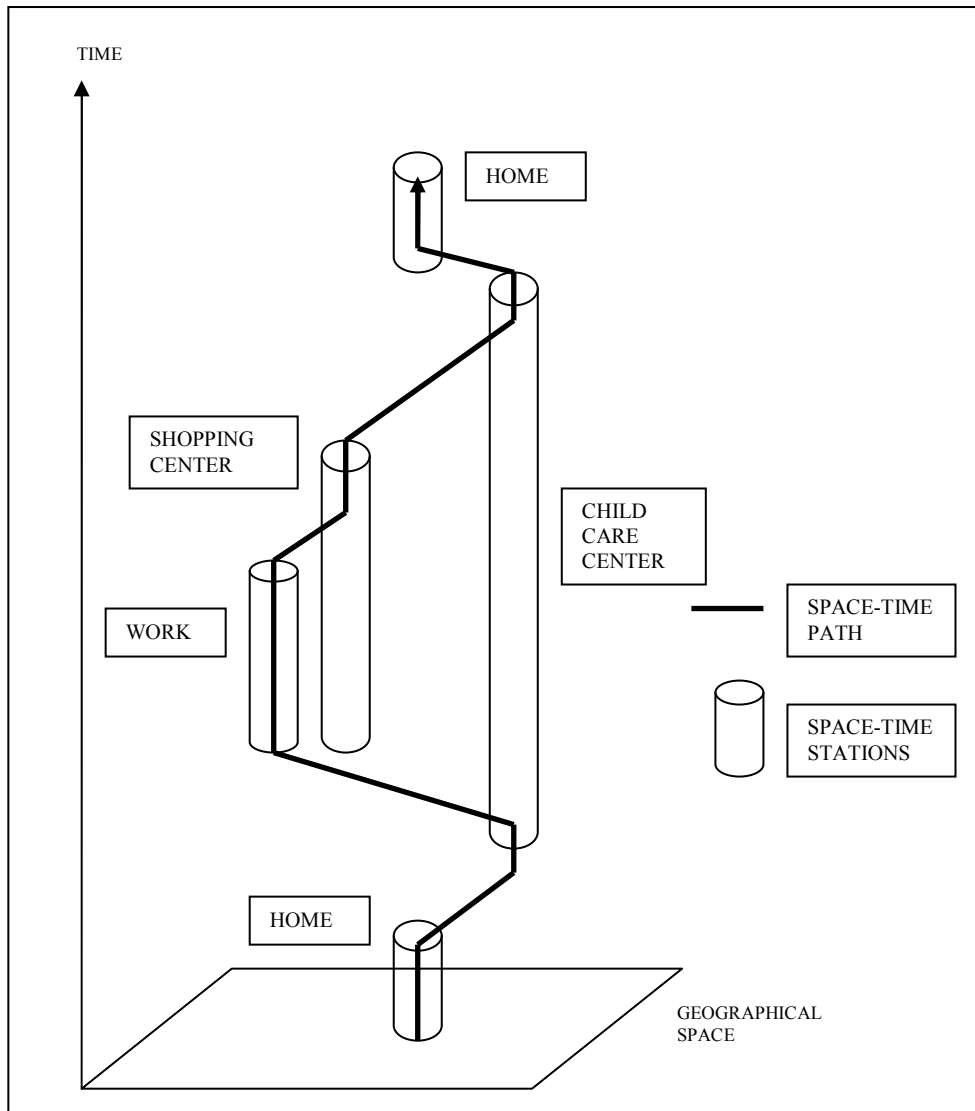


Figure 2.7: Space-Time Path and Stations (Miller, 2004, 11)

Figure 2.7 on the other hand, can be typical and a relatively simple one of a working woman with children. She has to take her child or children to the day care center and then she goes to work, being the primary activity as working, after leaving work she has to go shopping and then she has to catch the ending time of the day care center to take her child/children from day care center and then she has to go home, being secondary activities as shopping and taking children to/from the child care center.

When different types of stopping points has been added, or in other words the trip chaining becomes complex, the time has become a scarcer source and time spending on each stationary point other than obligatory activities has to be decreased and maybe some discretionary activities have to be lessened. Modal opportunities here is very important and a functionary one with considering route and time factors might increase the mobility of people and decrease the time spending on transportation which could be used in another activity. Therefore one can easily understand how the responsibilities of women affect the mobility within space and time. And if we add also the cognitive constraints, which will be described right below, to the scene, from the point of view of captive urban transport women riders, space time geography would be affected indifferently.

It is obvious that every individual has different movement paths and it is possible to follow these lines in time and space, as Hagerstrand (1970) mentioned. Parkes and Thrift (1980, cited in http://www.geocomputation.org/1998/68/gc_a.htm, April 2005) also put that, it was possible to identify the “*unique individual movement paths or life-lines through the day, week, month and year*”. This concept claims that no one can do anything without some constraints. Hagerstrand developed 3 limitations categories (Hagerstrand, 1970). These limitations disable people to join activities (Raubal, Miller, Bridwell, 2004):

- 1- Capability Constraints: Physical or biological limitations of people to move. They are related to people’s themselves and the resources they have. People must make some trade-offs between spaces and time to travel. Faster modes, therefore give an advantage to people in this trade-offs.
- 2- Coupling constraints: To make an activity people must make such an arrangement that he/she could be at the same time, at the same place, with some other to interact. In other words, time-space paths of certain people must coincide to make an activity. That is to join an activity one must be at a certain place for a certain time.

- 3- Authority Constraints: For some places could be used only in certain times and/or by some people. (For example military zone, private clubs, shopping malls, etc.). There is a controlling authority in other words.
(<http://www.ncqia.ucsb.edu/conf/BALTIMORE/authors/janelle/paper.html>, April 2005; Pred, 2005; Raubal, Miller, Bridwell, 2004).

Besides the three constraints mentioned above, there are also **cognitive constraints**, which shapes individual preferences and choices. Cognitive constraints subject is more meaningful from the point of view of women for many reasons, which is mentioned below in detail. Although time geography does not deal with cognitive constraints; this thesis study would focus on those cognitive constraints for women.

Space-time prism (STP), the key element of time-geography, is the spatial reflection of the individual's physical reach in space and time, and defines "*the set of all points that can be reached by an individual given a maximum possible speed from a starting point in space time and an ending-point in space-time*" (<http://www.ncqia.ucsb.edu/conf/BALTIMORE/authors/janelle/paper.html>, April 2005). As Recker, Chen and McNally (2001) also mentioned spatial location, temporal availability, and maximum velocity in that urban area determines the space-time prism, the size of which designates the reachable area of a person. The space-time prisms help to identify the possible accessible points for an individual at a limited time with different travel modes or travel patterns; that is "*what can be accessed (spatially) at what cost (temporally)*" (http://www.geocomputation.org/1998/68/gc_a.htm, April 2005). It is also called as the expression of a person's physical reach in space and time (Raubal, Miller, Bridwell, 2004), reflecting their space time paths.

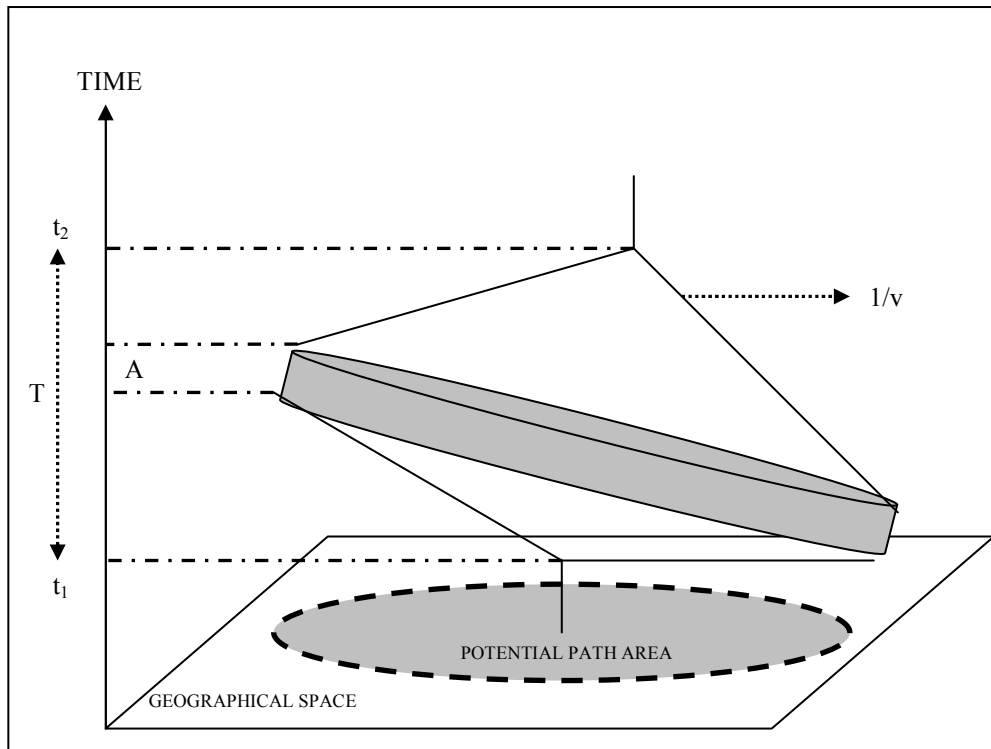


Figure 2.8: An example of a space-time prism and a potential path area (Raubal et. al., 2004, 249)

In Raubal et. al.'s (2004, 248-249) words:

“Figure... illustrates a STP for the case where two fixed activities occur at different locations (say, home and work) and frame a flexible activity (say, shopping). The STP can be constructed if we know the times when the fixed activities must occur (t_1 and t_2), the minimum time required for the flexible activity (A) and the average maximum travel velocity in the area (v). an activity or person is accessible only if its station or path intersects the STP to a sufficient degree (i.e. a minimum temporal duration, determined by the type of activity). The projection of the STP to geo-space defines a potential path area (PPA): this shows all locations in space that are accessible to the individual. Ignoring their temporal durations, an activity or person is accessible only if its location intersects the PPA”.

Primerano (2003) also put that in the calculation of space-time prisms three basic data could be used: affordable *time* for activities, *distance* between the locations of activities and the between locations of activities and the travel *velocity*. Lawrence Burns put another dimension to the accessibility aspect of the space-time model of Hagerstrand, and demonstrated that some factors affect the accessibility; such as different modes have different effects and developed transportation options increase the accessibility, in fact related with the travel velocity. Primerano (2003) mentioned that especially in rush hours, people's space-time prisms are very narrow due to the traffic jam. But with the help of factors mentioned above, the prisms could be enlarged (<http://www.ncqia.ucsb.edu/conf/BALTIMORE/authors/janelle/paper.html>, April 2005)

There are two types of activities, when coupling constraints are concerned: fixed activities, which have to be made in a fix place and/or in a certain time, that is to say relocation and/or rescheduling of the activity is very hard or impossible (for example working, home activities, etc.); and flexible activities, which are easy to change in place and/or time (for example shopping, recreational activities, and etc.) (Raubal, et.al, 2004, 248; Miller, 2004, www.geog.utah.edu/~hmiller/papers/travel_exclusion.pdf, 29.08.2006).

“The STP delimits the possible locations for the path based on the ability to trade time for space when moving and participating in flexible activities in the limited durations between fixed activities during a given time horizon (hourly, daily, weekly, and so on) (Raubal, Miller, Bridwell, 2004; 248).

“The STP can be constructed if we know the times when the fixed activities must occur (t_1 and t_2) the minimum time required for the flexible activity (A) and the average maximum travel velocity in the area (v). An activity or person is accessible only if its station or path intersects the STP to a sufficient degree (i.e. a minimum temporal duration, determined by the type of activity).

The projection of the STP to geo-spaces defines a potential path area (PPA): this shows all locations in space that are accessible to the individual. Ignoring their temporal durations, an activity or person is accessible only if its location intersects the PPA...It is also possible to construct these entities within multi-modal transportation networks, accounting for spatial and temporal variations in travel velocities” (Miller, cited in Raubal, Miller, Bridwell, 2004; 249)”.

This means that for anyone, traveling to anywhere is within the constraints of his/her space-time prisms, this is also called as “potential path spaces” (PPS’s); or “potential path area” (PPA’s).

(<http://www.ncqia.ucsb.edu/conf/BALTIMORE/authors/janelle/paper.html>, April 2005)

As mentioned above although time geography does not deal with cognitive constraints, it is an important constraint especially for women. For example lack of information and security matters could be strong cognitive constraints. As Hall (1983) and Kovan and Hong (1998) mentioned (cited in Raubal, Miller, Bridwell, 2004; 249-250), “*incomplete information and locational preferences can limit a person’s accessibility as well as the usefulness of activity possibilities obtained from a STP*”. Miller (2004) also put that if an individual does not have exact information on the transportation opportunities and changes in the mode routes and schedules, he might have faced with severe problems from the point of view of transportation usage, like losing time and money.

Since women’s responsibilities in a household are much more than men’s and women’s are physically and psychologically more vulnerable, lack of information on transportation modes could give other results, such as not to find any mode to go in a transfer place, in a trip chain, without much money, or in the dark and in an insecure place. Of course those problems may become more difficult when the income level is low, when there are children, when the person is elderly; when she is married, with

dependent children and full employed etc. Increasing responsibility increases the severity of the women's problems.

Security, on the other hand, may be another cognitive constraint that we come across. Particularly women can give up traveling and therefore their space time prisms could be affected, that is to say narrowed, by this insecurity feeling. Therefore from the point of view of women security might be the dominant cognitive constraint to be dealt in order to improve their STP's. In this sense, dealing with women's STP's affected by cognitive constraints; especially by security can be a study area for our research. Cognitive constraints subject will be examined in detail in the following part.

2.6. WOMEN STUDIES AND TRANSPORTATION

Men and women are quite different from each other, in terms of choices, preferences, roles and life cycles and styles. Especially the roles and responsibilities are very different; because women have more domestic duty to perform. Not only the roles and responsibilities are different but also the physical and psychological structures also differ. Understanding those differences between genders helps us to perceive the different travel patterns of women. Because all of those differences create differentiated travel patterns with differentiated activity participations and thus differentiated urban geographies, including different mode choices and travel times of both genders.

In order to understand the differences between men and women, public and private space division should be understood well. Public space-private space distinction has started during the industrialization period when domestic works and wage labor had distinguished; when women's space- men's space distinction has also started (Lyon, 2007). In this respect one can say that private space is the product of a western modernization period (Lyon, 2007). Therefore feminist theorists have mostly dealt with this differentiation (Lyon, 2007). According to western feminists female have been located within the private realm of the family (Lyon, 2007). This private realm

necessitates some private activities such as rearing children, supporting family members, caring for the sick, looking after the home and garden (Lyon, 2007).

In literature it is claimed that liberalism defends individualism and egalitarianism, but this is ostensible and in fact this obscures “*the patriarchal reality of a social structure of inequality and the domination of women by men*” (Pateman, 2006, 157). Women and men are thought to belong to private (domestic) and public spheres respectively; and men belongs both of the two worlds and rule them (Pateman, 2006). Nagar (<http://www.acme-journal.org/vol1/nagar.pdf>, 15.11.2008) too, said that public space is male dominated. Walker (1998), in the same way, mentioned that public space (political life) is the legitimate sphere of men where he is renumarated and private space (domestic life) is the place for women where she undertakes the responsibilities of home and household members based on an unpaid manner, only with love.

Gender ideology also says that public space belongs to men and women are limited within private/domestic sphere (Capper, 1999). Public-private space discussion has a powerful political component from the point of view of gender ideology. In this component men have the leadership role in the public space and women have the control of household (the private space) (Capper, 1999). Blair (1997) put that women are an exchanged material of men by marriage and therefore men determines the boundaries of private life where the women are limited. Therefore private life is men dominated female area and public life is again men dominated male area, and if women want to work outside, she plays the roles designed for them by men.

In this respect Capper (1999, 2) mentioned the following statement:

“According to a Pythagorean treatise of the second or third century BC 'Men's vocations are to be generals and city officials and politicians, and women should guard the house and stay inside and receive and take care of their husbands. The ideal woman was absent from public space or silent and invisible when within it”

Locke supplied a theoretical basis for a liberal separation of a public and private in *Second Treatise*. Feminist theoreticians agree with Locke in the determination of “domestic life is paradigmatically private”; but they do not agree that with the view of Locke that natural characteristics of sexes give way to a separation of private and public (Pateman, 2006).

According to feminists, private (domestic) and public (civil society) are interrelated, not separate or opposed; and we can understand liberal social life only when we accept this reality. “*The sphere of domestic life is at the hearth of civil society rather than apart or separate from it*” (Pateman, 2006, 158). In this respect female is commonly accepted as private; but public space is constituted from private lives (Kaufmann, 2007).

As Edgeworth (1999) mentioned, political theory and public intellectuals’ deny private sphere when theorizing social life.

“The domestic sphere; the world of family, nature, love and emotion, is regarded as inferior to the public sphere; a place of reason, objectivity, culture and power. Thus, in its emphasis on civic and social matters that deny the importance and place of the private domain in life experience, the word ‘public’ in public intellectual defines both the subject and place of intellectual discourse. On these terms, women are conspicuously absent as contributors to public thought” (Edgeworth (1999, 4).

Chackraborty (2008) made an analysis of the system of Zo/Mizo society (an Indian patriarchal society), from the point of view of women. He put that women have been left behind men; but in recent years women try to make heard their voices and they have established certain organizations (after 1997). This is named as the shift of voice of women from the private to public, or “*the emergence of women from the spatial existence at ‘the private’ to ‘the public’*” (Chackraborty 2008, 34).

In these terms Pateman (2006) stated the women's activities have always related with their world, domestic sphere. Their public sphere activities are also for their domestic life.

“The separation of the private domestic life of women from the public world of men has been constitutive of patriarchal-liberalism from its origins and since the mid-nineteenth century, the economically dependent wife has been presented as the ideal for all respectable classes of society... women have never been completely excluded, of course, from public life; but the way in which women are included is grounded, as firmly as their position in the domestic sphere, in patriarchal beliefs and practices. For example, even many antisuffragists were willing for women to be educated, so that they could be good mothers, and for them to engage in local politics and philanthropy because these activities could be seen, as voting could not as a direct extension of their domestic tasks. Today, women still have, at best, merely token representation in authoritative public bodies; public life, while not entirely empty of women, is still the world of men and dominated by them” (Pateman, 2006, 158).

Feminist theorists defend the idea of “the participation of poor and often stigmatized women who have little or no access to formal education of political venues” (Nagar, 2008, 59). Therefore feminists, in recent years try to develop a theory, in which men and women are equal and in an interrelationship in private and public space, sharing responsibility in both spheres (Pateman, 2006). This new arrangement in private space in terms of domestic responsibilities, according to Pateman (2006), will require also a change and an arrangement in public sphere, too.

Therefore, as mentioned above, we can see that men and women differentiation originates from the physical differentiation and thus traditional role of women. Women always thought to belong to the domestic life. This reality caused women to be in a secondary position in social life and related mobility issues have always been a problematic for women. Since public sphere has accepted as men's world,

women's position in this man dominated and owned world has always been limited. However with women's participation in work force this reality has started to be changed. Women have appeared more and more in public space. Therefore mobility problems of women appeared. As Grieco, Pickup and Whipp (1989) mentioned, poor public transport services lead to an exclusion of women from the social life (stated in Hine and Mitchell, 2003), in other words public space.

Women, who have joined the workforce have still more domestic responsibilities than men, although they both belong to private sphere and public sphere in modern world, their private sphere responsibilities have not shared by men and still they mostly have the largest part of the domestic responsibilities. www.stellaproject.org/FocusGroup3/Lisbon2004/presentations/Rosenbloom_Hakami-es-B05_04.ppt, 29.09.2006; Li, Guensler, Ogle, 2005; Williams, 2005; Donaghy, Rudinger, Poppelreuter, 2004; Root, Schintler, Button, 2000; Carlsson-Kanyama, Linden, Thelander, 1999; Hanson and Hanson 1980). Although women join the workforce more and more in recent years, many researchers claim that the traditional responsibility at home does not change, and women still have the most domestic responsibilities (Furthermore Williams (2005) stated that women's access to job, educational and other opportunities were also poorer when compared with men, as mentioned in feminist research due to belonging to private space, not the public space; and men have priority in the access to household resources, which brings about a general perception –misleading or not- that women are economically disadvantaged. For example household head (this has mostly been the men) has the priority in the usage of family vehicle (Lee et.al., 2007).

Travel is an integral part of our lives, and in order to maintain our lives we have to do some activities like shopping, working, going or taking someone to health care centers, taking children to or from school and/or day care centers and etc, all of which requires traveling. In a household these responsibilities are shared among household members, as called gender division of labor in the literature (Sarmiento, 1996), and as the traditional role requires women take the largest part of those responsibilities, as mentioned above.

Therefore travel patterns and needs are different from men since they have different roles and responsibilities, related with their private space; they have more responsibility like caring child, elderly, disabled adults, shopping for food and other domestic needs (Coleman, 2000). Hamilton and Jenkins (1992) also put that women have more roles, more responsibility due to child care and domestic roles and etc; therefore they have to take attention of transport planners more (mentioned in Hine and Mitchell; 2003, 16). Rosenbloom (1993) also dealt with the same subject and mentioned that women's travel patterns are quite different than men because they have more responsibility for the needs of children and home, domestic space. Therefore women have to combine many trips and make more complex journeys and a higher proportion of their trips are local and short distanced and they rely on public transportation more (Coleman, 2000; Hine and Mitchell, 2003, Rosenbloom, 2003).

Despite the fact that the number of women who have joined to the work force has increasing in recent years, traditional transport planning has based its studies on men's work trips and peak hours (Williams, 2005). Whereas women's working patterns might be different from men's and women might work part time or we can say that the number of non-working women is greater than the number of women who work. But, as mentioned above since recently women's participation to work force and social life increased greatly, their social roles are also changed significantly. Levinson and Kumar (1995) stated that this increase in the participation of women into the workforce has been decreasing the time spent at home. Therefore their domestic responsibilities have declined and these services have been taken from outside like child care, eating activities, laundry and etc (McGuckin et.al., 2005; Williams, 2005, Levinson et.al., 1995). This brings the increase in the non-work trips, because in order to fulfill these activities travel is required (McGuckin et.al, 2005; Levinson et.al., 1995).

Therefore women have more responsibilities when compared with men and the travel patterns also differ. As mentioned early in this study, travel demand is created by the activity demand and since activity participation is related with responsibilities, different responsibilities create different activities to participate, and this creates different travel needs. Peters (1999, 2001) mentioned that differences in

transportation needs between men and women are caused from the “*gender-based division of labor within the family and community*”. Similarly Li et.al. (2005) stated that women have more responsibility at home and therefore their travel patterns are different from men’s. The traditional position in the family also affects employment types, income levels and etc., which also affect the travel patterns and mobility of women (Root et.al., 2000).

Taking children to and from school or day care centers, shopping, and running errands for household needs are commonly under the responsibility of women, causing time limitation and trip chaining, meaning one trip with more than one destination. Turner and Grieco (1998) also of the same opinion that women have more household responsibility, and they also added that having more responsibility causes a time poverty which also differentiates the travel patterns from men’. Therefore trip chaining, which means multi purpose trips, is a characteristic of women’s everyday mobility and by this way women’ travel patterns becomes highly complex (Nobis and Lenz, 2005; Turner and Grieco, 1998). In the Habitat debate of March 2005 it was mentioned that women’s responsibilities and working patterns are quite related with their mobility needs. Li et.al. (2005) also mentioned that the socioeconomic and life cycle status might affect their travel patterns with a greater share. Similarly Rosenbloom and Hakamies-Blomqvist (www.stellaproject.org/FocusGroup3/Lisbon2004/presentations/Rosenbloom_Hakamies-B05_04.ppt, 29.09.2006) mentioned that men and women differ in travel types in terms of number and purpose of trips, licensing and auto usage, serve-passenger trips and trip-chaining and chain complexity.

In a study it was also mentioned that women use transportation not only for working purposes but also for shopping, taking children to and from schools, child care activities, health care facilities, and for social purposes like visiting friends and relatives, all of which reflect the responsibilities of women apart from men (http://www.ndpgenderequality.ie/about_genmain/about_genmain_6a.html, 08.08.2006). Rosenbloom and Hakamies- Blomqvist put that women’s different employment types, roles and nature causes in different transportation needs in scheduling, location and security means

(www.stellaproject.org/FocusGroup3/Lisbon2004/presentations/Rosenbloom_Hakamies-B05_04.ppt, 29.09.2006). Therefore when investigating women's travel types and travel needs their socioeconomic status at home and in society should be taken into account.

Women, in themselves, could also be categorized into sub groups, like married-unmarried, working-nonworking, and women with children or not. Married women, women who work and women with children may also be more time disadvantaged when compared with others. Because having a job brings the time limitation, and this limitation increases to a certain degree from part time to full time jobs. Being married also brings responsibility of another person, husband, and more running errands for home; which together also cause time limitation. Having children is very different than the other two and requires the most responsibility; because one or more children depend on the mother for everything, at least to a certain age if there is no health problem. For example Rosenbloom and Hakamies-Blomqvist stated that having children has a more significant effect on women's than men's responsibilities, affecting the transportation types. McGuckin and Murakami (1998) and Sarmiento (1996) stated that among all the women groups, it is the women with children who suffer the most responsibility and therefore the most trip chaining.

When one or more of the conditions mentioned above come together the responsibility has been getting bigger and bigger and there has left few time for any other activity, especially for leisure purposes. Transportation mode availability is very important in that sense. Because if convenient and reliable travel mode choices could be available, women could participate any other activity other than their responsibilities. Jang (2003) approached to the same subject from men/women differentiation and put that activity participation rates also differ between gender and men participate into different types of activities more than women. This is also related with mostly time limitations. For example, Hamilton (2002) and Bianco et.al. (1996) mentioned that, women's roles are much diversified as; income earner, primary care providers; from caring children; taking them to and from school or day care, and caring adults if present; to doing shopping, and etc., one who have the

choice opportunity, generally chooses automobile as transportation mode. For example Rosenbloom and Hakamies-Blomqvist

(www.stellaproject.org/FocusGroup3/Lisbon2004/presentations/Rosenbloom_Hakamies-B05_04.ppt, 29.09.2006) and Sarmiento (1996) stated that due to their complex responsibilities, women have to trip chain and unfortunately mostly automobile is the only mode to provide the need; therefore women depend more on automobile than men.

Furthermore most women have less driving license compared to men, and women have little access to cars than men; because still men have priority on the car usage if one car is available for a household, therefore women compulsorily use public transportation more (Buck, 2005; Jang, 2003; Hamilton, 2002; Carlsson-Kanyama et.al., 1999; Peters, 1999; Bianco et.al., 1996, Hanson and Hanson, 1980). Similarly Nobis and Lenz (2005) expressed that although women have more responsibility and more complex travel patterns due to those responsibilities, they are more captive riders when compared with men and unfortunately they are obliged to use public transportation which is less flexible and therefore traveling becomes a big burden for women. Therefore “*regular, reliable and affordable public transport is crucial to managing the range of tasks that have to be fitted into day*” (Buck, 2005).

The more complicated, shorter, more frequent and more dispersed trips in a day time than men brought by the responsibilities of women (Donaghy et.al., 2004; Root et.al., 2000; Peters, 1999), brings the need of multiple stops or trip chaining; or *more stops for multi purpose trips* (Hanson and Hanson, 1980, 294). As Peters (2001) mentioned women mostly chain work trips with some *domestic and care taking responsibilities*.

Trip chaining behavior of people has sharply increased in recent years. This can be related with the modern life patterns of people. For example as Vasconcellos (2005) put that, in Sao Paulo a research has been made in 1997 to see the mode choice and mobility changes of people, and between 1987 and 1997 female mobility levels have approached to male's, although remaining lower (the change in the workforce structure) and for those ten years period private vehicle usage has risen sharply. That is to say when people have the right to choose a mode, especially when women are

considered; they mostly choose the private mode. Because, as mentioned above, increasing household responsibility requires complex trips and trip chaining (will be explained in the following part) probability increases and furthermore the number of trip chains increase, and a flexible mode like a private car enable people to undertake such responsibilities and trip chains easily. The change in Sao Paulo also is a reflection of this fact. In another point of view having a private motorized mode in a family motivate people to trip chain (Hamed et.al., 1993).

Mostly these complicated trips include many different located places, mostly with children, and require more than one type of vehicle, for example bus with metro, etc (Root et.al., 2000). We need to mention here that we deal with captive women public transport riders. That is to say women we study do not have the possibility to reach a private mode. But the conditions requiring trip chaining still remains, like taking children to and from school or day care centers, or shopping for home, etc. Therefore women might be limited within walking distance or limiting their geography, since there is no convenient public transportation mode. This might be caused by several reasons, like increasing travel cost, increasing travel time, traveling with children, etc. For example, cost burden might increase much if there is not a ticket integration policy, because every trip demands single ticket (Peters, 1999). Therefore the different roles and responsibilities women have also created different travel patterns and unfortunately sometimes mobility constraints due to lack of time and high travel costs.

In order to mention the travel patterns of people, rather than trips alone, we have to examine the relations among all travels made in a whole day, by an individual and among individuals' travels in a household, since household members' travel types, patterns and activity choices affect each other (Primerano, 2003; Shaw, Wang; 2000). Therefore when mentioning women's travel patterns and mobility, it may also be important to analyze the adults in a household in terms of roles and responsibilities and transport needs, because this is a very important variable reflecting the mobility constraints of women; however, in this study the main focus is chosen to be women's travel patterns.

Mobility constraints are not only related with roles and responsibilities that women have in a household. Their psychological and physical sensitivities may also cause a restriction on women's mobility and therefore activity participation of them decreases dramatically. Therefore although previous travel demand analysis put emphasis mostly on time and money cost of the mode as the main variable of affecting the mobility of people, from the point of view of women, time and money may be less important when compared with some other factors, like security and customary and legal constraints. Root et.al. (2000) put that security has often be on the central issue when compared with time and cost variables for women, although for men this is not so. The physical vulnerability of women to violent attacks or sexual abuse may cause them not to take public transport (Williams, 2005; Hamilton, 2002; Peters, 1999). As on the official web site of UK (<http://www.dft.gov.uk>, 03.08.2006) put and Buck (2005), Hamilton (2002) and Bianco et.al. (1996) mentioned fear of harassment and threat of violence affect the women's behavior, hence mode choice could easily be affected from insecure occasions, and insomuch that they could forgo from traveling all together. Coleman (2000) also mentioned that personal safety issues in transportation are related with the transportation infrastructure design like stations, underground car parks and etc., from the point of view of women.

In that sense security is directly related with cognitive constraints, which are very important in mode choice, mobility, activity participation and urban geographies of women, as mentioned in the Section 2.3.

Security cognition differs between men and women. Security cognition is so important in the mode choice of women that, this feeling could easily affect the foregoing of travel or not

(http://www.ndpgenderequality.ie/about_genmain/about_genmain_6a.html, 08.08.2006; Carter, 2005). Women mostly feel themselves less secure when traveling on public transportation and in the dark this insecurity sense intensifies. In the 1998 White Paper on Transport "A new Deal for Transport: Better for Everyone", it was mentioned that women have fears on personal security especially when alone and at night (Coleman, 2000). Fear of crime is more widespread among women than men

due to their nature (http://www.extra.rdg.ac.uk/EQUAL/Transport/Sue_Sharp1.pdf, 25.07.2006, Whitley, Prince, 2005).

According to the official web site of UK Government people's fear of crime about transportation is not only related during just traveling action, but most importantly people feel insecure while waiting for a bus or train due to the station's features or the place of the station and its surroundings (<http://www.dft.gov.uk>, 03.08.2006).

Along security and comfort variables of the transportation mode; accessibility, routes and services provided, costs, and information are also important for women's mobility needs satisfaction as a Scottish government report suggested. Women mostly travel in off peak periods when the transportation services are less in amount and in terms of reliability and safety of station points (Peters, 2001). For example in chained trips, which require different transportation mode using in combination, information on and reliability of the modes' time schedule become very important. This situation could also be linked with the personal security cognition of women because well integrated different transport services and improved regularity and reliability of services, which enable the lessening of waiting times, are very useful tools for women especially after dark.

Some sociological factors like having low income and children also have a negative impact on women's fear of crime. This shows that women also have diversified needs and feelings according to some personal attributes as mentioned before, like having children or not, regular income or not etc. For example Whitley et.al. (2005) mentioned that women, with high income and without children, wouldn't have fear of crime, because they have the opportunity to own a car or to take a taxi and they have not an extra responsibility like child nearby.

From the point of view of women's mode choice, certain modes are recognized as unsafe or less safe, such as double deck buses, trains and walking, especially on pedestrian underpasses (Scottish Executive Central Research Unit, 2000;

http://www.dft.gov.uk/stellent/groups/dft_mobility/documents/pdf/dft_mobility_pdf_029307.pdf, “Gender, experiences, perceptions”, 31.07.2006). For example unlike men, women use buses more when compared with train, underground or car (http://www.dft.gov.uk/stellent/groups/dft_mobility/documents/pdf/dft_mobility_pdf_029307.pdf, 31.07.2006; Carter, 2005).

In some cases, less usage rates of underground rail systems and trains are likely to be related with security perception, because women feel less safe when using underground and trains. Furthermore underpasses and areas which are rarely used, after dark with poor lightening, multi storey car parks with few staff, isolated bus stops and unstaffed railway stations, especially in areas where interchanges are made, accessing to and from the station points, stations, trains, some underground stations and underpasses are very important features in the security cognition of women. For example it is mostly accepted that rail systems are considered to be safer due to higher-quality service and less crowds; but in some other cases it is also considered to be less safe than buses because they do not have a public officer (like a driver) in every rail car, or entering to an underground station point may make women feel insecure and prevent them from using this mode.

For example according to a study women’s underground usage rate of at least once a week is much smaller than men’s (%32-%72 respectively) and when compared with train, women feel less safe during the waiting time on underground stations (www.dft.gov.uk, 31.07.2006). The same study also claimed that women feel less safe when waiting at a railway station and traveling on a train after dark when compared with men (%60-%25; %51-%20 respectively). And also women’s feelings about safety while walking to/from the station and in pedestrian subways (Stafford and Petersson, www.dft.gov.uk, 31.07.2006) are different from men, in other words women feel less safe than men. This insecurity feeling, which is related with fear of crime, affects women’s traveling patterns and public transport usage rates, which also affects indirectly the activity participation and inclusion to social life.

Vandalism and graffiti causes a feeling of insecurity and this affects the usage rates of public transportation especially when an alternative mode is available. Also the

disordered environments with dirt, litter, broken windows also contribute the worry of people because they may think that it is an uncontrolled environment (Stafford and Petersson, www.dft.gov.uk, 31.07.2006)

In addition to the security subject in some countries women also face other customary and sometimes legal constraints in traveling. For example in the Habitat Debate (2005), it is stated that women in some counties are obliged to travel with certain modes, which also cause the foregoing of women from traveling. For example in Dhaka, Bangladesh, 10 seats or so have reported to be reserved for women and when all of those are full more women were not accepted to the bus, furthermore in peak hours women were not accepted to the public transportation, and therefore they have to walk anywhere regardless of the distance (Habitat, 2005). Unfortunately this contributes to the exclusion of women, who are already more disadvantaged than men in terms of mobility.

To address the transportation problems of women, some certain measures have to be taken. According to Peters (1999), the most important ones are accessibility to transportation modes, the sitting and routing of facilities and infrastructures and the timing/frequency of services. Peters (2001) also mentioned that women demand separate buses for themselves, security, improved off-peak transport services, integrated ticket policy. Other measures to be taken can be summarized as; better lightening in station points and areas of mode integration, more frequent services, route linkage of residential with working, shopping and education areas, accessible, clear and up to date timetables and multi-modal information (Scottish Executive Central Research Unit, 2000).

2.7. CONCLUDING REMARKS

This chapter presented a theoretical discussion of mode choice of women and its effect on their mobility and urban geography. Although in recent years some progress has been experienced through adding socioeconomic, demographic and psychological aspects into mode choice modeling, still travel time and cost are accepted as the most important factors in mode choice. However, activity based travel theory and women studies showed that, women's activity types, responsibilities and psychological and physical needs are very different from men, and therefore their travel patterns also differ than men. Because people's activity and travel decisions are affected from household characteristics, like gender, working status, having children or not, etc. In this respect when we examine the mode choice of women, other factors like security, perceptions of security might be more important than, or as important as, travel time and cost in mode choice.

Women have more domestic responsibilities and maintenance needs related activities, their trip chaining possibility, combining different type of activities, is more than men, for example combining shopping, working trips and other possible trips into one tour. Therefore women have limited time, short trips with more stopping points. Especially from the point of view of women in work, this means to allocate less time for leisure activities, and a decrease in the experienced geography.

Activity based travel theory and time-geography theory also provided that activity and travel decisions are bounded with time and space. These theories argue that if one cannot allocate time for an activity, spatial closeness does not mean anything. That is to say, for that person that place is inaccessible. From the point of view of women, time allocation is a more problematic one. Because having more domestic responsibility means time limitation and while in some cases it leads to an inability to reach the places although in close proximity, and maybe to a need to trip chaining and therefore more complex trips; in other cases it also means decreasing motorized mobility and narrowed experienced geography.

Time geography also provides some constraints in mobility, like capability (related with resources of individual), coupling (related with being in a certain place at a certain time) and authority (related with some places acceptance of (certain) individuals at certain times) constraints. But there is another constraint, which this theory does not have but basically as some researchers mentioned, very important: cognitive constraints (which was also mentioned in mode choice studies). They are related with knowledge and perception of people, especially of women.

Women have different perceptions than men and they are physically and psychologically more vulnerable than men. Furthermore women are more dependent on public transportation. Responsibilities and vulnerabilities are major problems for women's mobility. Because vulnerability causes fears and therefore they face with cognitive constraints while traveling. In some certain cases those cognitive constraints cause important decreases in mobility levels. But different women groups also have different cognitive constraints. Of course it cannot be expected that, for example, women with different education levels have same perceptions on transportation modes.

Therefore different women also have different mobility levels, married-single, working-nonworking, different aged, with different income, with children or without children, and with different education levels.

But the most important factor from the point of women might be cognitive constraints when mobility levels are considered, rather than money and time cost of the system, as stated in mode choice theory. In that sense metro could make women feel more secure, but the reverse impact is also possible. Therefore the effect of metro, as a chosen mode, on the mobility of women is very important, to determine women's urban experience, geography and participation to urban life.

As a summary we can say that all of the four study areas have many concepts and that we use some of them and interrelate them in this study. The starting point is the traditional role and private space of women (women studies). Belonging to the private space brings women domestic responsibilities in both worlds, private and

public. Public world activities are also related with domestic responsibilities. Those responsibilities necessitate them to make trip chaining and have complex trips and different daily activity schedules. However, the secondary position in the family as a trip maker, coming after men who are the life earner and the head of household, women mostly have limited access to automobile of the family and therefore most of them become captive public transport riders. From the point of view of mode choice, although in literature survey it is mentioned that money and time cost of the system is the most important and perhaps the only reasons of people during the mode choice (mode choice theory), it can be said that from the women point of you we can mention cognitive and capability constraints (time geography theory) as important as money and the time cost of the transportation system. This is because women are physiologically and psychologically more sensitive than men, and they have more domestic responsibility affecting their travel patterns. Especially cognitive constraints can be quite important that, the result might be the give up of motorized trips. Therefore being imprisoned in a limited urban geography within walking distance might become inevitable. In this respect metro might be an important transportation mode decreasing cognitive constraints and increasing the activity geographies of women. Therefore, from the point of view of women travel needs and patterns, priorities must be examined again.

Figure 2.9. and Figure 2.10 give the theoretical and conceptual structural relations of this study. We have four theoretical backgrounds: mode choice, activity based travel theory, and time geography and gender studies. Basically gender studies, activity based travel theory and time geography studies are dealt together and their total effects on mode choice and therefore urban geographies are intended to be determined.

As conceptual structure; we have physical and psychological sensitivity and domestic responsibilities from gender studies, trip chaining and daily activity schedules from activity based travel theory; cognitive and capability constraints from time geography theory; and characteristics of transportation mode and trip maker from the mode choice theory.

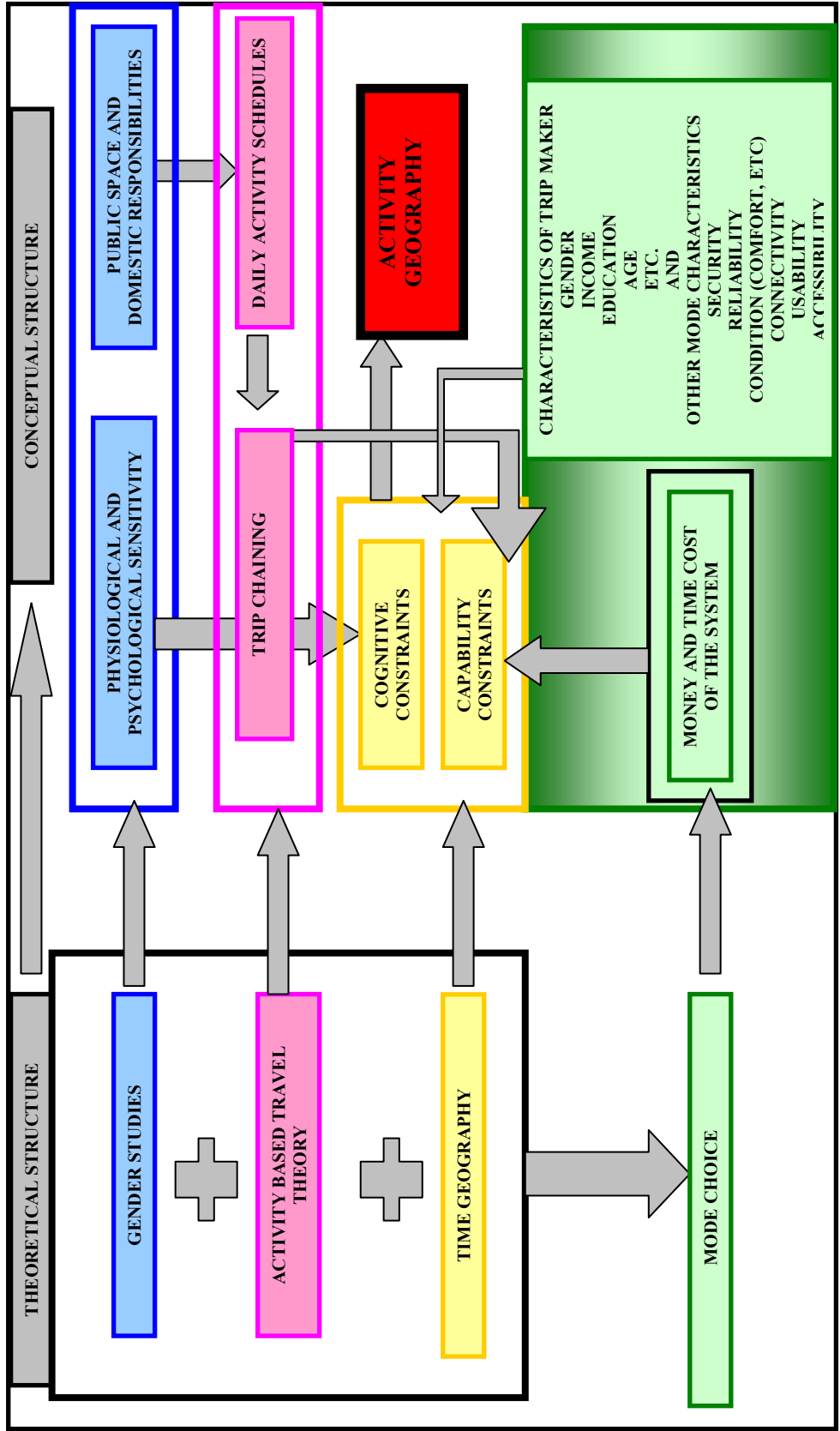


Figure 2.9: Theoretical and conceptual structure relations

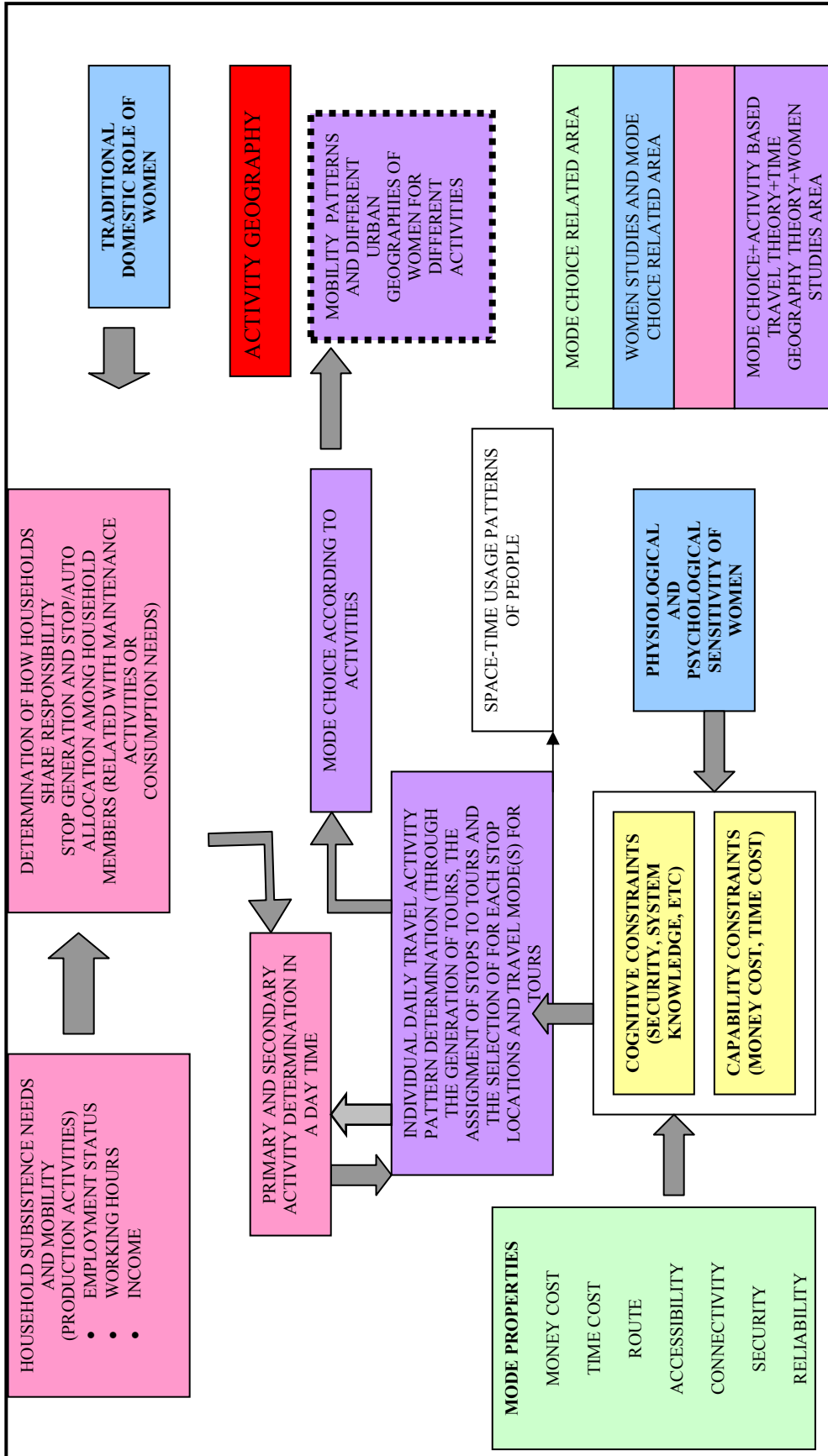


Figure 2.10: General structure of the study

The literature review shows that there are valuable studies on mode choice, activity based travel, time-geography and women. However it is obvious that there are gaps in the literature:

- ✚ Although there are many studies on mode choice, activity based travel theory, time geography theory and gender; four study areas are not brought together to examine different women groups' mobility problems
- ✚ There is a tendency to overstate money cost and time cost of the transportation system in mode choice of people. But from the point of women there might be other factors affecting mobility: domestic responsibility, traditional role and cognitive constraints
- ✚ Although women and transportation problems have been studied by many researchers, there is not an exact study on “metro choice based **activity geography** of vulnerable women groups”.
- ✚ Time geography theory is constructed on 3 main constraints: capability, coupling and authority. But on the other hand some researchers suggested cognitive constraints as another category and they mentioned mostly the lack of information as the cognitive constraint. But security matters and related fears are more important cognitive constraints for women from the point of view of metro; and studies are limited on this subject.

Based on the findings of the literature review, which is summarized above, this thesis focuses on women's mobility and mode choice effect on their urban activity geography. In detail, it focuses on vulnerable women groups' mobility levels based on metro choice, and it critically evaluates the metro perception and cognitive constraints affecting mobility and activity geography of vulnerable women groups. Therefore this thesis study will try to answer the following questions:

1. What are the vulnerable women groups in terms of mobility levels, considering their socioeconomic and demographic factors and capability constraints? Does the metro usage affect the mobility levels of those vulnerable women groups?
2. What are the activity geographies of those vulnerable groups? Does the metro usage affect the extent of urban geography that they experience?
3. What are the effects of fears and knowledge level of the vulnerable women on metro usage and mobility levels? Does metro prevent those fears transforming into cognitive constraints?

CHAPTER 3

METHODOLOGY

3.1. CONTEXT

The starting point of this study is the increasing investment in urban rail systems in most cities in the world, with the underlying expectation that improved travel time and improved service quality that these rail systems provide in public transport can bring about significant increases in mobility levels, affecting people's choices of destinations for work, shopping, leisure, etc. It is known that most urban rail investments are justified on the grounds that they will contribute to a better quality of life helping people to travel more in frequency and further in distance and thus increasing their mobility levels as well as the "geography" they experience in their city. This understanding is shaped mostly by the mode choice theory, which has an explicit emphasis on the effect of cost, time and comfort and convenience on travel: urban rail systems have the potential of decreasing the generalized cost of travel by improving travel times (as well as accessibility, connectivity etc.), and hence they can help improve mobility levels, particularly for captive public transport riders and also maintain comfort and convenience of passengers.

While travel time, cost and comfort and convenience are important factors in travel decisions, in mode-choice, and eventually in travel patterns, the literature review in the previous chapter was aimed at illustrating the complexity of travel decisions and how additional factors may affect these decisions. This complexity is particularly relevant for women travelers, whose household responsibilities and possible cognitions regarding transport modes reveal other factors as important as generalized cost in their travel and mode-choice decisions. The study, therefore, intends to focus

on the mobility of women with an emphasis on urban rail system's effects on their travel patterns. The research intends to contribute to our understanding of how improvements in public transport conditions, resulting from a new urban rail investment, may affect mobility in the case of those that have significantly diversified activity patterns, as well as special circumstances regarding their perceptions of travel, hence a high level of complexity in travel decision-making.

It was discussed in the previous chapter that women's travel patterns and mode choice are quite different from men's due to many reasons. Women mostly use public transportation. The rate of holding a driving license is generally less for women compared to men. If a family has one car, usually men have the priority to use it. If the family is low income, household members are likely to be captive public transport riders and so do women. Furthermore, the literature on gender studies show that women's responsibilities at home are quite diversified and especially from the point of view of married women with children there may be a variety of responsibilities, all of which affect travel patterns. Therefore women are expected to make trip chaining more on their trips to work, when compared with men: for shopping, taking children to and from school and to day care centers, etc. That is to say women do not make just one type of trip, but their trip involves many stops until a final destination. All of these affect the mode choice and therefore mobility of women as both the literature on gender studies and the activity based travel theory state. If they have the opportunity, women use the car because those responsibilities could easily be undertaken with the transportation flexibility that car can provide. On the other hand from the point of view of time geography, when we consider women, not only the responsibilities but also the constraints, especially cognitive constraints also affect the mode choice, mobility and thus space time prisms. But as we mentioned before, women may be more likely to have less access to a car, and hence mostly use public transportation, and when we add all of those circumstances; being captive public transport riders, having trip chaining responsibility, and cognitive constraints; the view is a very coercive one, causing mobility restrictions, and sometimes forgo work or social life, etc. and narrowed space time prisms. Therefore it appears that unlike the mode choice studies tell us, the main determinants of mode choice, from the point of view of women, are not just cost and time.

All of the four study areas, reviewed in the previous chapter, constitute the basis of this study. Therefore the main hypothesis is created by the questions generated by the four theories.

In terms of the mode choice theory characteristics of the transportation system, urban rail systems, and characteristics of the trip maker will be handled as main variables, and their effect on the mobility levels of different women groups are analyzed. This means that factors like money cost, time cost, accessibility, usability, connectivity, and security of the system will be analyzed from the point of view of women, and their effects on overall mobility will be studied. Certainly, discussions regarding characteristics of the trip maker and of the trip (purpose, travel time, distance etc.) are also important, and it is intended to observe how the rail system affects travel patterns of women with different socio-economic characteristics, and for different trip purposes, different duration and time of trips, and for different distances and different locations and directions. The main purpose, however, is to assess whether using an urban rail system can increase women's mobility and their urban geography, i.e. the extent of their using and experiencing the city they live in.

Considering the activity-based travel theory, the focus will be on determining the differences in mode choice decisions for different activities, particularly for primary and secondary activities of women in day time. It is intended to understand whether having access to a metro system affects trips made for household needs/individual needs and hence daily schedules; or whether the complexity/diversity brought about by household and individual needs (and daily schedules that involve a high level of trip-chaining) affect the decision of choosing metro.

From the perspective of time-geography arguments, the aim is to find out how an urban rail system, being a higher speed system compared to bus, affects the geography of women. Although it was intended to study the time-space prisms of women too, this required an additional in depth analysis and the application of travel diary method, which proved to be ineffective on the sample group, as will be discussed below. Therefore, women's geography is the main focus here. Due to

higher speed and other conveniences provided it is expected that the geography of those using a metro can be wider. However, the money cost is also an important factor, particularly for lower income. It is known that income is directly related with travel patterns, and when compared with high income, low-income people travel less, in shorter distances with using mostly public transportation (Hanson, Schwab; cited in Hanson, 1995). Therefore, it can be stated that low-income people's, or low-income captive public transport riders' geographies may be narrower than middle or high-income people. In this case the limiter is not time, but income and the cost of travel. Therefore, it is intended to find out whether lower income women who use urban rail systems have a wider geography..

As mentioned before space-time prisms and the geography of traveller are affected by capability, coupling and authority constraints, which will also be taken into consideration in the research; in addition, cognitive constraints are also an important focus for this study. Cognitive constraints do not only contain factors like cost of travel; but some sociological subjects are also within concern. For example access possibilities to travel time information are a very typical cognitive constraint. That is to say, having enough income to travel might not be enough for a person to travel. Also these cognitive barriers might differentiate for young/elderly, married/single, low/high income, women with/without children, etc. Due to these barriers the urban space usage patterns/maps would differentiate for those different groups. In women's case, cognitive constraints assumptions, also coupled with studies on gender studies reveal that security and safety may also act as important barriers in mode choice. In this case it is important to examine the types of cognitive constraints that affect their mode usage, and particularly whether an urban rail system brings or overcomes some cognitive constraints like security, and how secure urban rail systems are recognized.

This thesis focused on the women's mobility and mode choice effect on their urban activity geography. In detail, it has focused on vulnerable women groups' mobility levels based on metro choice, and it has critically evaluated the metro perception and cognitive constraints affecting mobility and activity geography of vulnerable women groups.

As a conclusion of this thesis study, it is expected to have activity geographies of different women groups living on the Ankara -Batkent metro route. Therefore firstly we need to determine the socioeconomic and demographic characteristics of the sample women, and then it is tried to capture the domestic responsibilities and mobility levels and the effect of metro on the mobility levels of different women groups. This is expected to give us the vulnerable women groups. Then we will study the urban geographies of women for different activity types and activity geographies of vulnerable women groups with a metro users and non-metro users consideration. On the other hand we will research the fears and knowledge (education) level of women regarding public transportation, particularly on metro, and investigate whether those fears and their education level become a cognitive constraint or not. At the end of the study it is expected to have the vulnerable women groups living on Ankara metro route, the activity geographies (related with subsistence, maintenance and leisure activities) of them and whether metro has been a factor affecting their mobility levels and urban geographies, which are determined their capability (related with their domestic roles, responsibilities and mobility resources) and cognitive constraints (related with physiological, psychological structure and education level).

3.2. HYPOTHESIS AND RESEARCH QUESTIONS

Following the literature review we can construct our main deductive hypothesis as follows: *urban rail systems may increase the mobility, expand urban geographies of women due to system quality, and removing the effects of cognitive constraints.* Such expected benefits can be even more for the more vulnerable women, such as low income, with children, elderly, etc. There is a general expectation that urban rail systems can help overcome the varied cognitive constraints, but also it is possible that an urban rail system brings new fears and other cognitive constraints. Considering these various issues, the main research question, as well as secondary questions are identified below.

Considering the above arguments, the main research question can be stated as follows:

- Does the existence and usage of an urban rail system have a significant effect on women's mobility levels and the urban geography that they experience (i.e. Do women living nearby or using an urban rail system make more trips, that are higher in frequency and longer in distance, resulting in a higher number of destinations in the city visited by them?)

Secondary questions can be stated as follows (The research chapters that correspond to the analysis of each question are shown in brackets):

1. What are the vulnerable women groups in terms of mobility levels, considering their socioeconomic and demographic factors and capability constraints? Do being close to the metro and using the metro affect the mobility levels of those vulnerable women groups? (Chapter 4)
2. What are the activity geographies of those vulnerable groups? Does the metro usage increase the urban geography that they experience? (Chapter 5)
3. What are the effects of fears and knowledge level of the vulnerable women on metro usage and mobility levels? Does metro prevent those fears transforming into cognitive constraints? (Chapter 6)

It can be seen that the cause-and-effect relations are intended to be analyzed in both ways:

- Effects of such factors as income, trip-chaining, cognitive barriers etc. on the choice of urban rail systems.
- Effects of urban rail systems on mobility and geography (and on factors, such as trip-chaining, cognitive barriers etc. that may determine levels of mobility)

3.3. METHOD OF RESEARCH

3.3.1. Case Study: Ankara

Since the 1970s, private car usage rates have been increasing in Ankara, similar to the rest of the world. In fact the car ownership rates did not reach the Europe and USA levels in Ankara. However, as early as the 1970s, insufficiency of the road network, inadequacy of public transportation that was based on bus systems, and the need to develop the city over longer distances required a faster, higher capacity public transport system and led to the development of urban rail systems in Ankara in the 1990s. Due to the features of urban rail systems, such as its speed, comfort, convenience, and service quality, Ankara is considered to be a convenient case to study the mobility of women who live nearby and use the Ankara Metro.

Today in Ankara there are public and private buses, minibuses, and rail systems as components of public transportation system. Also there are private services for public and private sector workers and for students.

In a study prepared by Çubuk et al. (2002) it was mentioned that by the 2000 data, rail system usage rates has been 15% within all transportation rates undertaken by all of public transportation vehicle types.

The urban rail systems in Ankara comprise a short light rail line and a metro line. Ankaray is light rail system that mostly replaced a bus way and started to be operated on August 28, 1996. Ankara Metro (1st phase) opened on December 28, 1997. Currently, there are other phases for both the metro and Ankaray light rail system. There are two different routes of metro for which constructions are being undertaken, Batıkent-Sincan (Törekent) (M3) and Ulus-Keçiören (M4). The rail systems routes and their existing and planned stations can be seen in the figure below:

ANKARA RAYLI SİSTEM HATLARI 2005 (mevcut-inşaat)

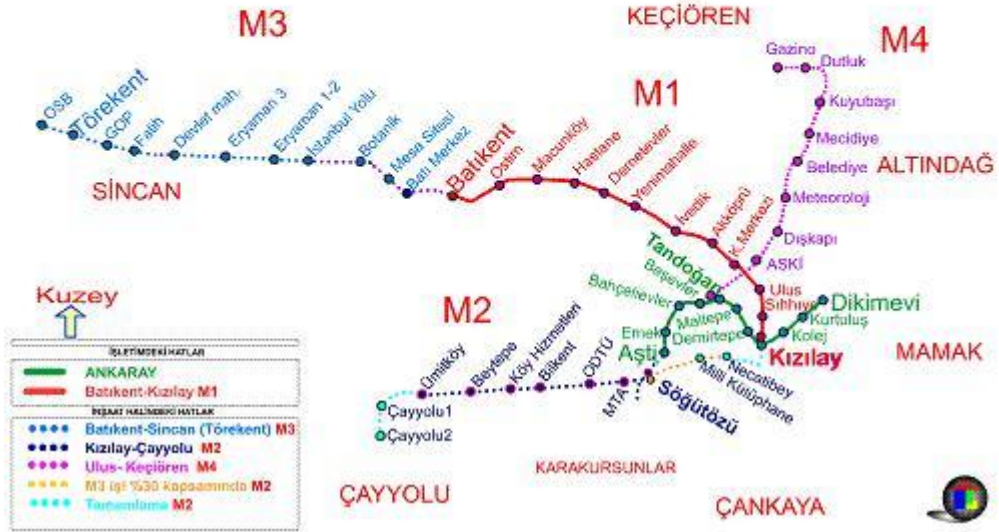


Figure 3.1: Ankara rail systems (<http://www.ego.go.tr/uprs/uprs.asp>, 13.02.2007)

The station points and the route of 1st phase of Metro can be seen in the following figure:

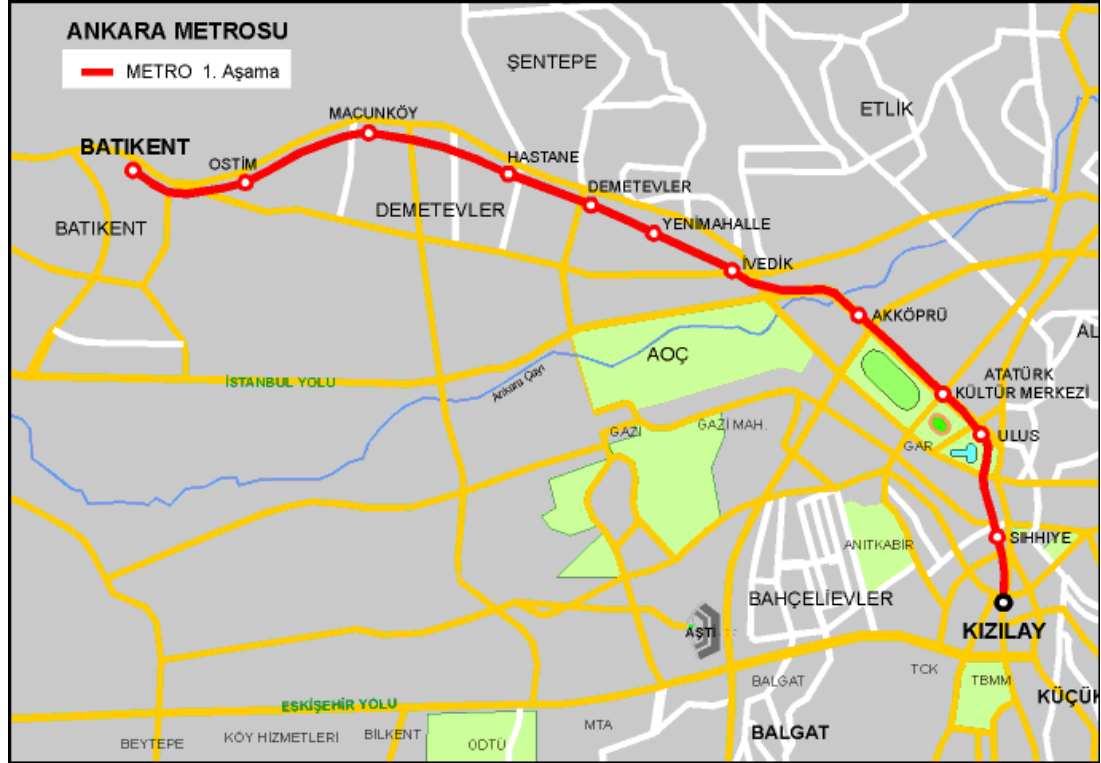


Figure 3.2: Ankara Metro route, http://www.ego.gov.tr/uprs/metro_guz.htm, 13.02.2007

The most important reasons for the choice of urban rail technology have been declared in the web site of EGO as follows: “they do not create air pollution; they are not delayed due to waiting at traffic lights and therefore they can reach from one place to another in the planned time; they can carry more passengers with less energy use; they do not create traffic jam and therefore contribute to the improvement of surface traffic; they are faster and more secure; passengers are not affected from the weather conditions due to waiting in closed spaces; and they are more economical” (<http://www.ego.gov.tr/uprs/tercih.htm>, 13.02.2007).

In this thesis the 1st phase of Metro route and Ulus-Keçiören (M4) route, which is under construction nowadays, will be used for field research. Therefore two field-researches will be conducted in Ankara within different women groups. The first area will be Batıkent-Demetevler-Yenimahalle metro corridor (M1), and the second area will be Keçiören-Etlik (M4) corridor. In the M1 corridor the area to be studied is between Demetevler and İvedik metro stations, containing Yenimahalle station, in order to capture women who are living nearby the metro stations, are who are likely to use the system. In the other route the women living in Keçiören and Etlik neighborhoods are targeted in order to analyze the mobility of those who are not in close proximity to a metro station yet and therefore whose metro usage may be limited.

The main aim of conducting a research on these two different areas is to catch the urban space usage types of women who use and who do not use metro, and also make a comparison among two groups who have direct access and have indirect access to metro stations. Choosing those two different routes gives opportunities to study both women that live along a metro line and hence metro accessibility and those that live at areas where a metro line has not been constructed yet and hence public transport is provided by buses. The analysis of mobility levels in these two selected areas can help compare how having direct access to the metro affects mobility levels and the coverage of urban area (geography).

Therefore women's mobility levels, urban space usage patterns, their geography, their cognitive constraints and mode choice factors will be assessed considering the effect of metro usage on all these factors. Women in all ages will be questioned, because different age groups can give us different trip modes usages for different trip types, differentiating according to age, for example shopping trips may be more for adult women than younger ones, and school trips may be more for younger group than adults. Also it will be aimed to cover different income and education levels, married as well as single women, and also women with and without children, in order to incorporate various criteria that may affect mobility, geography, and metro usage.

3.3.2. Questionnaire

As a method of data collection, questionnaire method is used on both corridors. Mobility and geography of women in the metro corridor is compared with those in the corridor without metro access. In addition the mobility and geography of women who use the metro system and those who do not are compared. 300 house questionnaires are conducted totally; 200 on Batıkent route and 100 on Keçiören route.

Travel diary method was tried to be conducted on both corridors; but unfortunately the rate of return of these diaries has been extremely low and the quality of the returned diaries were extremely poor to conduct any research on. Therefore, time-space prisms have been eliminated from the study; but instead the questionnaire has been formulated in a comprehensive way to include a variety of mobility issues as well as a wide range of questions on traveled destinations, so that geography of women could be mapped.

The Questionnaire is more detailed for the metro-corridor inhabitants in order to reveal how various factors may affect their choice of using the metro: socio-economic factors, such as income, education, age, profession, as well as work location; factors such as household responsibilities etc. and factors such as cognitive barriers, perceptions about metro.

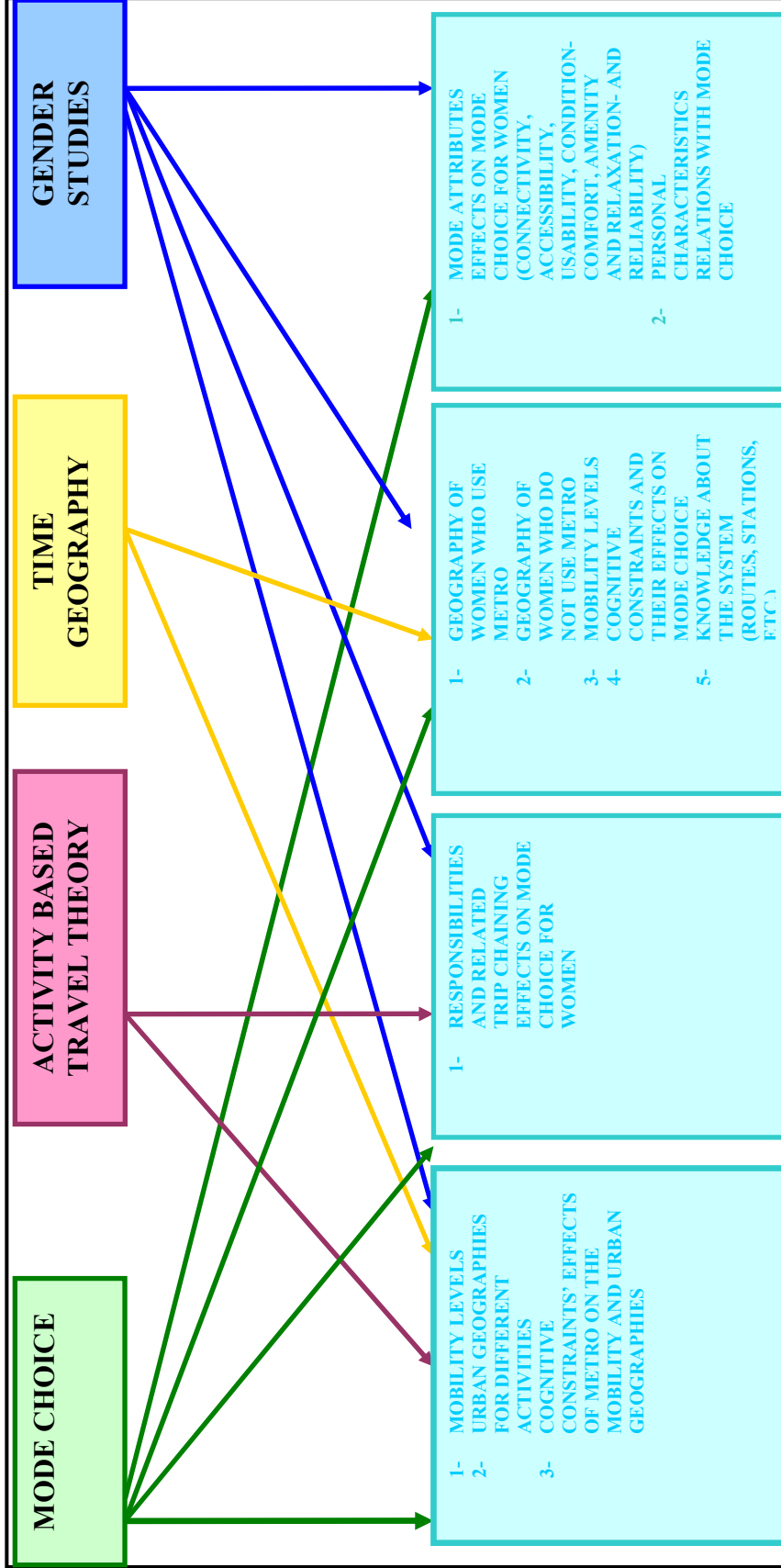


Figure 3.3: The questions (developed from the four theories) that are intended to be answered with the field research

In the literature there are many studies in each one of the four study areas that this thesis is based on. However, to the knowledge of the author, there has not been a study gathering the four study areas and testing them with a field survey in Ankara, which gives originality to the study. In the mode choices, it is clear that, different factors other than time and money cost might be more important from the point of view of women riders. Therefore the integration of different physiological and psychological structure and needs of women with the “cognitive constraints” concept of time-geography theory and “trip chaining” concept of activity based travel theory, into the mode choice, will give another dimension to mode choice studies.

Furthermore, there is a general acceptance that rail systems have positive effects on the mobility and urban life quality of those who are vulnerable in terms of mobility, and women are often considered among the vulnerable groups. But when we investigate women studies, it is understood that the transportation patterns and mode choices of women have been shaped by different and complex factors. The outcomes that will be obtained from Ankara case, will add to the studies on urban rail systems, and new argument areas would be opened on the justifications of rail systems as increasing the urban life quality and mobility of people.

3.4. CONCLUSION

This chapter presented the methodological framework of this study. Case study results will be handled from the point of view of the hypothesis as in the context mentioned in Figure 3.4:

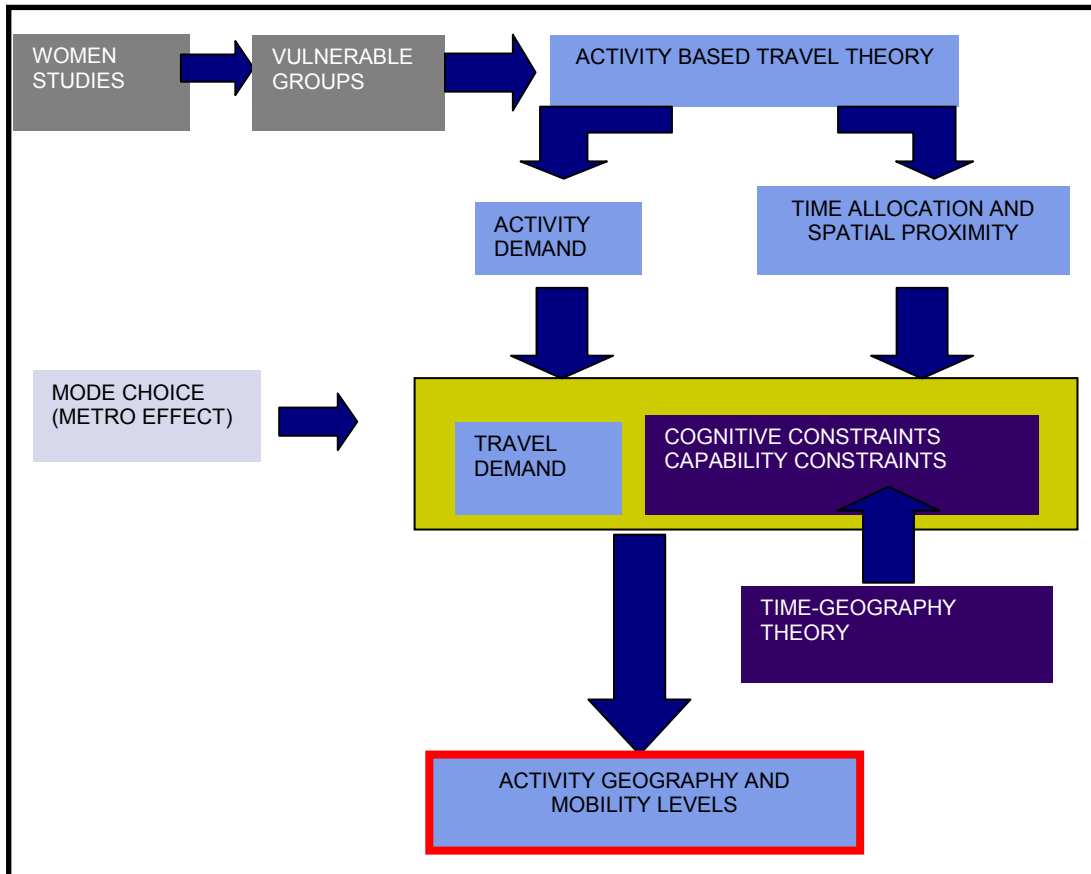


Figure 3.4: Handling types of case study results from the point of view of hypothesis
(See Appendix 3 for details)

The data will be handled under three headings, which will construct the following three chapters:

- 1- Firstly general mobility levels of different women groups and metro's effect on those mobility levels will be analyzed in Chapter 4. The effect of metro comprise the analysis of two issues: the effect on mobility of living close to a metro station and the effect on mobility of actually using the metro.
- 2- Secondly trip types and urban geographies of women will be observed in Chapter 5, considering those who use the metro and those who do not. There will be a particular focus on more vulnerable women's activity types, and activity geographies based on their using the metro, in order to assess whether

metro usage can help increase the mobility and geography of the more vulnerable women groups.

- 3- Thirdly metro perception, particularly fears and knowledge levels of vulnerable women groups about metro, whether they transform into cognitive constraints or not from the point of view of vulnerable and whether they affect mobility levels of vulnerable women will be assessed in Chapter 6.

CHAPTER 4

CASE STUDY QUESTIONNAIRE RESULTS: GENERAL MOBILITY LEVELS OF WOMEN AND THE EFFECT OF METRO ON MOBILITY

The questionnaire was held in housing areas along Batıkent-Kızılay Metro corridor (Batıkent, Batıkent İlk Yerleşim, Kardelen, Yeni Batı, Kent Koop., Batı Sitesi, Yeşilevler, Karşıyaka, Esentepe, Yenimahalle, Demetevler, Varlık) and Keçiören (Aydınlıkevler, Basınevleri, Kalaba, Subayevleri, Karargahtepe, Güçlükaya, Tepebaşı, Şevkat, Kamilocak, Yakacık, Bağlarbaşı, Şenlik, Aktepe, Şahlar), a northern neighborhood in Ankara which is not served by the metro yet, where 300 women were interviewed in total. (200 women living on Batıkent Metro Route and 100 women living on Keçiören corridor. The sample total is few and therefore there might be some deviations; however, the questionnaire is comprehensive and extremely detailed, and therefore help to gather valuable and comprehensive data on travel behavior and urban geography). There are two different questionnaire sets; since Keçiören metro is not operational yet, and therefore women living there have an indirect and limited metro access (the questionnaire sheets are given in the Appendix section). This method will help us to compare women who have immediate access to metro and those who have limited access to metro.

In this chapter, firstly socio-economic and demographic characteristics of different women groups will be studied. Secondly, their mobility levels will be investigated based on two variables: being close to a metro station or not; and using the metro system or not. Hence the first part of mobility analysis will compare the residents of Batıkent and Keçiören routes (with metro and without metro case). The second part of the analysis will compare the mobility of those who use the metro and those who do not. It is important to note, in this chapter the analysis of “mobility” is limited to

the frequency of trip-making; and that spatial and geographic extent of mobility are covered in Chapter 5. While showing the effects of metro on mobility, the initial analysis in this chapter also helps identify women groups who are particularly vulnerable in terms of mobility (trip-making). With the help of this finding, effects of metro are then examined separately on more vulnerable groups.

4.1.General Information on Sample Data

The data, acquired by the two sets of questionnaires, can be divided into six groups: personal data; household data; subsistence, maintenance and psychologically necessary activities related data (as mentioned in Chapter 3, subsistence needs are related with work and work related business; maintenance needs are related with grocery shopping, personal and household business, and pick-up/drop-off passengers or in other words consumption activities; and physiologically necessary activities are leisure needs, and can be connected with social and recreational purposes) and cognitive data. The details of data are as follows:

DATA TYPES:

- 1- Personal Data: Age, education level, marital status, working status, mobility.
- 2- Household Data: Having children or not, the number of people living in household, age and position of the people living in the household, total household income, house ownership, accommodation (Car ownership is not relevant since interviews were conducted only with those who do not own and use a private car).
- 3- Data on Subsistence Activities: Type of job/sector, place of work, daily working time, preferred transport mode for working trips, reasons for using or not using metro for work trips.
- 4- Data on Maintenance Activities: Places visited for shopping trips, transport mode choice for shopping trips, reasons for using or not using metro for shopping trips, frequency of such trips, time of day/time of week for such trips, other responsibility types that require going out of

home, transport mode choice for these other trips, reasons for using or not using metro for such other trips.

- 5- Data on Psychologically Necessary Activity: Trips made for visiting friends, leisure trips, transport mode choice for these trips, time of day/time of week for such trips, places visited for these trips.
- 6- Cognitive Data: Evaluations regarding metro, such as women's perceptions of safety of metro, their access to a metro station, etc.

Those data are analyzed for certain women groups as follows:







-  Income groups
-  Age groups
-  Working status
-  Women who have or do not have children
-  Education levels
-  Marital status

Figure 4.1. gives us the data types and how they affect the mode choice, metro usage, and mobility levels. Firstly we can express that personal and household characteristics characterize personal activity schedule, as described in Chapter 3, and therefore trip types. Because, as we mentioned before trip demand is created by activity demand. According to those, activity schedules and therefore trip types and personal mobility levels are determined. On the other hand, personal characteristics and household characteristics also determine directly the mode choice, therefore metro usage, throughout cognitive factors. Metro usage both affects the activity types and mobility levels directly. By this way we can say that mobility levels are affected from personal and household characteristics, mode choice and activity schedules and trip types of people. These hypothetical links are to be tested using the data obtained in Ankara.

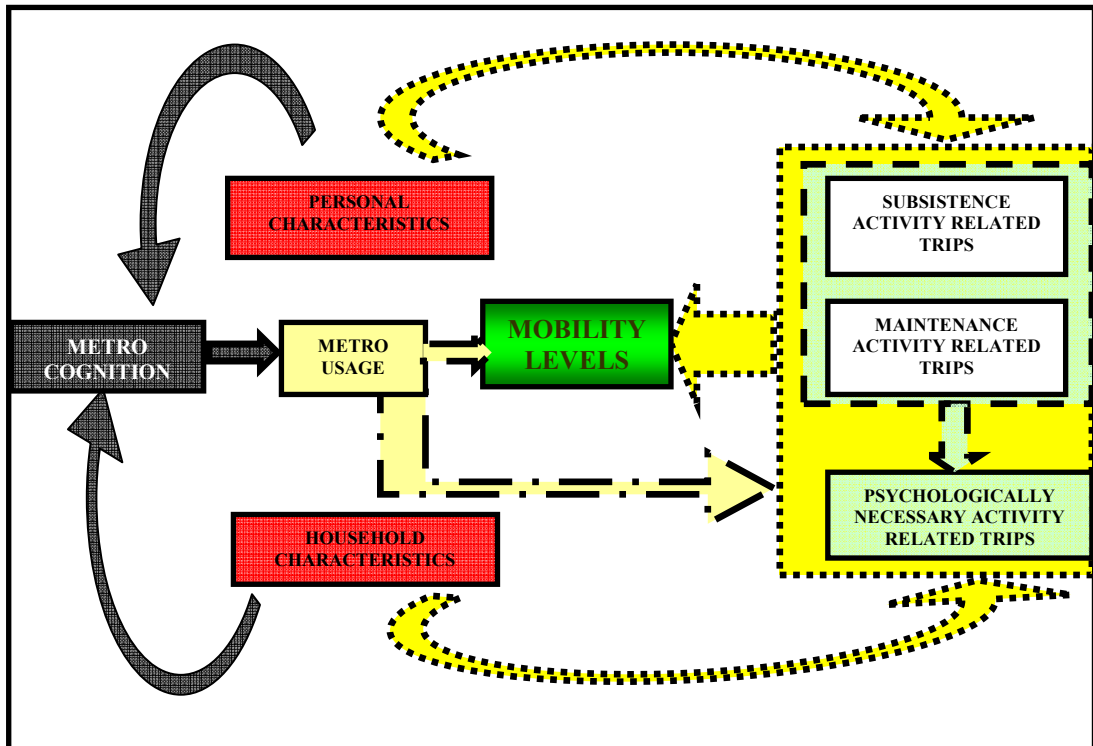


Figure 4.1: General structure of the evaluation of variables, affecting mobility levels within the research area

Questionnaires were held with women who are over 14 years old and who do not drive private cars, regardless of any other factors like education, income level or marital status. The majority of women who have been interviewed are married (77%); and have children (78%). More than half of those who have children, have 2-3 children (52%). Family size is mostly 3-4 people (58%). The majority are over 18 (98%) and the largest group is 36-45 age group (26%). The age of children in the household is mostly under 18 (51%), which indicates more household responsibilities for women.

The ratio of families which have relatives or other people living in the house constitutes a small ratio (12%). However of these 12%, more than half (56%) live with relatives who are younger than 17 or older than 56, which means that although less women have extra responsibility due to a family member or a person living in

the house, women's responsibility is likely to be quite high due to the age of those people, which may affect the travel patterns and transportation modes used.

The majority of women live in families with a household income of 500-999 YTL/month and 1000-1499 YTL/month, as shown in Figure 4.2.

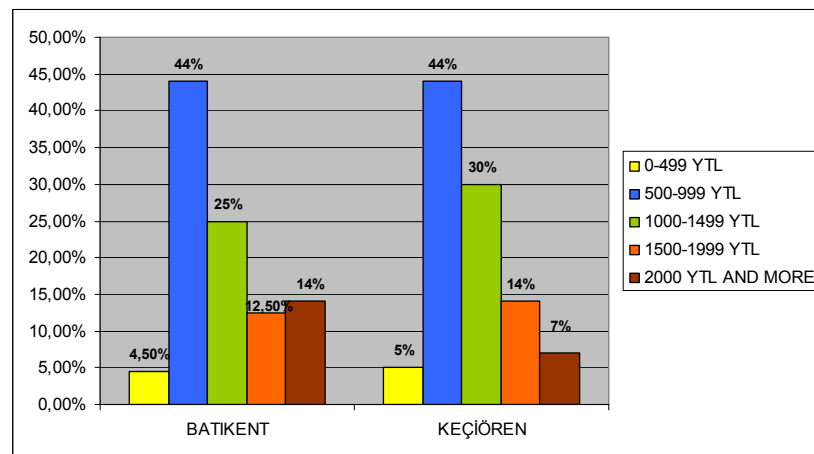


Figure 4.2: Monthly household income distribution by corridors

When we examine the education level (Figure 4.3), it can be seen that most women did not have a university education (79%) women with elementary school education level constitute the biggest portion (33%). This means that women's education level is low in general. On Batikent corridor, while university graduates are more than those in Keçiören corridor; high school graduates in Keçiören corridor constitute a higher proportion than those in Batikent corridor (Figure 4.4).

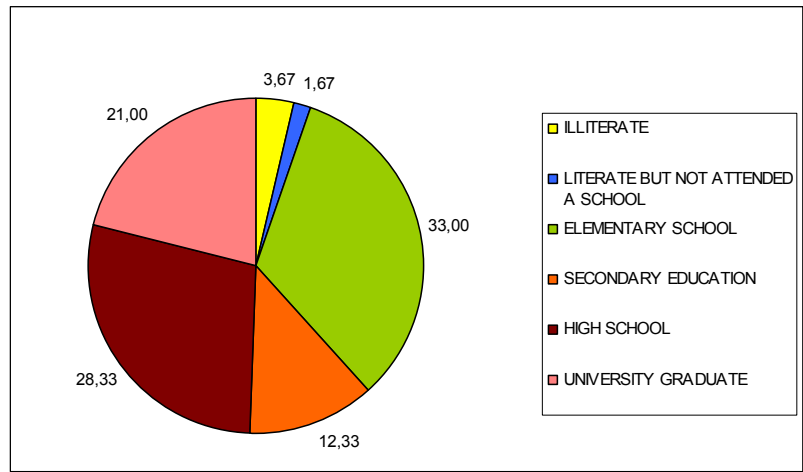


Figure 4.3: General education levels of interviewed women.

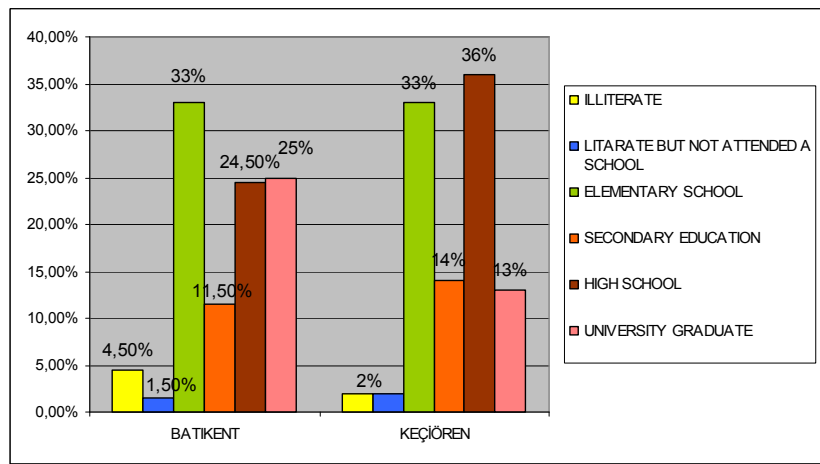


Figure 4.4: Education levels of women in the two corridors

Another aspect in analyzing general mobility levels is the effect of age on mobility. Therefore it will be important to examine the age structure of women who have been interviewed. Figure 4.5 shows that 26-45 and 46-55 age groups constitute the highest portion.

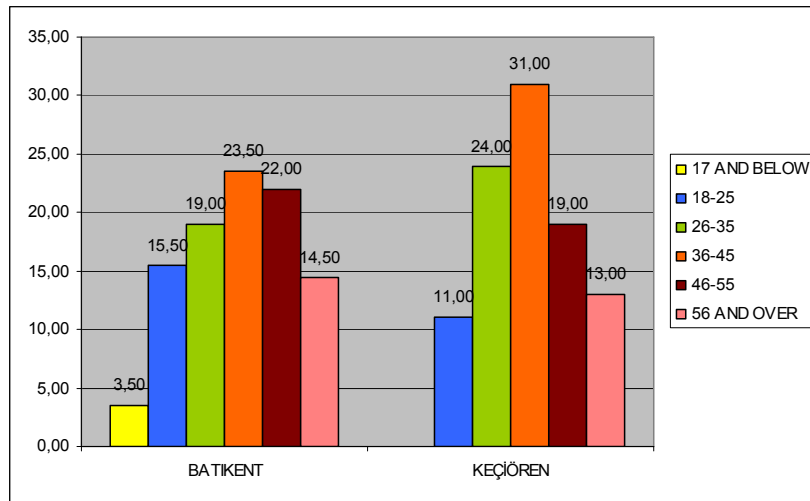


Figure 4.5: Age groups by corridors

As shown in Figure 4.6, in both Batikent and Keçiören metro corridor the majority of interviewed women do not work.

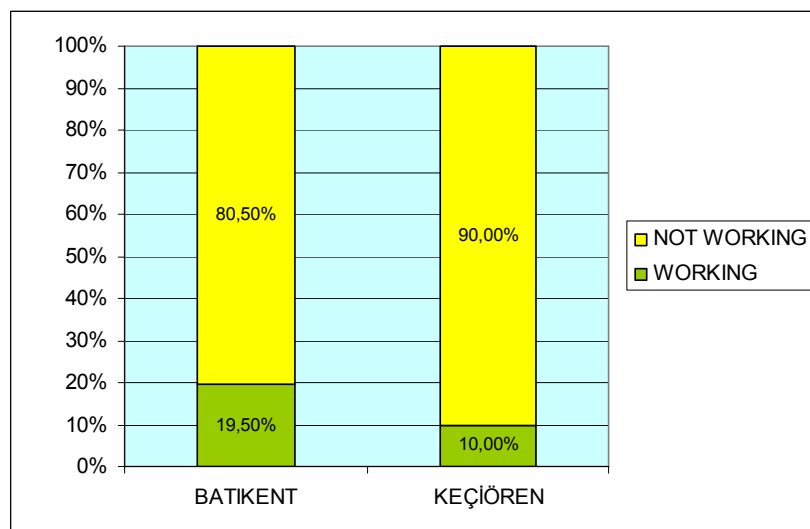


Figure 4.6: Working status by corridors

Majority of women who have been interviewed own the flats they live, while 39% are renters (Figure 4.7). When we examine the monthly rents in Figure 4.8, we see that an important proportion are those who pay a monthly rent of 301-400 YTL. It appears that in Batikent corridor, the proportion of women who pay a monthly rent of more than 400 YTL is higher than those in Keçiören; however, it is also important to note that those who pay a monthly rent of less than 300 YTL are more in the Batikent corridor when compared to Keçiören. The families are mostly from middle or low income groups (30% for 300YTL and under, 39% for 301-400 YTL).

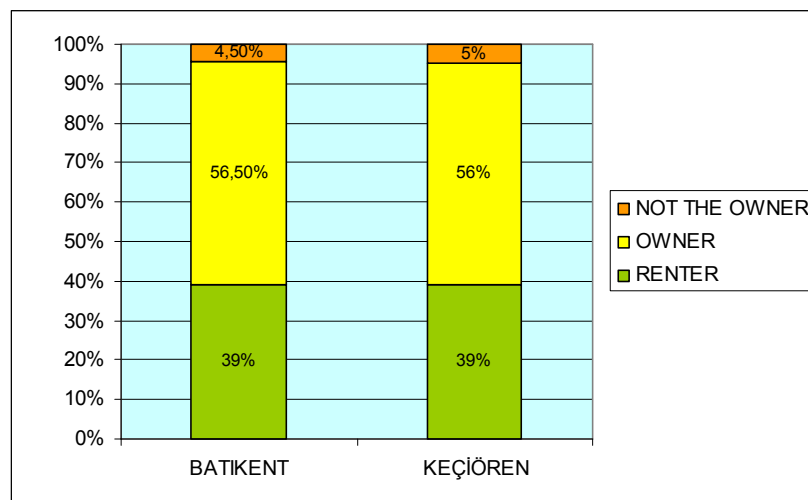


Figure 4.7: Ownership of residence by corridors

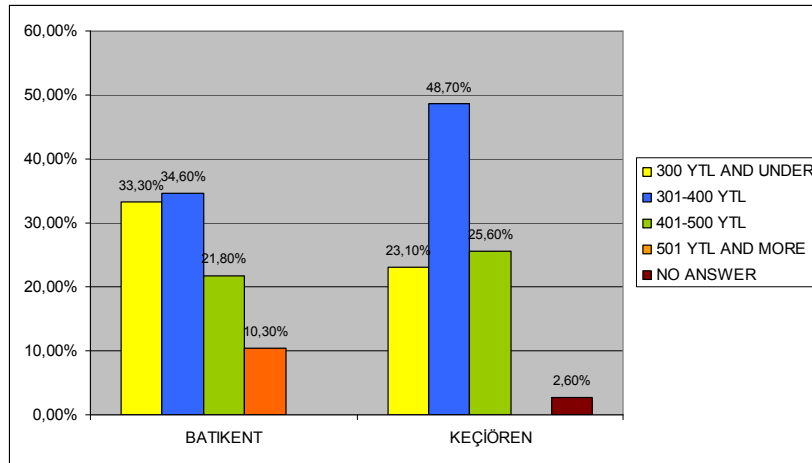


Figure 4.8: Monthly rent distribution of renters by corridors

More than half of the women, who live in Batıkent corridor, lived in another neighborhood before (Figure 4.9) and nearly 41% of them declared that metro had been an important reason in their moving to the current neighborhood in Batıkent (Figure 4.10). This is an important rate, showing that the metro has been effective in attracting people to live along its route.

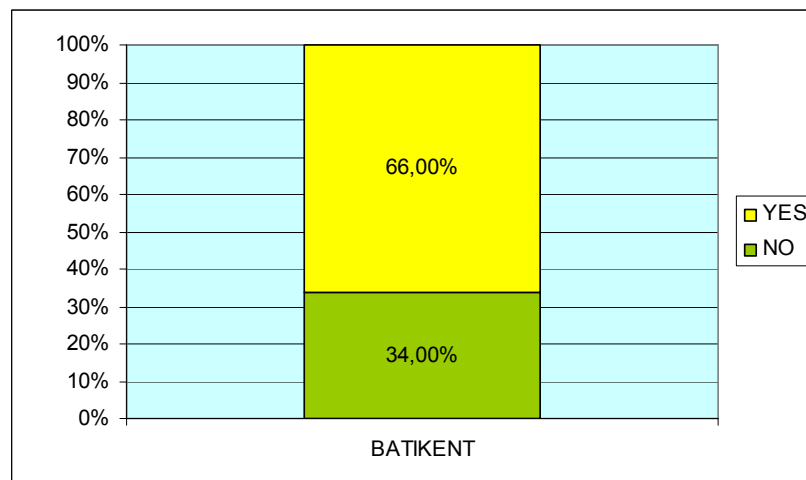


Figure 4.9: Resided in another neighbourhood before in Batıkent corridor

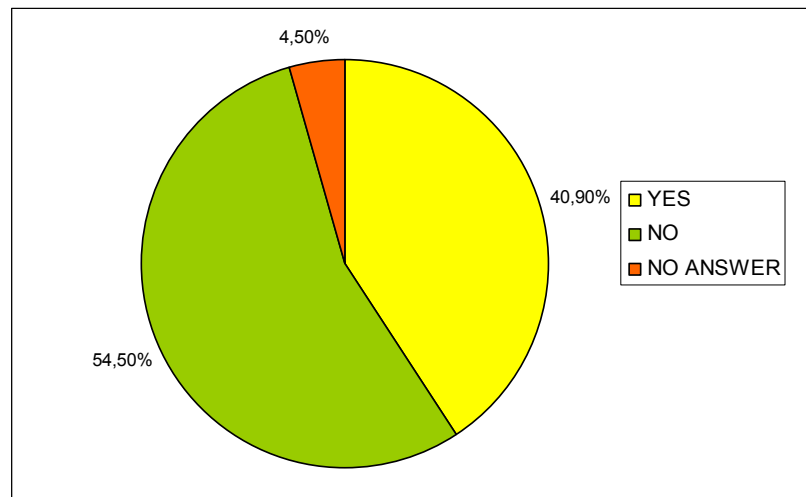


Figure 4.10: Metro's effect on the movement to Batikent corridor

Frequency tables and cross-tabulations, constituted from the data, will explain the general mobility and metro usage levels, subsistence, maintenance and psychologically necessary activity related travel patterns and general metro cognition and cognitive constraints about metro preference according to different personal and household characteristics. Therefore the following sections will give us general mobility levels and different travel patterns for different trips purposes according to personal and household characteristics.

Mode choice changes according to different variables as mentioned in the literature survey chapter. It has also been stated in Figure 4.1 that, personal and household characteristics directly affect the mode choice levels. They also affect the subsistence, maintenance and psychological needs and therefore travel needs and types. So there is an indirect effect of personal and household characteristics on the mobility level through those three types of needs. When we examine those mentioned need types in detail it could be understood that subsistence and maintenance needs determine the psychologically necessary activities, that is to say social life integration because of time limitation of the mentioned two. Finally on one

hand personal and household characteristics, on the other subsistence, maintenance and psychologically necessary activities can have an effect on the metro usage which may affect the mobility levels. We will examine; firstly the general mobility levels according to personal and household characteristics; secondly metro usage according to the personal and household characteristics and subsistence, maintenance and psychologically necessary activity types in this chapter; thirdly the nature and mobility levels for different trip reasons (working, clothing shopping, leisure, other reasons) and geographies of those trips will be examined in Chapter 5 and fourthly the effects of cognitive constraints (determined by the personal and household characteristics) will be studied in Chapter 6.

4.2. General Mobility Levels in Batıkent and Keçiören Corridors “With Metro” and “Without Metro” Cases (Motorised Trips):

One of the indicators of mobility is defined in this study, as the frequency of trip-making. Certainly the distance of trips and their variety in terms of destinations are also important in identifying mobility; however, these latter issues are analyzed in the next chapter. In this chapter, general mobility level is assessed by looking at the amount of trips made by a person during the day.

The analysis of general mobility levels of the women interviewed reveal that more than 65% of women make at least one motorized trip during both the weekdays and weekend (Figure 4.11 and 4.12). It is important to note that about 30% of the women travel very rarely with a motorized vehicle during the weekdays or weekends, revealing that they either leave their houses seldom or take trips mostly in walking distances. Majority of them make 1-2 trips a day. An important finding is that frequency of trip making increases in weekdays (about 25% of women travel more than 3 times a day in weekdays as opposed to 13% in the weekends). This may be due to shopping and other trips that result from household responsibilities. It is possible that these responsibilities are mostly carried out in the weekdays, causing an increase in trip numbers and trip chaining, as mentioned in the literature survey. Weekends are days when people travel mostly for leisure. Therefore, it is possible

that trip frequency decreases as a result of traveling only for leisure purposes and not for any household responsibilities.

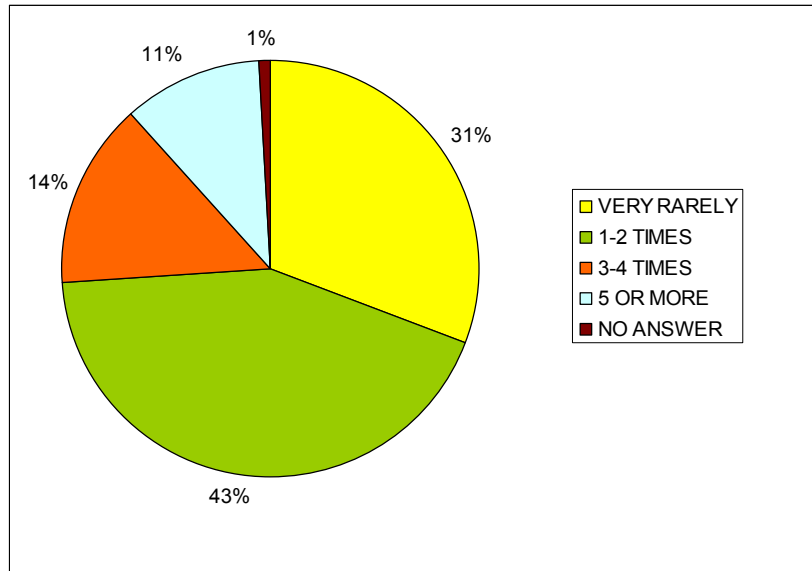


Figure 4.11: Weekday mobility of women in general

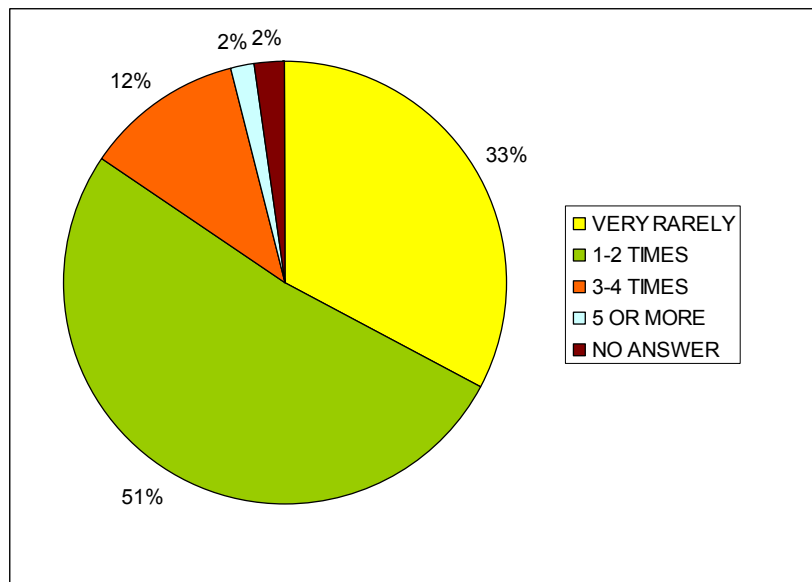


Figure 4.12: Weekend mobility of women in general

The comparison of mobility levels in Batıkent (corridor with metro) with those in Keçiören (corridor without metro) reveals that women are slightly less mobile in Batıkent route than in Keçiören route. Figure 4.13 and Figure 4.14 also show that trip frequency, i.e. rate of women who travel more than 3 times a day, is significantly high in Keçiören in the weekdays. Overall women in Keçiören corridor, which does not have a metro, seem to be more mobile. Although it was expected, based on the literature survey that, metro would increase the mobility levels of women, this does not seem to be the case. However, mobility is a complex phenomenon, requiring the analyses of more variables. It should also be remembered that the comparison of Batıkent corridor and Keçiören provides the comparison of “with metro” and “without metro” cases at this stage, and does not include a comparison of those who actually use the metro as opposed to those who do not.

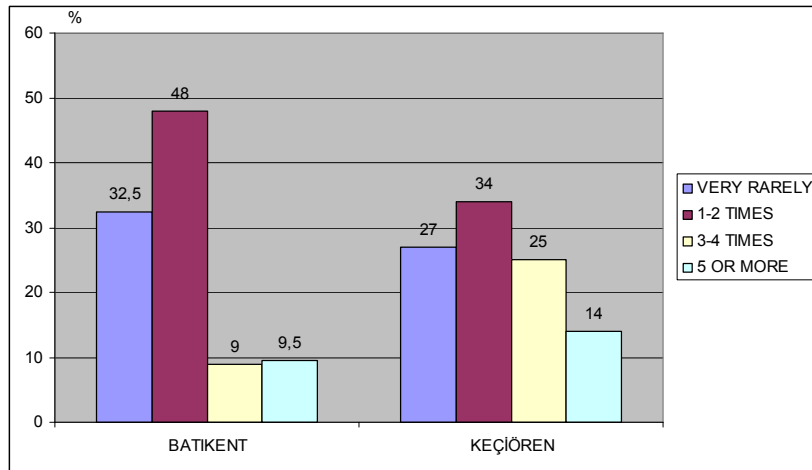


Figure 4.13: Weekday mobility of women by corridors

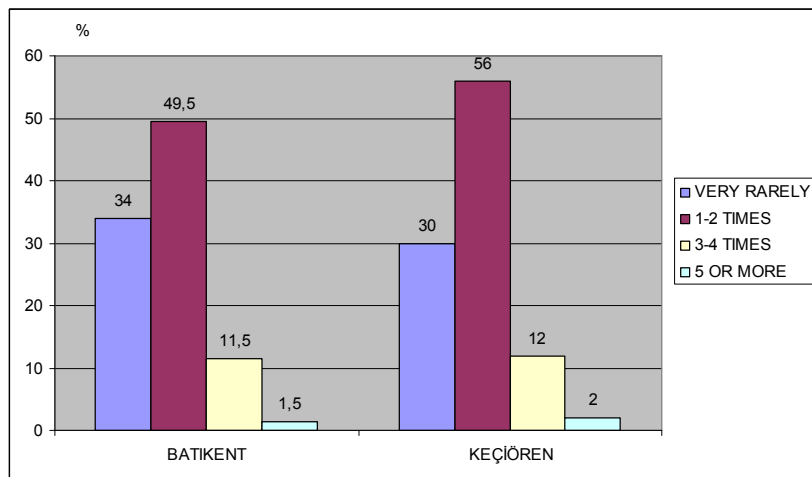


Figure 4.14: Weekend mobility of women by corridors

One of the most important factors affecting mobility is known to be the income level. In the literature survey chapter, it was stated that low income people's mobility levels are lower than middle and high income people. Figure 4.15 and Figure 4.16 show the mobility levels of women from different income levels, indicating that

mobility level increases with increasing income. Especially in weekends, 50% of the lowest income group (0-499 YTL) travel almost never, meaning that their mobility level for leisure is very low. In weekdays low income groups are still quite immobile, indicating that for maintenance and subsistence needs they mostly choose to go places within walking distance, or they do not go outside often. Both situations point to low mobility levels for low income groups.

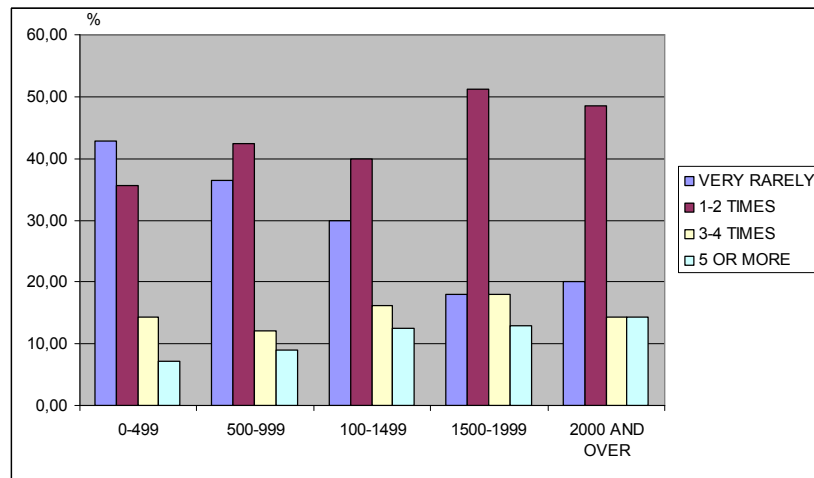


Figure 4.15: Weekday mobility of women by income in general

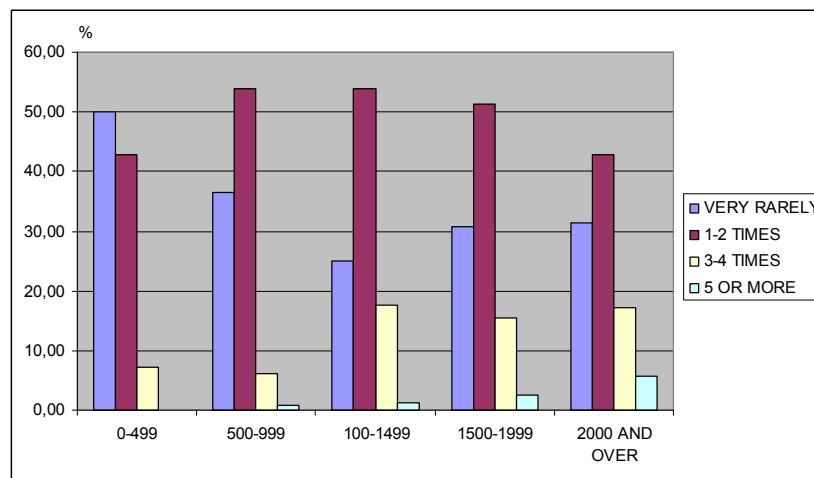


Figure 4.16: Weekend mobility of women by income in general

When we examine income levels by districts in general, it can be seen that there is not a significant differentiation between the Batıkent and Keçiören corridors. Although the proportion of women in middle-high income groups (1000-1499, 1500-1999 YTL) is higher in Keçiören than in Batıkent corridor (Figure 4.17). This may, to a certain extent, explain the higher mobility level of women in Keçiören.

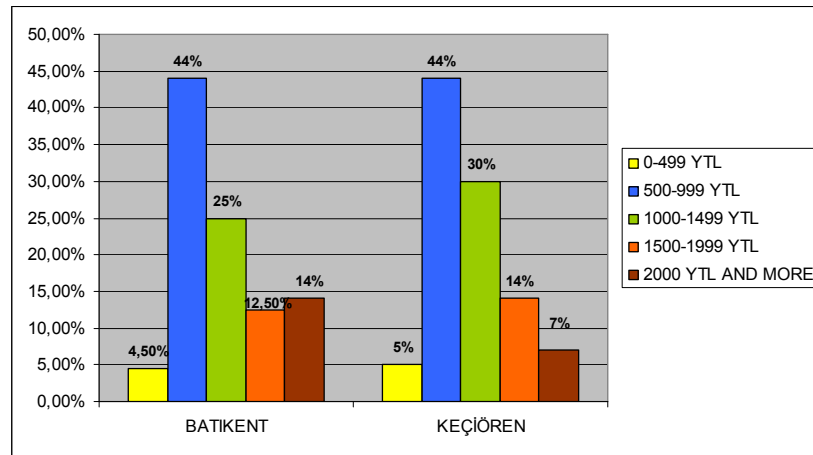


Figure 4.17: Total household income by corridors

When the weekday mobility of the same income groups are considered, the following remarks can be made:

- 1- In 0-499 YTL income group, women in Batıkent corridor are significantly more mobile (Figure 4.18), and the difference between the two corridors in terms of the amount of women who said that they travel with a vehicle very rarely is also very significant. This rate is 60% in Keçiören and 33% in Batıkent. This may be the positive effect of metro on mobility.
- 2- In 500-999 YTL income group, again women in Keçiören corridor are slightly less mobile than women in Batıkent corridor (Figure 4.19)

3- In the income groups of 1000-1499 YTL, 1500-1999 YTL and over 2000 YTL, women living on Batikent corridor seem to be less mobile (Figures 4.20, 4.21, 4.22). That is to say on Batikent corridor women under 1000 YTL income are more mobile than Keçiören corridor, and this is a very important result because the most vulnerable group when income is considered seem to be more mobile on Batikent corridor, which has a metro system.

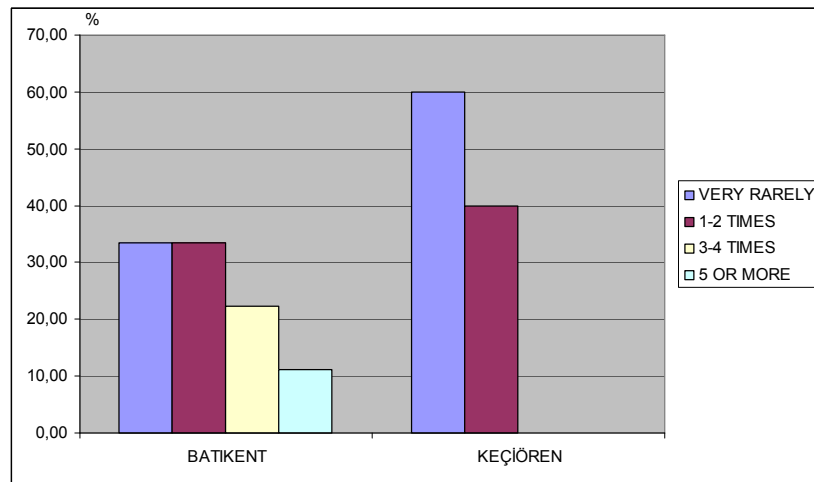


Figure 4.18: Weekday mobility of 0-499 YTL income group by corridors

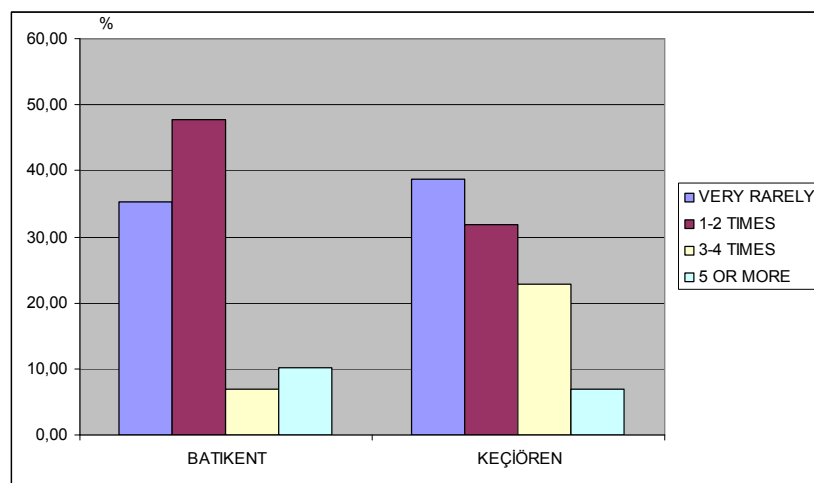


Figure 4.19: Weekday mobility of 500-999 YTL income group by corridors

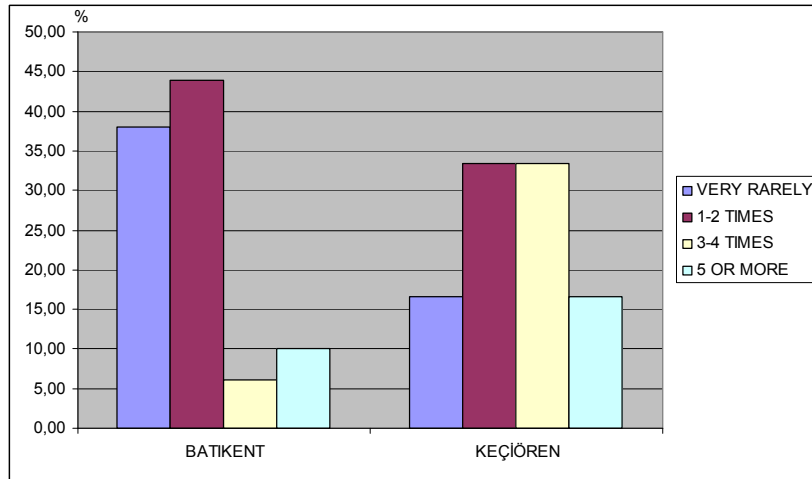


Figure 4.20: Weekday mobility of 1000-1499 YTL income group by corridors

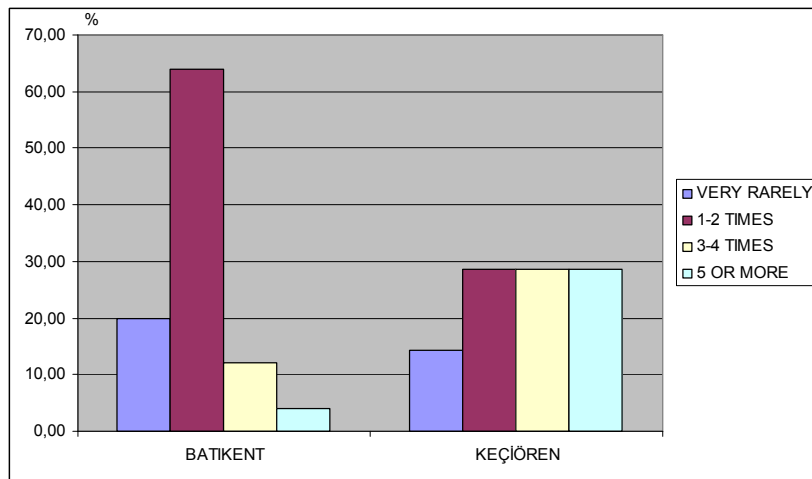


Figure 4.21: Weekday mobility of 1500-1999 YTL income group by corridors

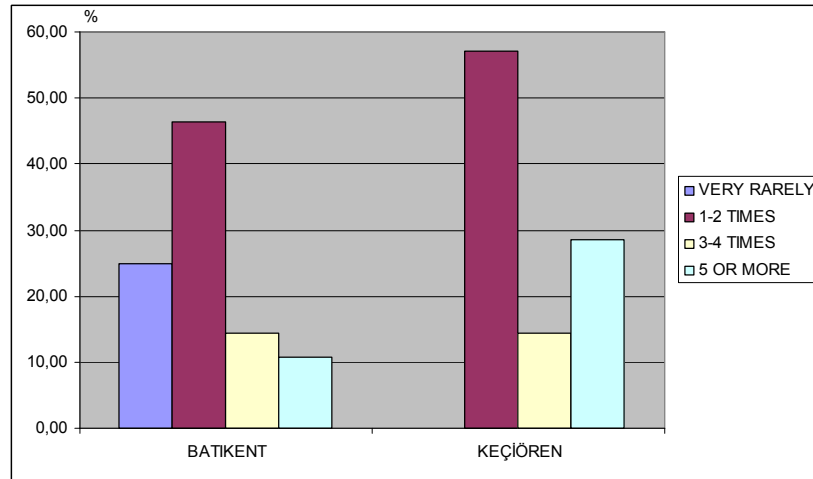


Figure 4.22: Weekday mobility of 2000 and more YTL income group by corridors

When the weekend mobility of the same income groups are analyzed, it is seen that the general mobility levels of women who said that they travel by a vehicle “very rarely” in the weekend days remain at around the same level in Batıkent regardless of different income levels (Figures 4.23, 4.24, 4.25, 4.26 and 4.27). The rate of this low-mobility group is much higher for low-income groups in Keçiören however. This may again be an indicator of the positive effect of metro accessibility (which is limited in Keçiören) on the mobility of more vulnerable low-income groups. On the other hand, the ratio of this low-mobility group (those who rarely travel in weekend days) is also high for the highest income groups in Keçiören. It appears that women living on Keçiören route make less motorized trips in the weekend, which may indicate less leisure trips.

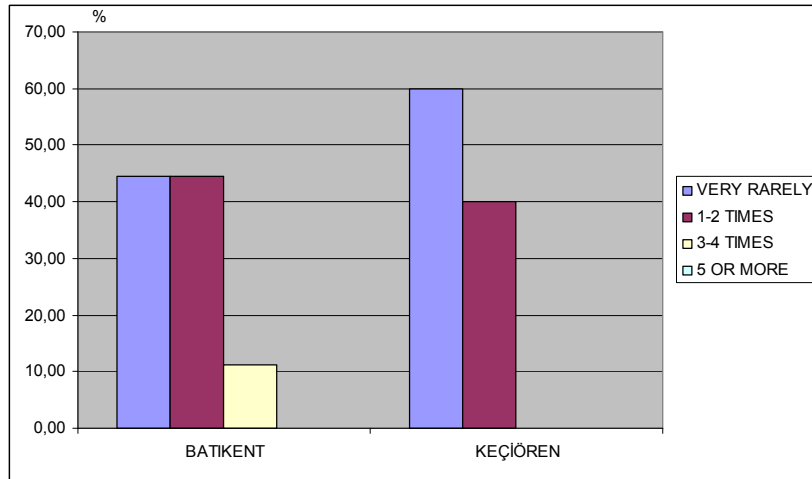


Figure 4.23: Weekend mobility of 0-499 YTL income group by corridors

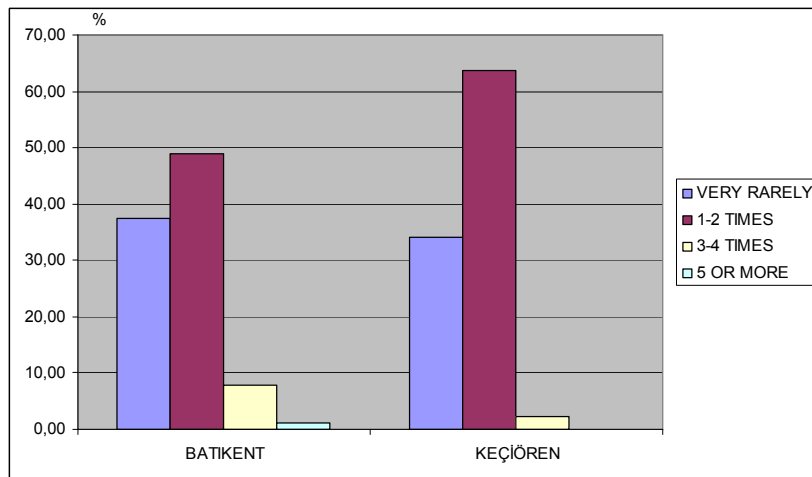


Figure 4.24: Weekend mobility of 500-999 YTL income group by corridors

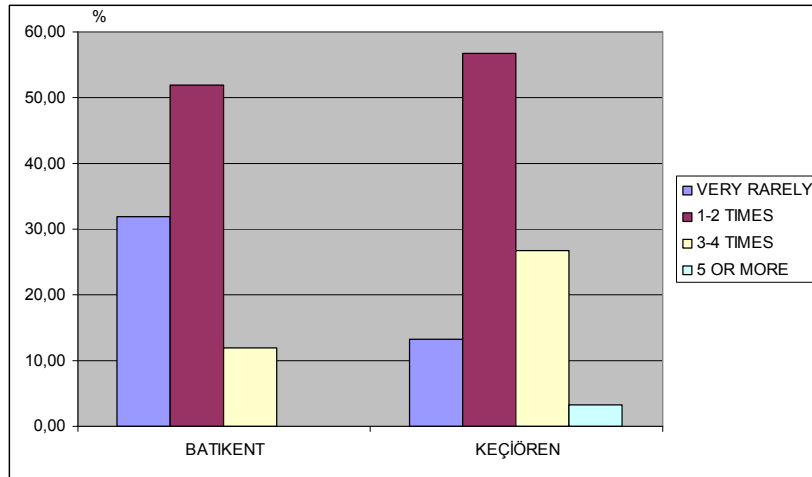


Figure 4.25: Weekend mobility of 1000-1499 YTL income group by corridors

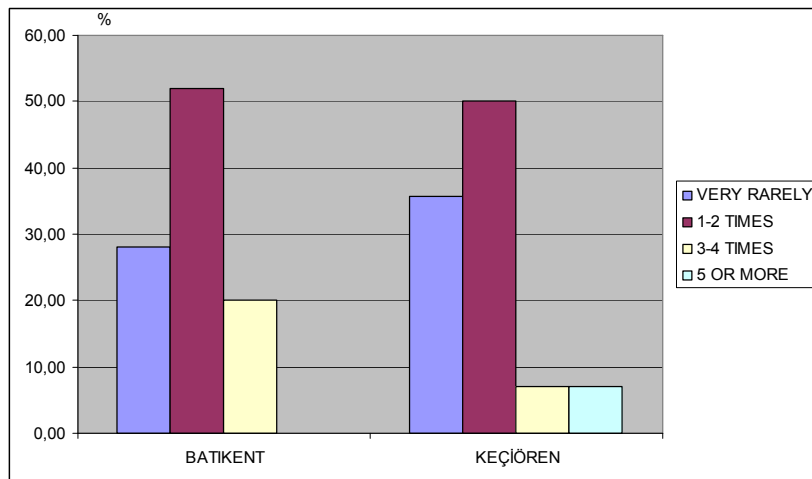


Figure 4.26: Weekend mobility of 1500-1999 YTL income group by corridors

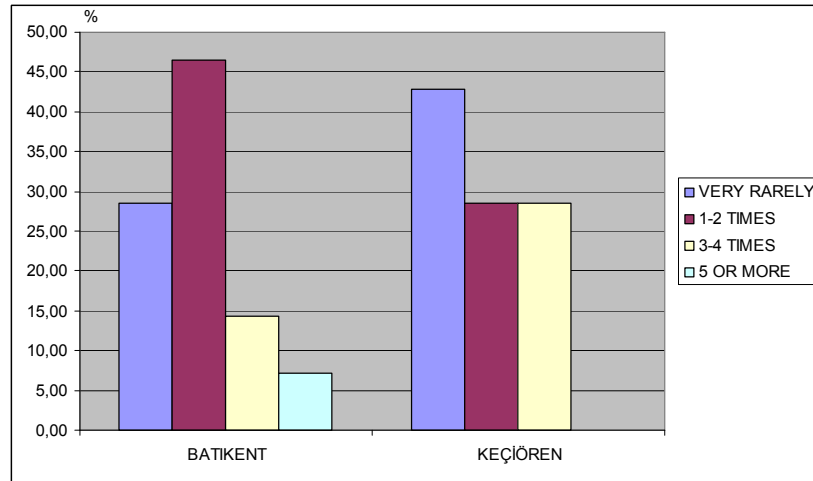


Figure 4.27: Weekend mobility of 2000 YTL and more income group by corridors

It will be remembered from Figures 4.13 and 4.14 that women’s mobility levels and particularly trip frequency (those that travel more than 3 times a day) were less in weekend than in weekdays, especially on Keçiören corridor. As mentioned in the literature survey chapter, women have more responsibility related with subsistence and maintenance needs. Studies mentioned in the previous chapter showed that those type of needs (subsistence and maintenance) are satisfied mostly in weekdays, resulting in an increase in the amount of trips made; and also the possibility of trip chaining in weekdays.

Analysis of women’s mobility by different age groups (Figures 4.28 and 4.29) show that the ratio of those who travel “very rarely” increases with the increasing age. It will be remembered that on Batikent route women of age 46 or more had a higher proportion compared to those in the Keçiören route; and since mobility decreases with the increasing age it is not very surprising to find relatively less mobility on Batikent route than on Keçiören route.

The weekend mobility ratios (Figure 4.29) by age groups show another interesting result. Again like in weekdays, the ratio of women who said that they “very rarely” travel, increases with the increasing age in weekends. But this time women mostly

travel 1-2 times a day. The rate of women who travel 3 or more times a day is relatively smaller in the weekend days for those aged 18 and over (especially by the economically active/working population). This means that trips created by the maintenance and subsistence needs are mostly done in weekdays and therefore average amount of trips and so the probability of making trip chaining at weekend decreases. That is to say that weekend trips are more likely to be leisure trips. It is seen that those who are below the age of 18 (over 14) either travel very rarely or make 1-2 trips a day in the weekend, that is to say since their age group requires them to make less complex trips, the responsibility is likely to be at the lowest level on those ages and they probably make more simple leisure trips, not complex ones requiring trip chaining.

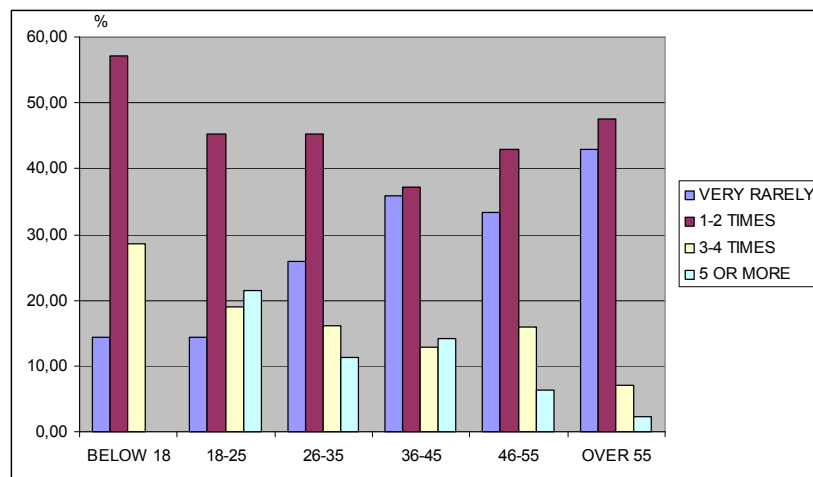


Figure 4.28: Weekday mobility of women by age groups

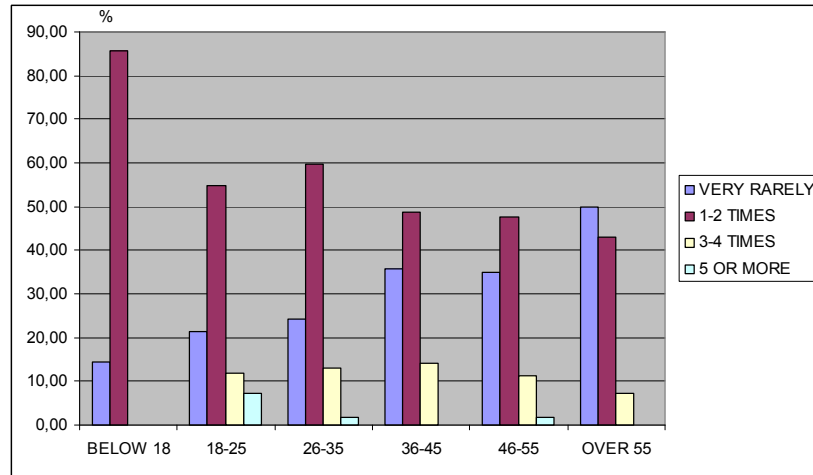


Figure 4.29: Weekend mobility of women by age groups

Figure 4.30, 4.31, 4.32 and 4.33 show the details of age groups' mobility levels by districts. It is interesting to see that the high trip frequency in Keçiören in weekdays is mostly due to the high mobility of those aged 18-25, although the 46-55 age group also seems to have high trip frequency in weekdays. This is quite different from the weekday mobility trends in Batıkent, where majority of women travel 1 or 2 times a day. This means that women in Keçiören are more mobile and they may make more trip chaining.

In spite of those differences, there are some similar trends. It was stated earlier that trip frequency (for example 3 or more trips a day) is at the lowest level in the age group of 56 and above, physically the least active group. This means that mobility levels are higher, travel patterns are more complicated and trip chaining is more probable for age groups below 56. As also mentioned above the economically most active groups are 18 to 45 age groups. If we look at the mobility levels of those groups we see that in weekdays women from those groups are more likely to make trip chaining because over the half of the working group constitutes 26-45 age interval.

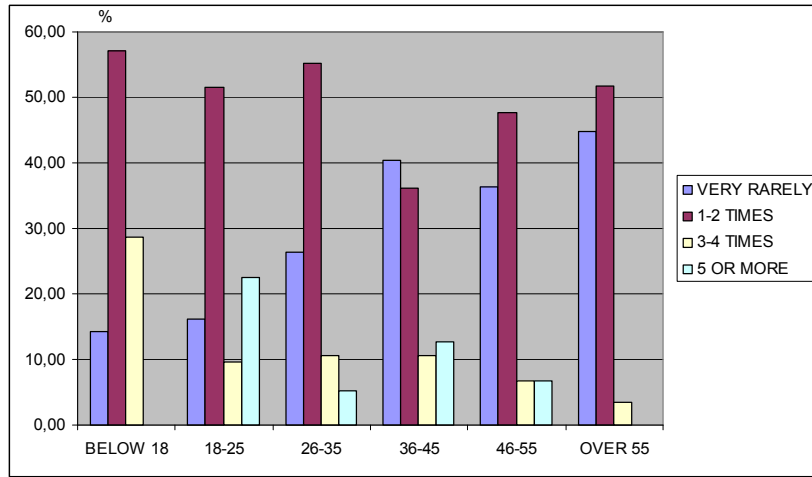


Figure 4.30: Weekday mobility of women by age groups on Batikent corridor

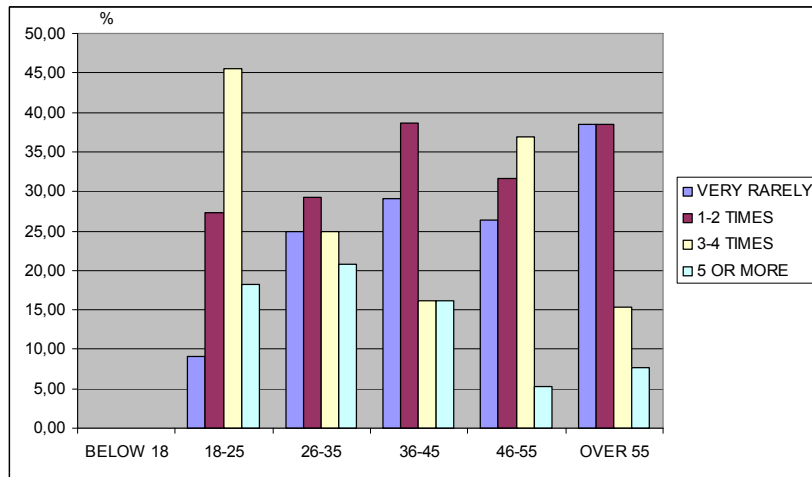


Figure 4.31: Weekday mobility of women by age groups on Keçiören corridor
(no women was interviewed who is below 18 age in Keçiören)

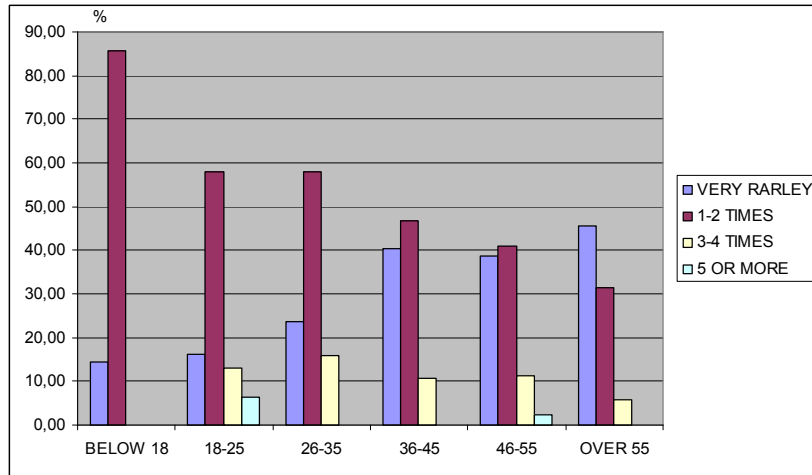


Figure 4.32: Weekend mobility of women by age groups on Batikent corridor

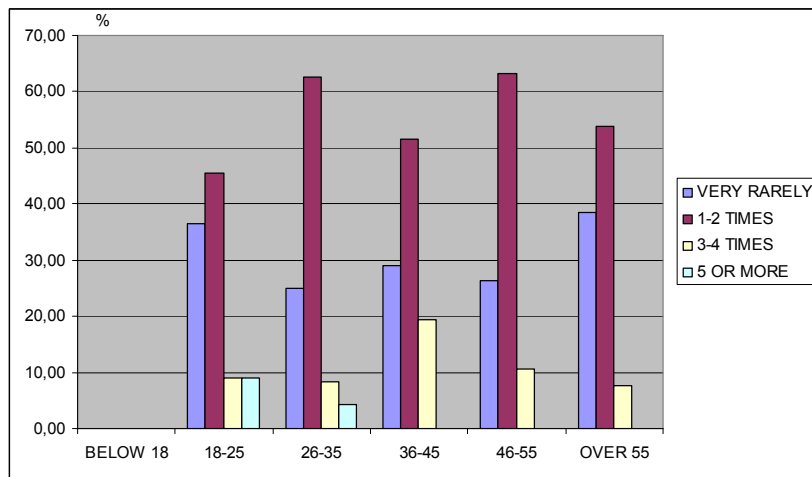


Figure 4.33: Weekend mobility of women by age groups on Keçiören corridor
(no women was interviewed who is below 18 age in Keçiören)

Firstly in weekday trips, the rate of women who rarely travel increases by age; secondly trip frequency is higher in the economically active population, that is to say beginning from age 18 up to age 55 women mostly make 3 and more trips in weekdays. To validate whether or not this is due to working trips (possibly chained

with other trips) we need to look at Figure 4.34, which shows the ratios of women who work for each age group.

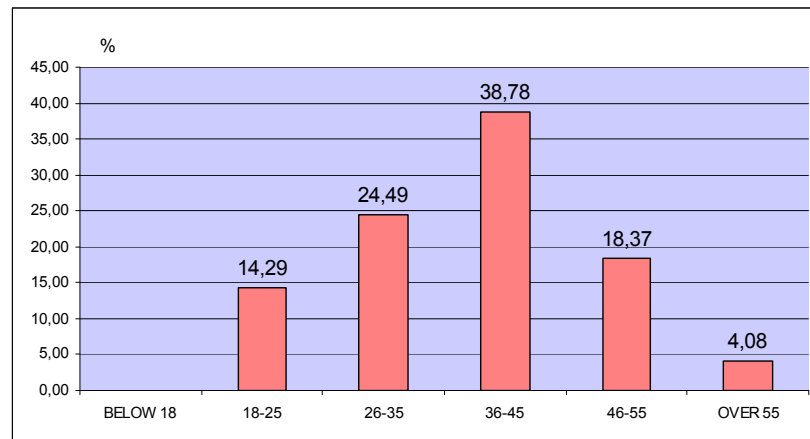


Figure 4.34: Working ratios by age groups

Figure 4.34 shows that women who work are mostly constituted from 18 to 45 age groups. That is to say it won't be wrong to make such an interpretation that in the weekdays, higher frequency trips (3 or more trips a day) are mostly realized by women who. When we consider the travel patterns of women who work, they have a starting point (home), a destination point (work place) and then a final destination (again home) every day; and possibly they have to integrate other trips, or stops into this round type of trip (as mentioned in the literature survey). Figures 4.35 and 4.36 give us the mobility levels of women who work and women who do not. As the Figure explicitly shows, both in weekday and weekends, women who work are more mobile. Weekday mobility of working and non-working women shown in the Figure 4.35 is supporting one of the above interpretations about the relatively higher trip frequency of women who work.

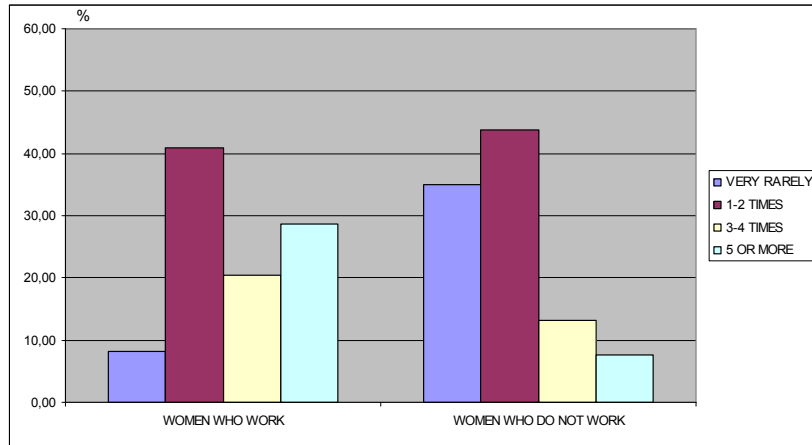


Figure 4.35: Weekday mobility by working status in general

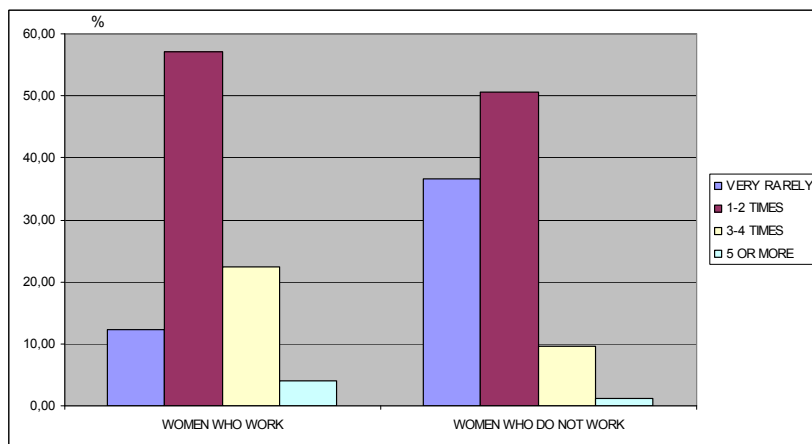


Figure 4.36: Weekend mobility by working status in general

When we compare the two routes (Figures 4.37, 4.38, 4.39 and 4.40), we can observe the metro's effect on the mobility of women who work. In weekdays as expected, in both corridors women who work are more mobile. On Batıkent route, ratio of women in work who make 1-2 trips a day are more when compared with women on Keçiören route. It is interesting that 40% of women in work in Keçiören corridor make 5 or more motorized trips in weekdays. It may be argued that this is due to the need to

take more than one or even two vehicles/modes in a single work trip for these women; however, the related question in the questionnaire was explicit in asking women how many times a day they travel to a certain destination, using one or more motorized vehicles. It was emphasized in the question that one motorized trip could involve more than one motorized vehicle. Due to the way the question was asked, it is concluded that the number of trips given by women indicates the number of each individual trip/journey and the number of transfers made within a single journey. Therefore, the findings indeed show a higher mobility and higher frequency of trip making for the women in Keçiören who work.

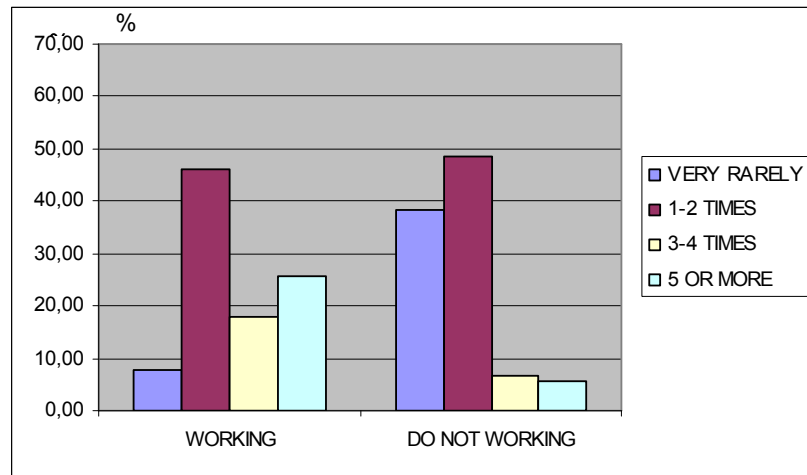


Figure 4.37: Weekday mobility by working status on Batkent corridors

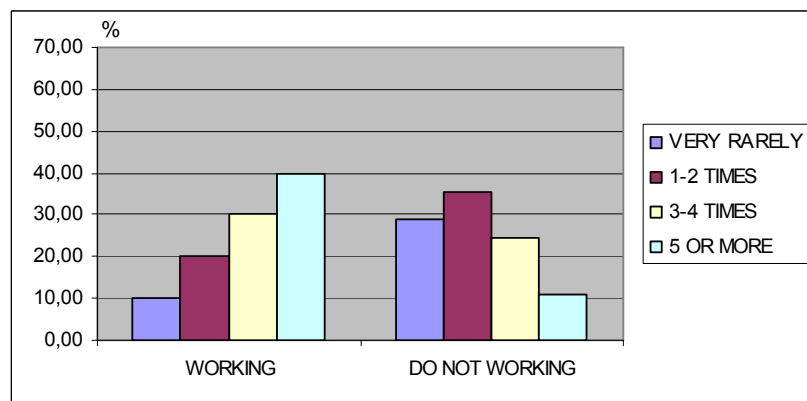


Figure 4.38: Weekday mobility by working status on Keçiören corridors

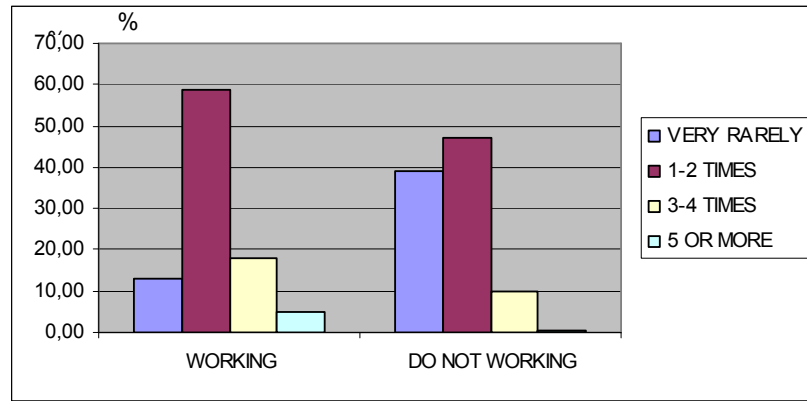


Figure 4.39: Weekend mobility by working status on Batkent corridors

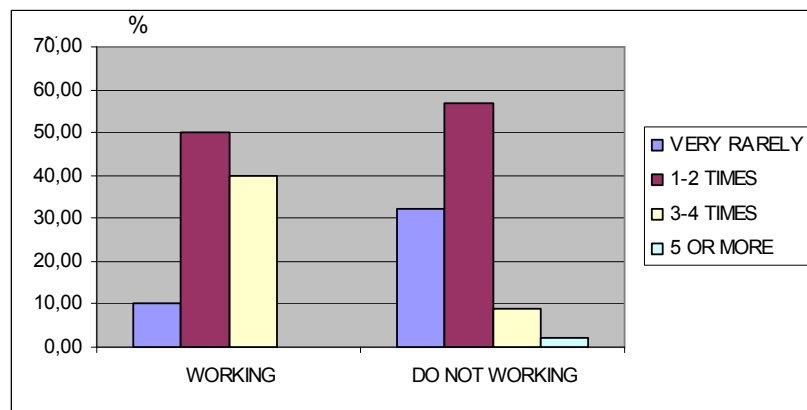


Figure 4.40: Weekend mobility by working status on Keçiören corridors

If the women have other responsibilities like taking children to school, or day care center, or shopping or running errands for household needs, trips may become more complex and trip chaining possibility increases. Therefore women in work with children are more likely to have higher trip frequency. In order to validate this argument, firstly a comparison is made in the mobility levels of women with children and those without children (Figures 4.41 and 4.42). Figure 4.41 shows the weekday mobility levels of women who have children and those who do not. As can be seen

from this Figure, women who have children (regardless of whether they work or not) have lower mobility levels: more than 35% of them travel rarely in weekdays as well as weekends; and their trip frequency (looking at those who make 3 or more trips a day) is much lower than those without children, particularly for the weekdays.

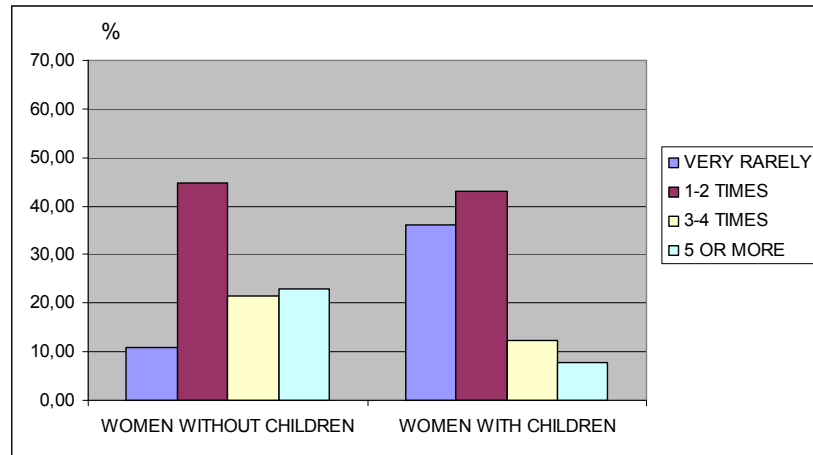


Figure 4.41: Weekday mobility of women by having children

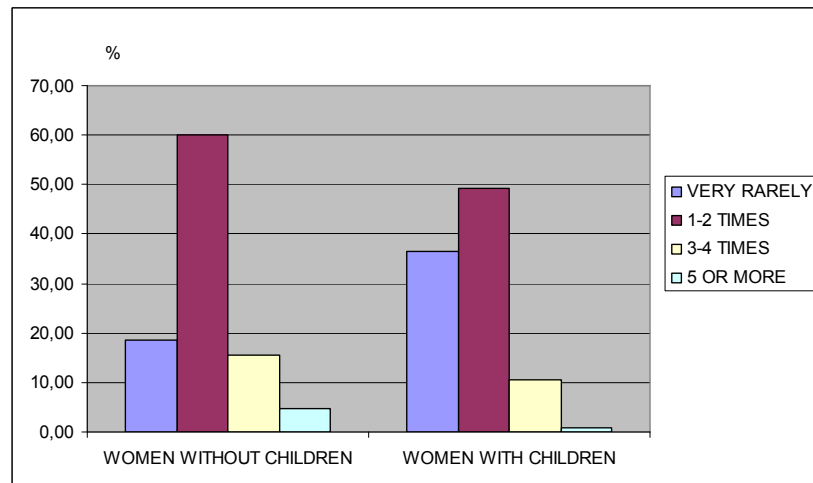


Figure 4.42: Weekend mobility of women by having children

Figures 4.43, 4.44, 4.45 and 4.46 show us the comparison of mobility of women with and without children by districts. From the Figures we can understand that on both corridors women with children are less mobile than women without children. But again women living on Keçiören corridor are more mobile in both categories than their counterparts on Batıkent corridor. On Batıkent corridor both women with children and without children make mostly 1-2 trips a day. On Keçiören corridor the ratio of 3 times and over trips are very high in weekdays especially among the women without children group. On Batıkent corridor the ratio of women who rarely travel does not change at weekend when compared with weekdays. On Keçiören corridor the ratio of women with children who rarely travel in the weekend days does not change; the same ratio in women without children group increases in weekends, that is to say mobility levels of women without children decreases on weekend days; but significantly high in weekdays.

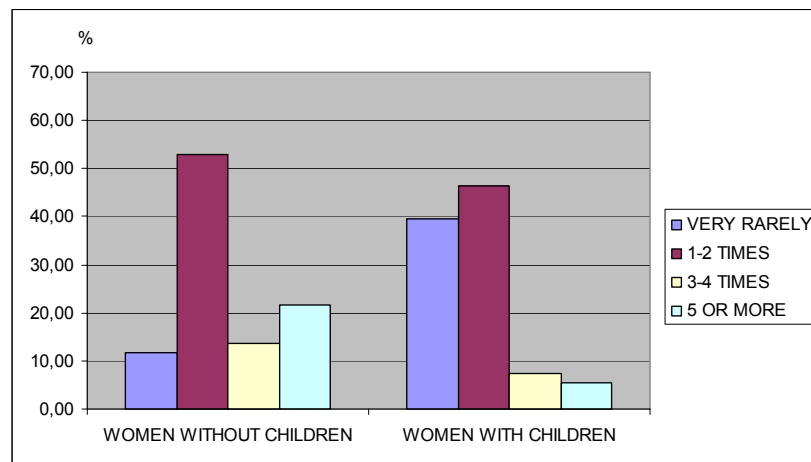


Figure 4.43: Weekday mobility by having children on Batıkent corridor

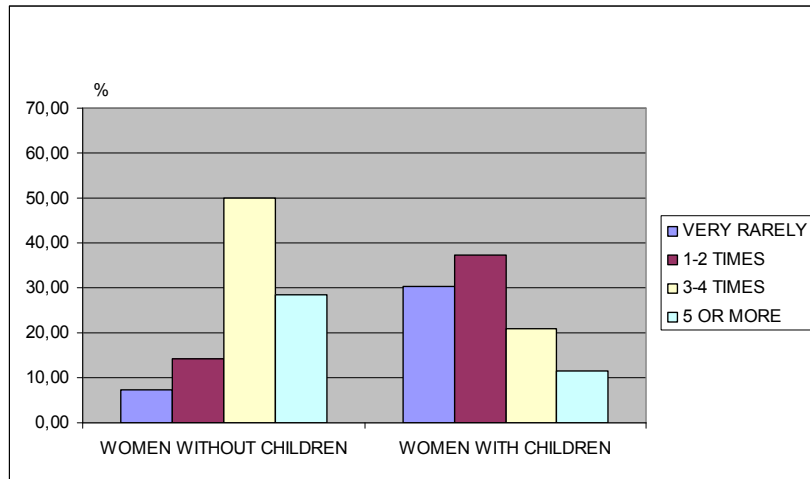


Figure 4.44: Weekday mobility by having children on Keçiören corridor

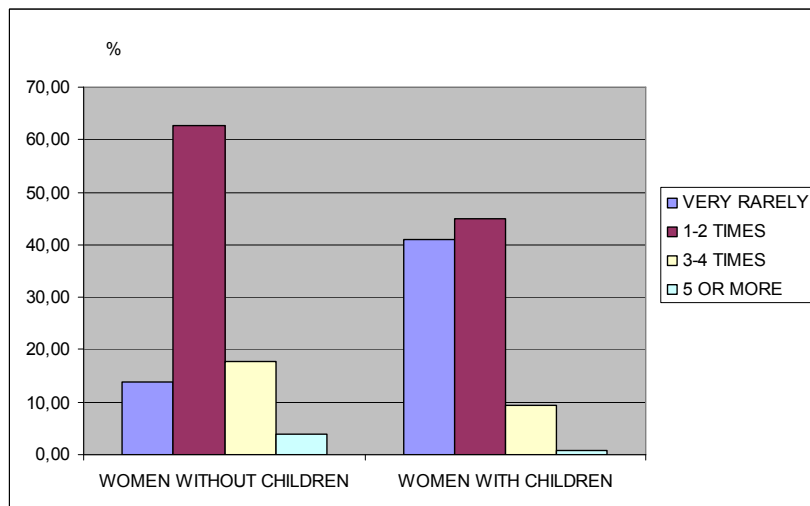


Figure 4.45: Weekend mobility by having children on Batıkent corridor

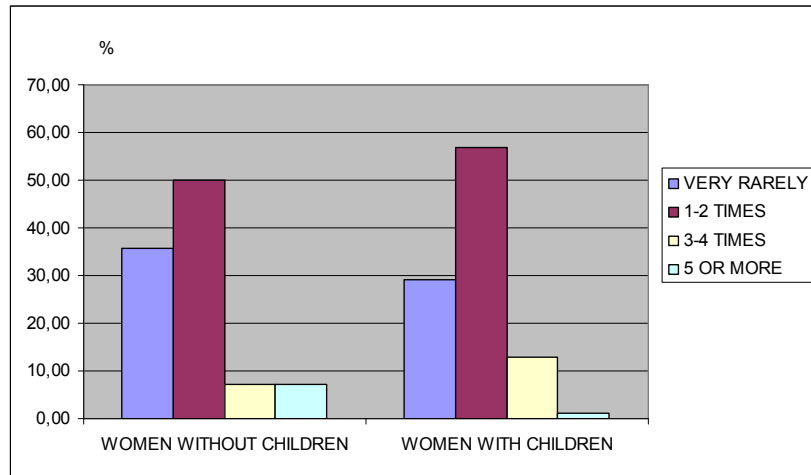


Figure 4.46: Weekend mobility by having children on Keçiören corridor

On the other hand, when mobility levels of women who work and have children as opposed to women who work and have no children are analyzed for both weekday and weekends, (Figures 4.47 and 4.48) it is seen that women who work and have children are slightly less mobile in the weekdays. Nevertheless, the difference is not too significant between the two groups (with and without children). It indicates that non-working is a factor which more affects women's mobility levels negatively than having a children, therefore it can be mentioned that women who do not work are more vulnerable than women who have children.

As for the weekends women with children (who work) are again slightly less mobile since the rate of those who very rarely travel is little less when compared with the women without children. However, women with children are seen to make more number of trips (particularly 3-4 times trips a day) in the weekends.

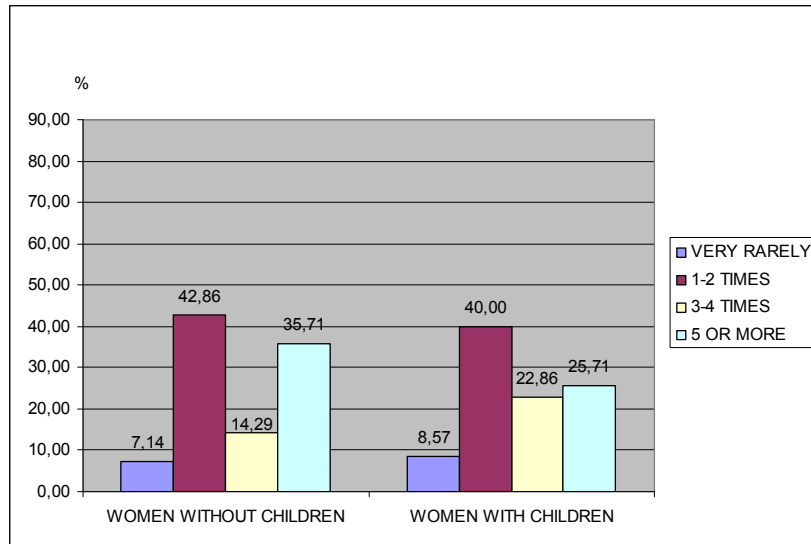


Figure 4.47: Weekday mobility of working women by having children

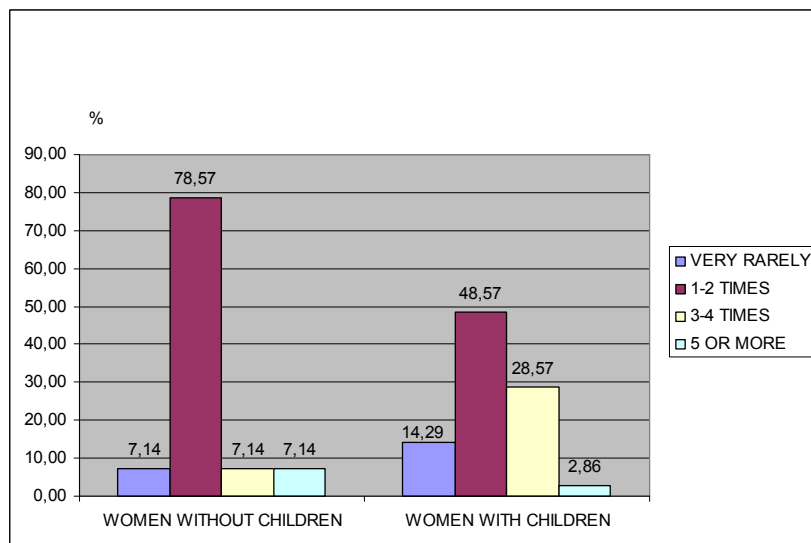


Figure 4.48: Weekend mobility of working women by having children

Figure 4.49 shows that, as would be expected, with the increasing age the ratio of women who have children also increases. On the other hand as women become older

their children get older too. Therefore relatively younger age women groups are likely to have less mobility levels. Because; having younger children contributes to the complex trips types, since the dependence levels of children to the mother are more when children are younger (for example taking them to school or health care center etc.). Therefore within 18-45 age interval women who work likely to have younger children and therefore they make more trips in a weekday, when they work (See Figure 4.50). The reason is related with the household and other responsibilities, and the trip types they require.

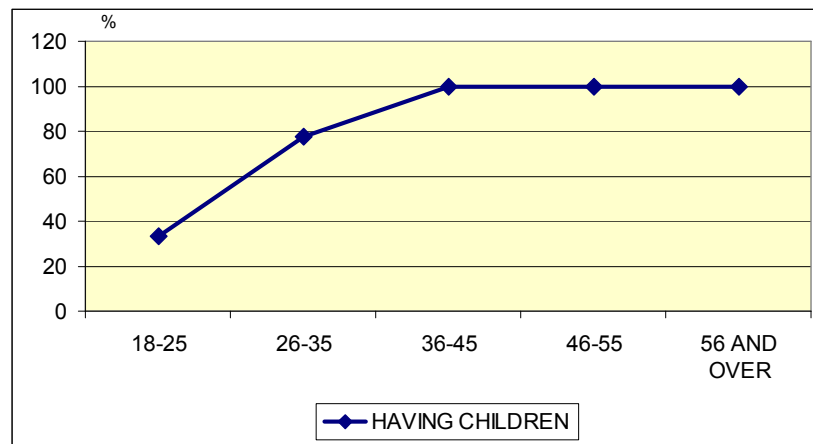


Figure 4.49: The ratio of working married women with children by age groups

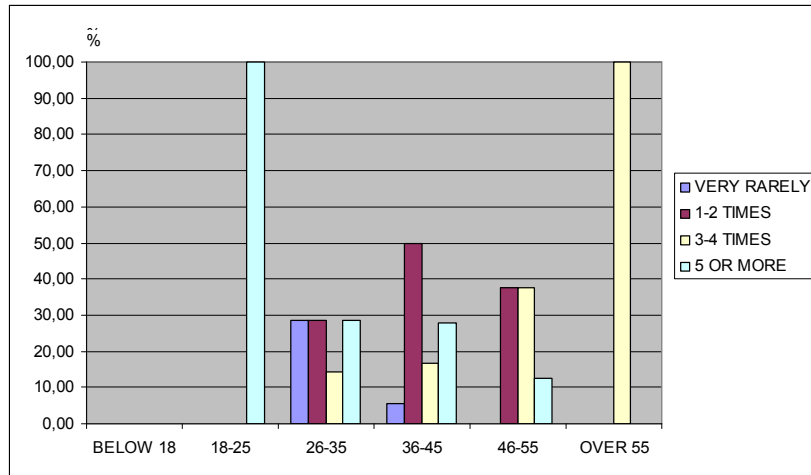


Figure 4.50: Weekday mobility of working women with children by ages: women who have children

Marital status can be another important factor affecting mobility. As mentioned earlier, being married brings various domestic responsibilities to women. While trip making, trip frequency and eventually mobility can be expected to increase because of these domestic responsibilities, it is also possible that married women with domestic responsibilities mostly choose their destination points in walking distance. Indeed, the rate of women who rarely travel is much higher for married women in comparison to single women, for both weekdays and weekends. It appears that the effect of domestic responsibility on mobility can be better observed by factors such as having children, number of children (Figures 4.51 and 4.52).

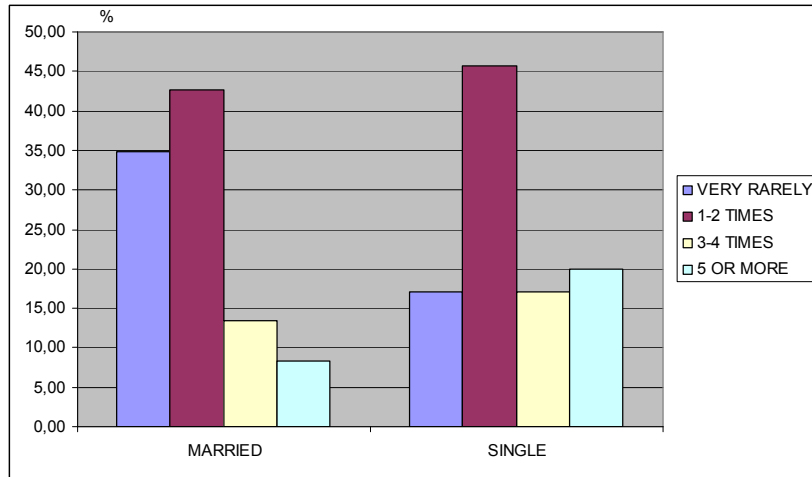


Figure 4.51: Weekday mobility by marital status in general

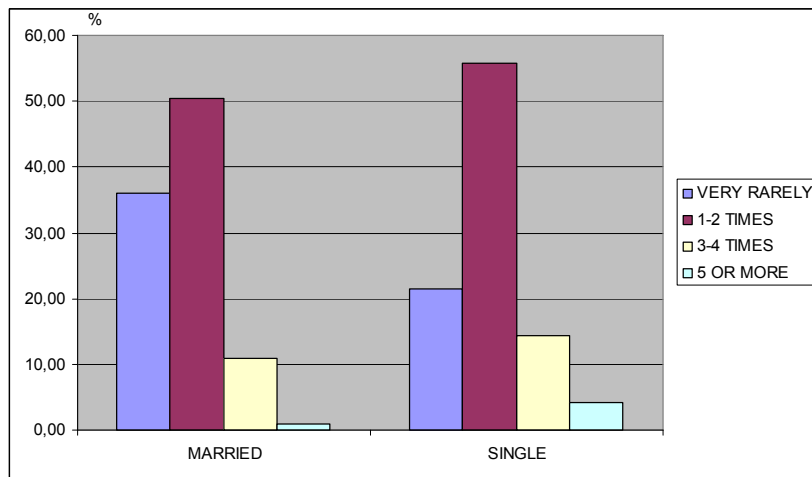


Figure 4.52: Weekend mobility by marital status in general

Figure 4.53 shows us that there is not a strong difference in working ratios according to marital status.

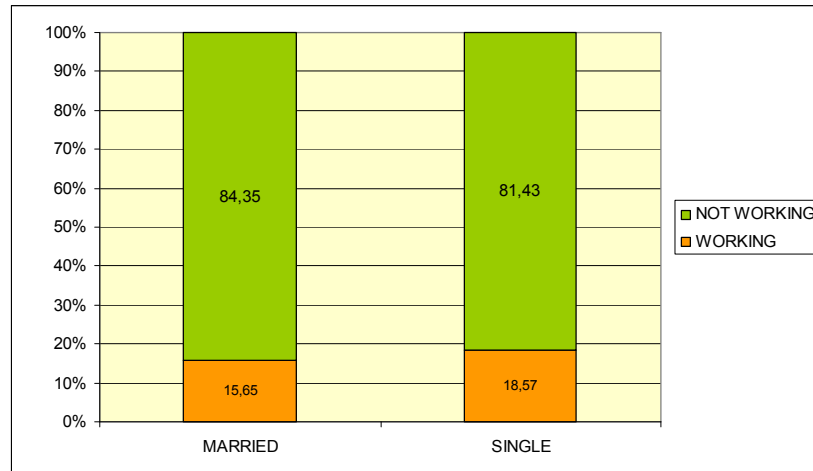


Figure 4.53: Working status by marital status in general

When we compare Batıkent and Keçiören routes, Figures 4.54, 4.55, 4.56 and 4.57, show that the rates of those who rarely travel in the Batıkent route change significantly by marital status: in both weekdays and weekends, about 40% of married women indicated that they seldom travel, while this rate is around 17-18% for single women. It is interesting that those who very rarely travel does not change much according to marital status in the Keçiören region.

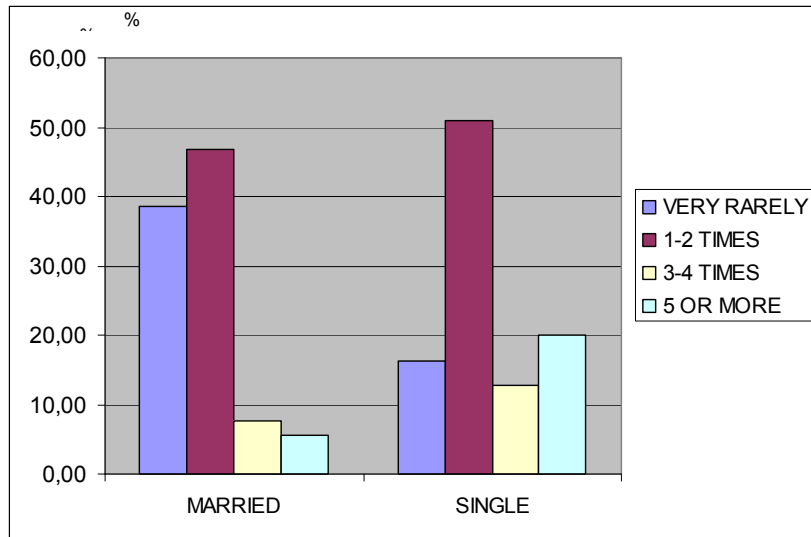


Figure 4.54: Weekday mobility on Batikent corridor by marital status

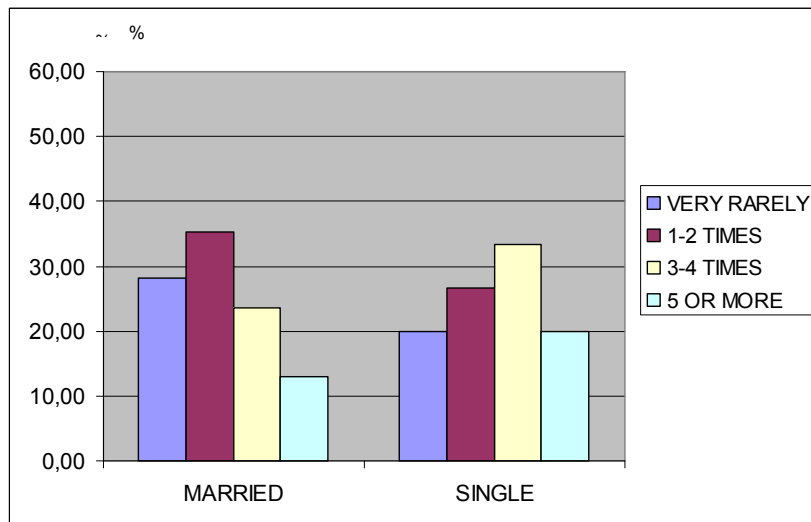


Figure 4.55: Weekday mobility on Keçiören corridor by marital status

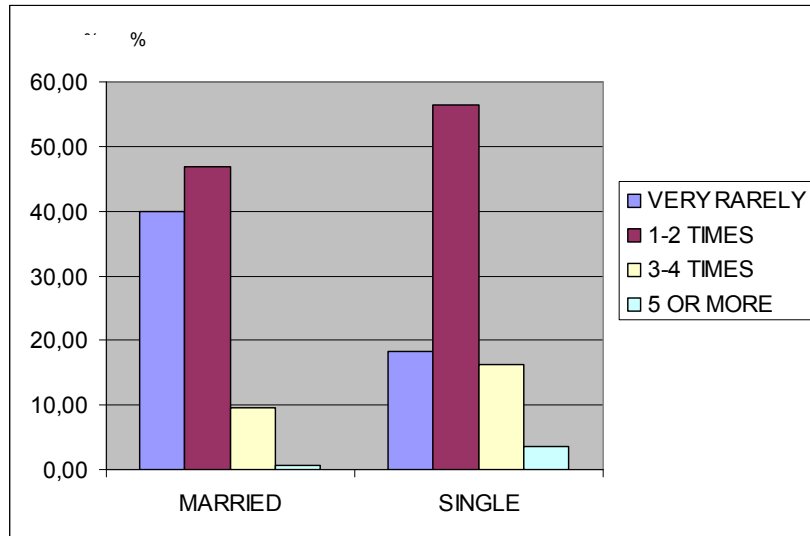


Figure 4.56: Weekend mobility on Batıkent corridor by marital status

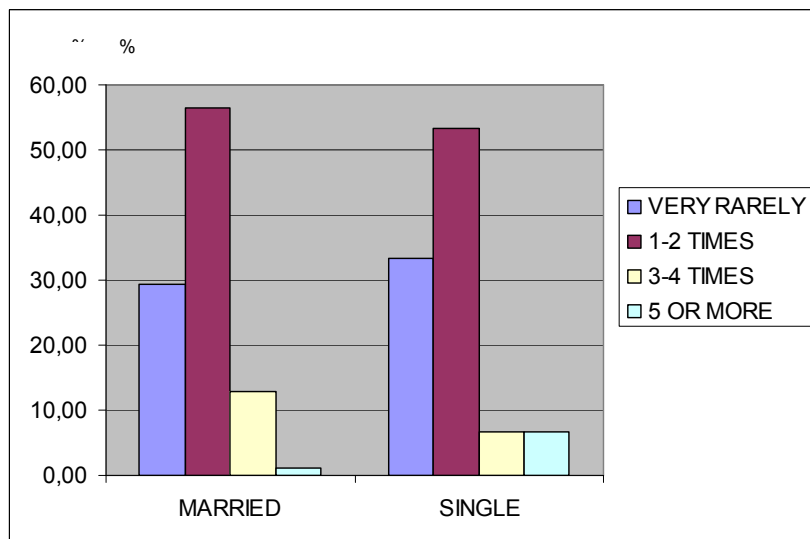


Figure 4.57: Weekend mobility on Keçiören corridor by marital status

As mentioned earlier women who have children and who are married have more responsibility than others. When we consider activities other than working that may require them to go outside, having children and marital status do not seem to make a difference (Figure 4.58 and 4.59). However it is interesting to see what other activities women are engaged and analyze them with respect to their having children or not (Figure 4.60), and being married or not (Figure 4.61). Therefore we need to differentiate other work types according to having children or not and marital status. It is seen that women without children travel for their own education much more than women with children, indicating that single women are mostly those that are younger than 25. Other type of activities are all related with household responsibility. In other words although women without children have other activities and trips as much as women with children, an important proportion of these are personal and not for the other household members. Nevertheless women without children, also make as many trips as women with children for shopping and bank payments.

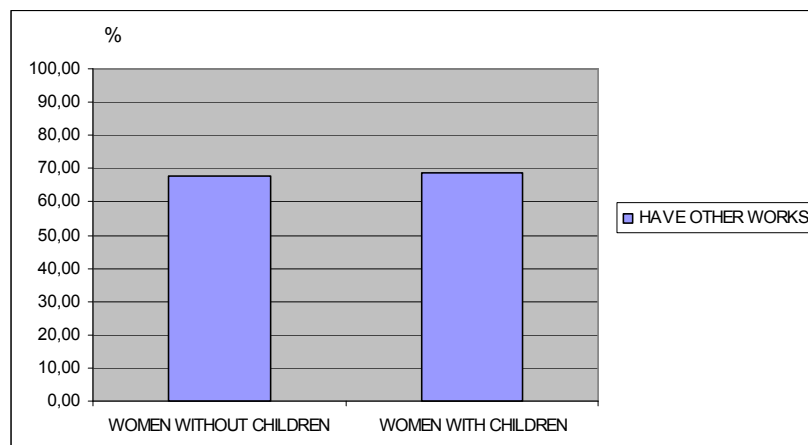


Figure 4.58: Trip making for non-work related activities: women with and without children

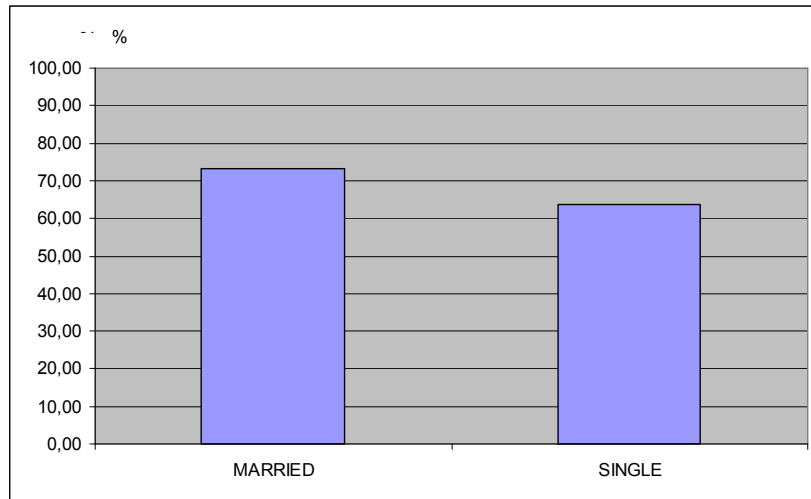


Figure 4.59: Trip making for non-work related activities: married and single women

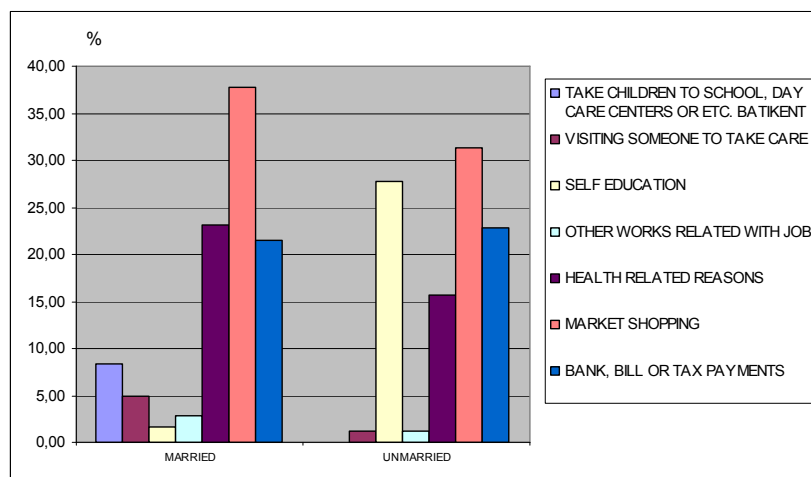


Figure 4.60: Non-work related activities: married and single women

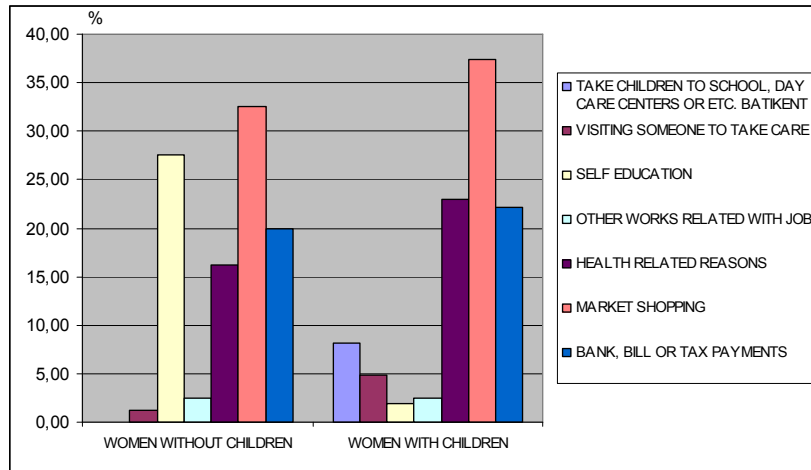


Figure 4.61: Non-work related activities: women with and without children

Education level can be another factor affecting mobility of women. This indeed seems to be case. Mobility levels increase with increasing education level both in weekends and weekdays (Figures 4.62 and 4.63). It is particularly important to note that women who rarely make motorized trips are those that have the lowest education levels.

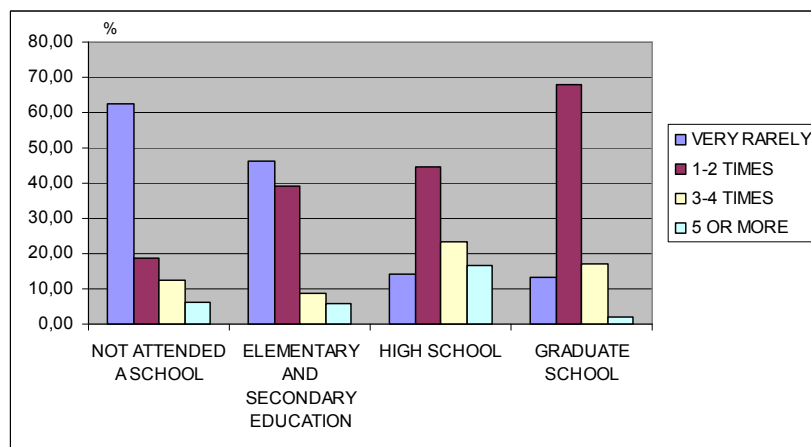


Figure 4.62: Weekday mobility by education level in general

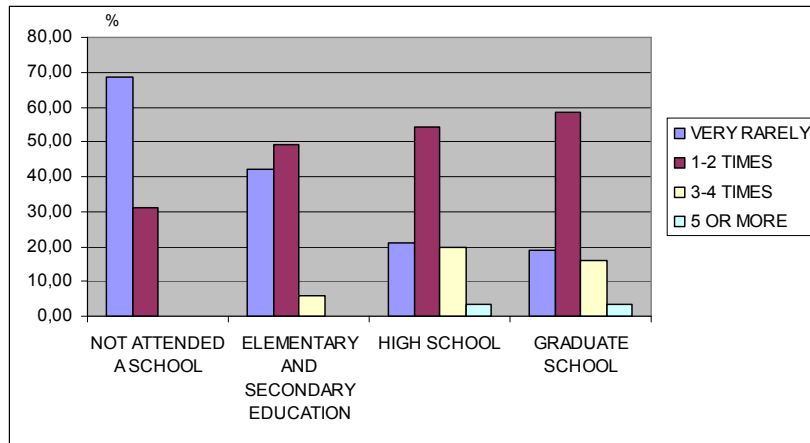


Figure 4.63: Weekend mobility by education level

Figures 4.64, 4.65, 4.66 and 4.67 once again show that in every education level, women living in Keçiören are more mobile than women living on Batıkent corridor.

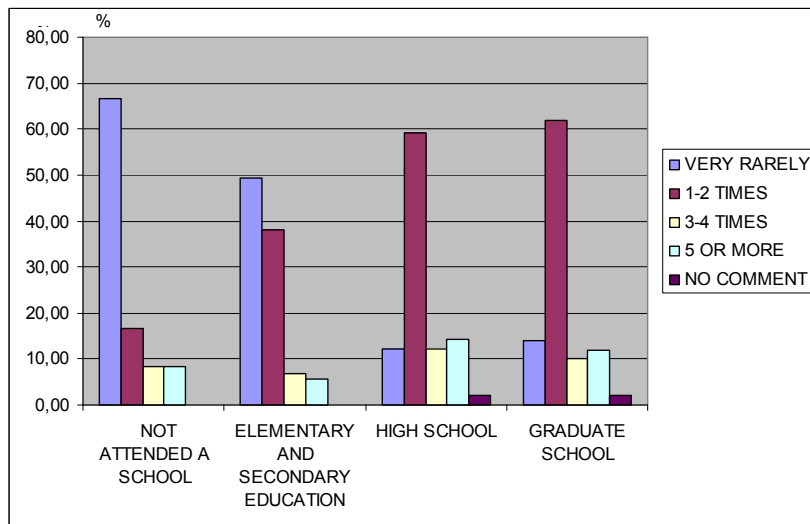


Figure 4.64: Weekday mobility by education level on Batıkent corridor

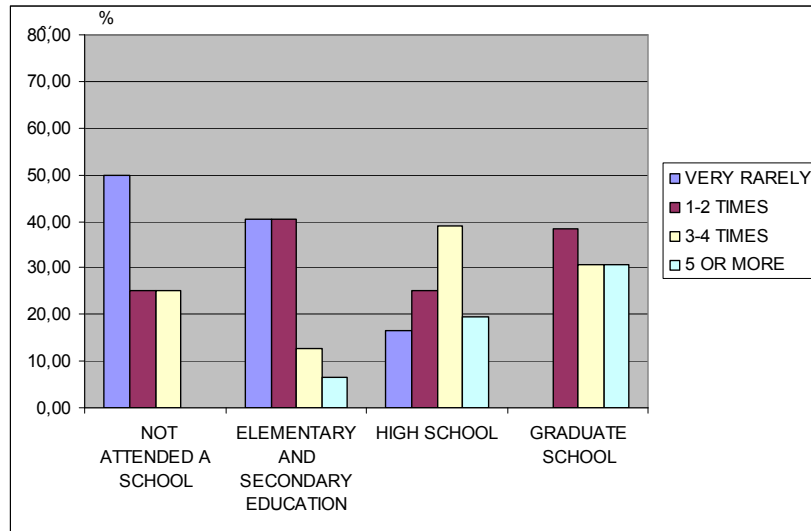


Figure 4.65: Weekday mobility by education level on Keçiören corridor

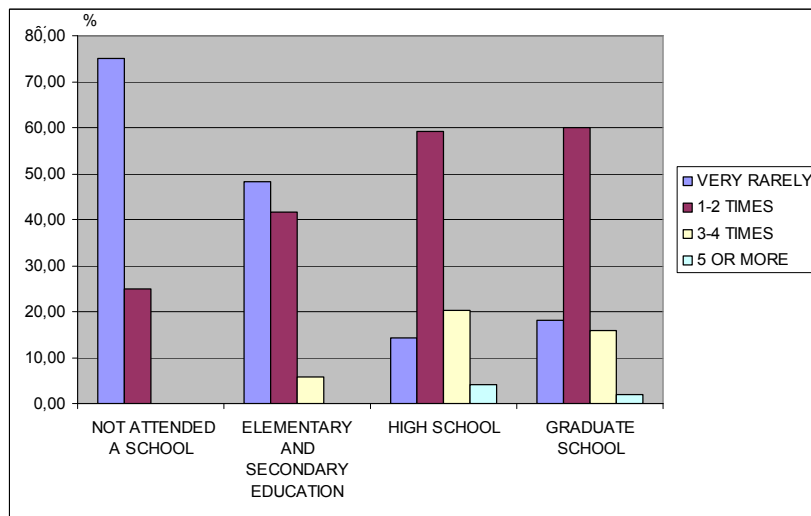


Figure 4.66: Weekend mobility by education level on Batıkent corridor

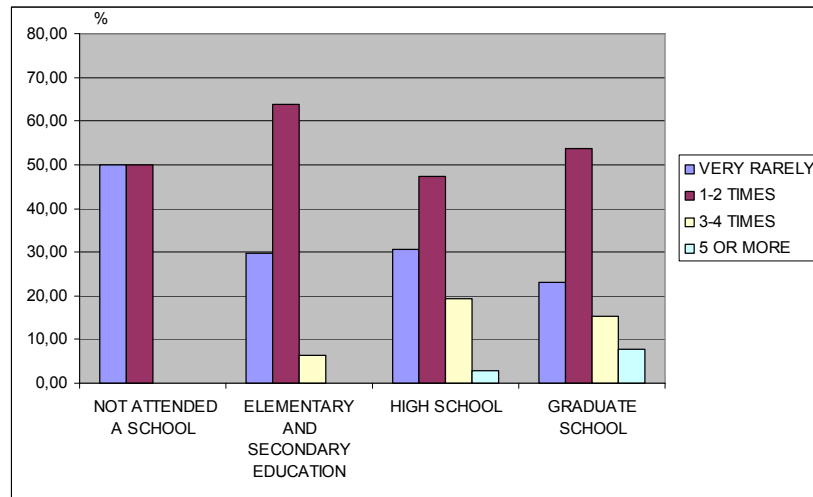


Figure 4.67: Weekend mobility by education level on Keçiören corridor

As a summary, it can be mentioned that one of the most striking result is that women at the Batkent corridor (which has a metro) are less mobile than those at the Keçiören corridor (where metro does not operate yet). It is generally accepted that an urban rail system, and particularly a high capacity one, like metro, can help increase the mobility of women. While this is not the case for the “with metro/without metro” comparison, it should be remembered that the analysis of the two corridors did not include an assessment on the level of metro usage. Therefore, this initial finding shows that it is not possible to suggest with certainty that on a corridor with metro, the mobility levels of women will be high compared to other corridors without metro. Obviously there are various other factors affecting mobility: not only their metro usage levels, but also socio-economic characteristics. We will analyze metro usage effect on the mobility levels below in this chapter.

4.3. General Mobility: Socio-economic Factors and Metro Usage

In the previous part we analyzed general mobility levels according to personal and household characteristics independent from metro usage. But metro is expected to be a factor strongly affecting the mobility levels; furthermore it is expected that metro

increases the mobility levels. Therefore in this part we will analyze the effects of metro usage on mobility levels and observe whether women are more mobile with the help of metro or not.

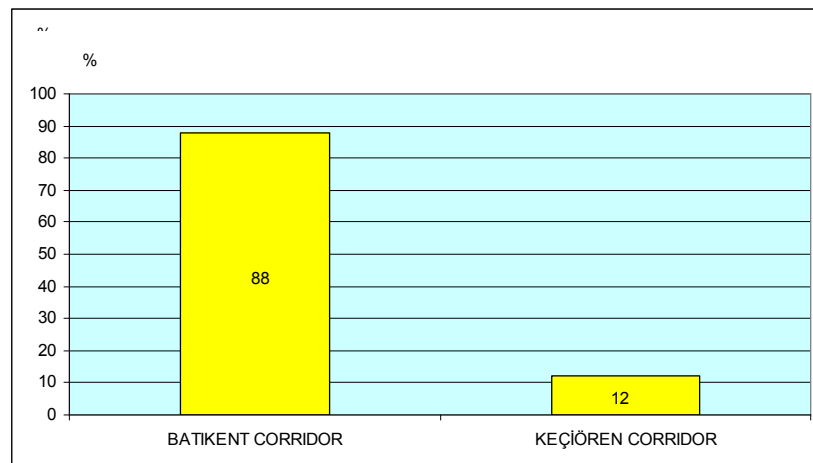


Figure 4.68: Metro usage rates by districts

Therefore firstly we need to make a comparison among metro users and non-metro users. Firstly we can see from Figure 4.68 that 88% of women on Batikent route and 12% of women on Keçiören route seem to use the metro. For Batikent it is very important, because metro usage rate is very high among very different women groups, different ages, income groups, education level, working status, etc.

When we compare the mobility's of metro users and non-metro users, (Figures 4.69 and 4.70) it can be observed that metro users are more mobile both in weekdays and weekends; although the difference in their mobility is not as high in the weekdays as in the weekends. It is possible to suggest that metro has a limited impact on weekday mobility of women, since they have to make certain trips (work, shopping etc) in the weekday with or without metro, but that it provides increased opportunity for leisure trips in the weekends, hence increasing mobility at leisure times.

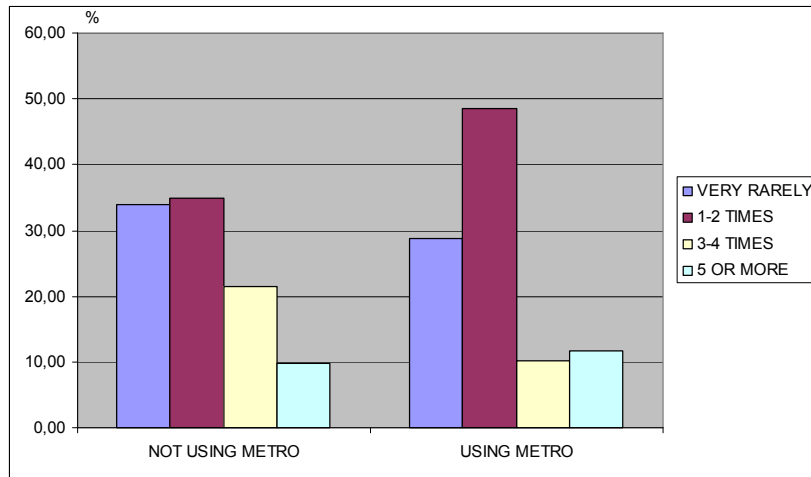


Figure 4.69: Weekday mobility by metro usage

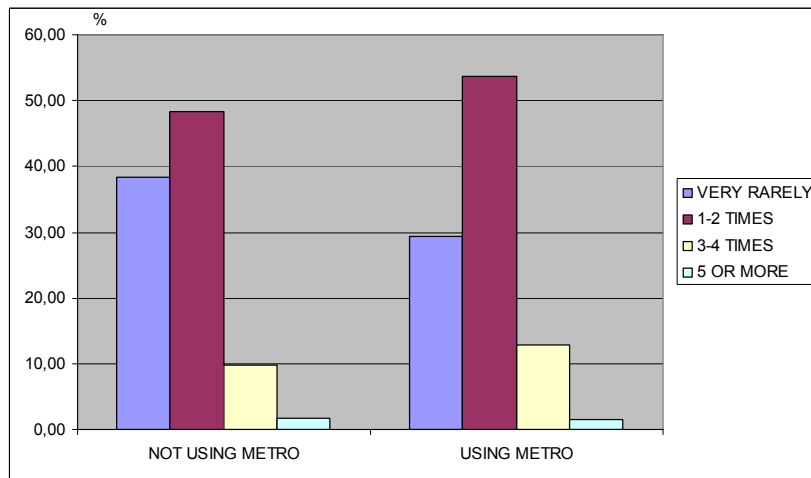


Figure 4.70: Weekend mobility by metro usage

The comparison of Batıkent and Keçiören corridors again reveals that, in both regions women who use metro are more mobile than non-metro users (Figures 4.71, 4.72, 4.73 and 4.74). It is possible to claim that when women choose to use metro, it can make them more mobile. It is particularly important to note that in Batıkent the

ratio of women who indicate they rarely travel in the weekdays is 54% for those who do not use metro and 30% for those who use it. Looking at the Batıkent case, it appears that metro can indeed help enhance the mobility of women who use it.

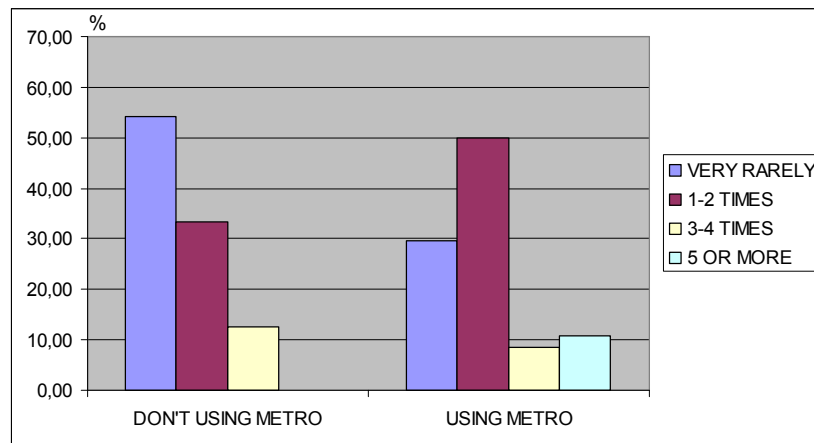


Figure 4.71: Weekend mobility by metro usage on Batıkent corridor

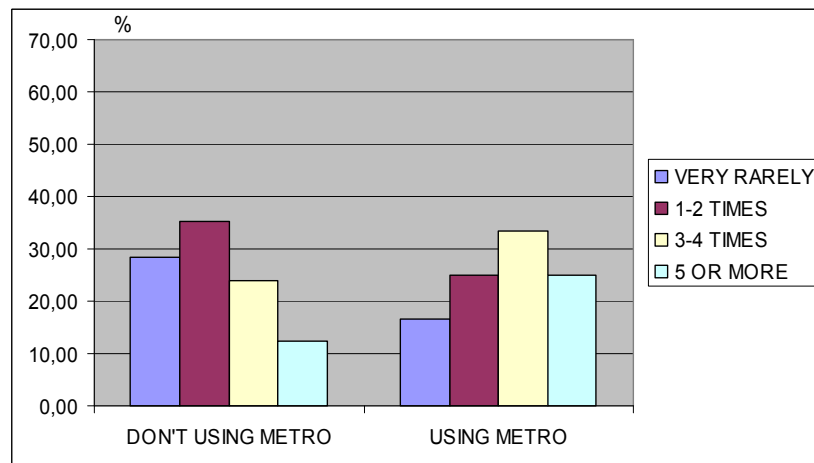


Figure 4.72: Weekday mobility by metro usage on Keçiören corridor

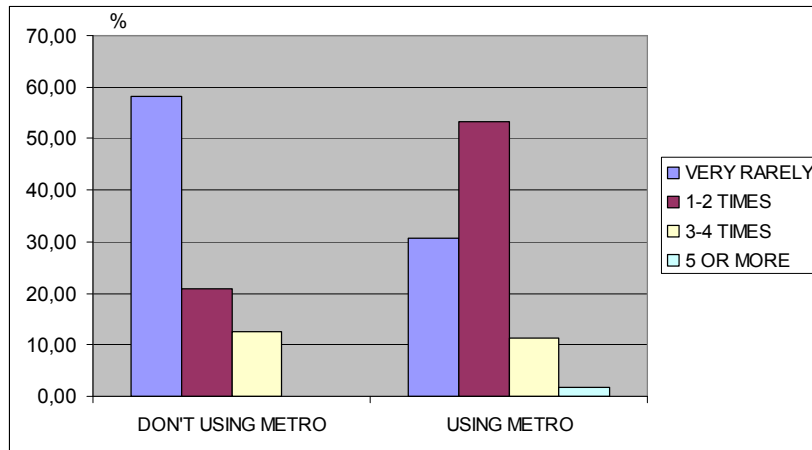


Figure 4.73: Weekend mobility by metro usage on Batıkent corridor

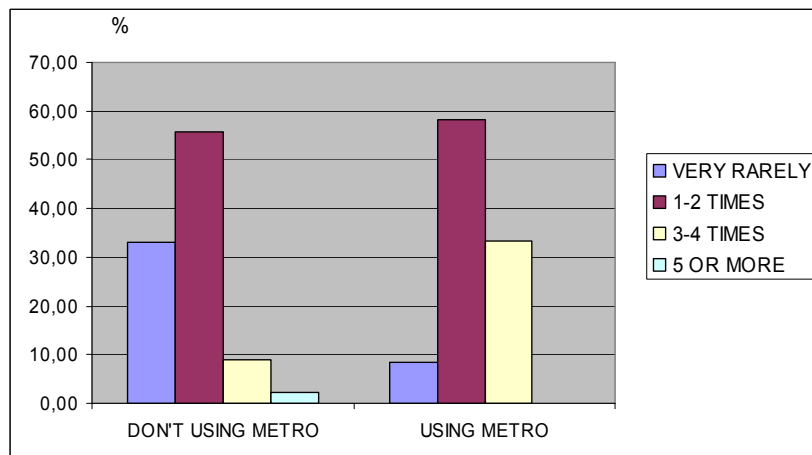


Figure 4.74: Weekend mobility by metro usage on Keçiören corridor

It was stated in the previous section that women in Keçiören corridor were found to be more mobile than those in Batıkent. This can again be observed when metro usage is analyzed: for the weekdays, the differences in mobility of metro users and non-users are not as stark in Keçiören as they are in Batıkent. However, the difference is

significant for the weekend: in Keçiören 32% of the women who do not use the metro travel very rarely, while this rate is only 9% for the metro users. Once again, it is not misleading to suggest that metro is an important factor that can increase mobility of women during the weekend, probably for leisure trips.

It is important to note that, increased mobility for the women who use metro does not necessarily mean that all these increased number of trips are made by the metro. The data from the questionnaire does not indicate this explicitly. What this finding means is that once women start using the metro, they may be inclined to make more motorized trips. These additional trips may or may not be made by the metro; nevertheless, they help increase mobility.

We mentioned in the literature survey that when choosing among transportation modes, the most important factors are said to be the money cost and time cost of the vehicle. And while people with low income are said to be more sensitive to money cost, people with high income are said to be more sensitive to time cost. As the Figure 4.75 shows metro usage rates increase by income, with a slight decrease in high income group. This is because metro is a fast mode and is generally perceived as a prestigious one. It was also mentioned in the literature survey chapter that, as income increases both time cost and prestige become very important and metro is perceived as the fastest and most prestigious mode among other mass transportation modes, and this figure supports this. Although low income people are likely to use public transportation more, we see from the figure that their metro usage rates are relatively lower than high income people, because low income people find metro to be expensive, and they are more sensitive to money cost in mode choice. The slight decrease in the high income group may mean that in quite high income groups, taxi and family's car usage rates may increase, therefore metro usage rates may decrease. Although we mentioned that low income groups use metro with a relatively lower ratio than the other income groups, they still use metro with a high ratio (75,5%). That is to say for all income groups metro is an important public transport mode.

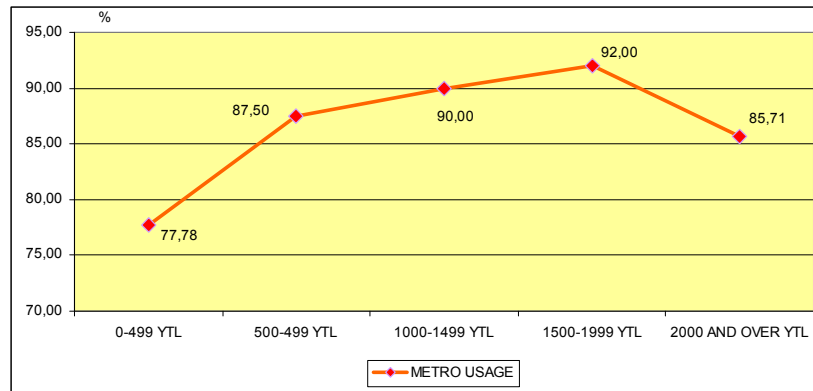


Figure 4.75: Metro usage rates by income level in general

Since we see the income effect on mobility and metro usage, we can analyze the mobility of metro users and non-users from the point of view of different income groups. Figures 4.76, 4.77, 4.78 and 4.79 give us the weekday and weekend mobility levels of different income groups separately for metro-users and non-users. The Figures clearly show the effect of metro on income related mobility. Especially low income women's mobility levels are very different when we compare metro users and non-metro users. 0-499 YTL income group's and 500-999 YTL income group's immobility levels (those who indicate that they rarely make motorized trips) are 66,67% and 43,45% in weekday and 66,67% and 41,51 % in weekend days respectively among non-metro users. But when we consider the metro users among the same income groups, immobility levels in the weekdays decrease to 25% and 32% respectively, and in the weekends to 38% and 33%. Although low income women who are using metro are less mobile in weekend than in weekdays, low income metro user women are again more mobile in the weekend than low income women who do not use metro. On the other hand in weekdays women from middle and high income groups who do not use the metro have a higher trip frequency (3 or more trips a day) than those who use it. This finding supports the argument that metro is extremely important in enhancing mobility levels of the low income women, but not that significant for the mobility of higher income.

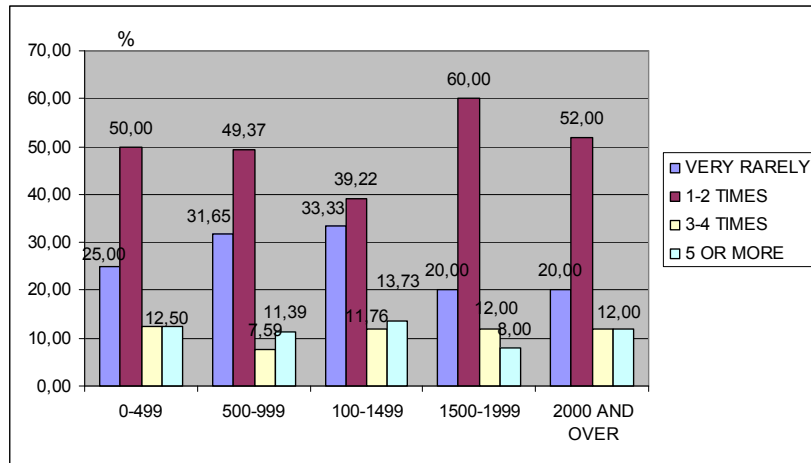


Figure 4.76: Weekday mobility of metro users by income level

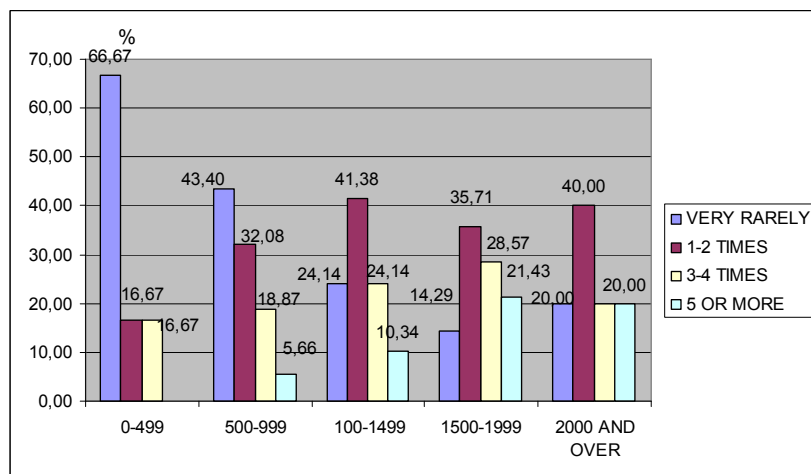


Figure 4.77: Weekday mobility of non-metro users by income level

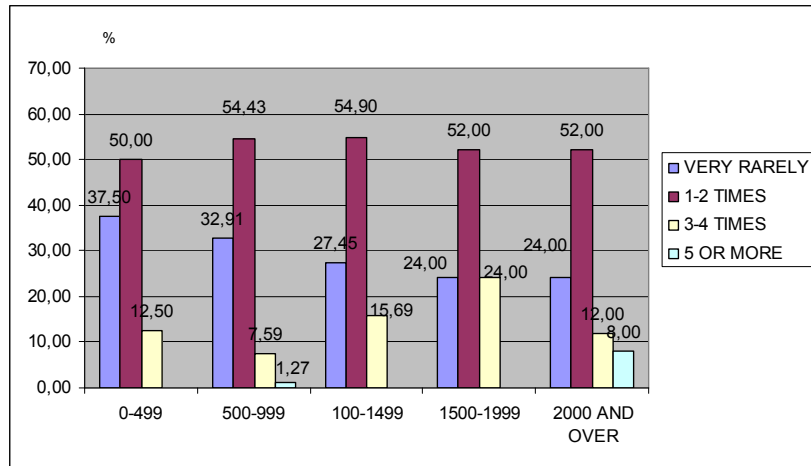


Figure 4.78: Weekend mobility of metro users by income level

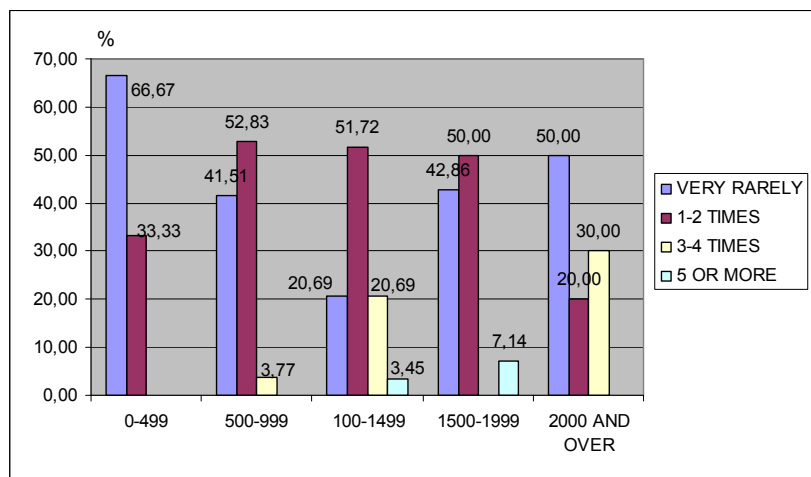


Figure 4.79: Weekend mobility of non-metro users by income level

Age is another factor affecting metro usage. When we examine the metro usage by age groups, we see that economically active group uses metro less than relatively younger groups and older groups Figure 4.80. This is important because as mentioned in literature survey chapter and as shown in the previous section, economically active group is more mobile than others. It appears that their mobility is due to their working trips and other household responsibilities and not due to the metro. However this same finding also reveals that metro is rather important from the point of view of relatively vulnerable women groups when age is considered (younger and older groups). In the previous chapter it was mentioned that rail systems are considered as comfortable, more secure and easily understandable/usable public transport modes in the world. Figure 4.80 supports this argument because the more sensitive age groups of below 18 and over 45 use metro more than the middle ages. This means they prefer the metro over other public transport modes. Another argument among researchers in literature is that mostly working age group use public transportation: 21-55 age interval. From Figure 4.80 we understand that other age groups use metro too. That is to say metro is considered as different from other public transportation modes and possibly enables more women to use public transportation. Hence, metro contributes to the increase of the mobility of more sensitive women groups (younger and older groups).

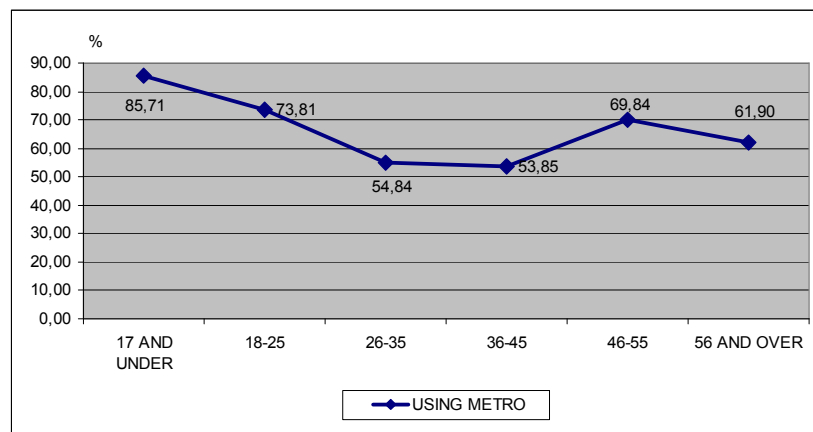


Figure 4.80: Age groups by metro usage levels

In the previous part we see that mobility levels decrease with increasing age and we see here that except economically active age group, relatively younger and older age groups use metro more. Therefore here we will examine whether metro usage increases the mobility levels of relatively immobile groups or not.

Therefore here we will analyze the mobility levels of the younger group and elderly group with considering metro usage and non-usage. Figures 4.81, 4.82, 4.83 and 4.84 give that generally among vulnerable age groups (younger and older groups), women who use metro are more mobile than non-users, especially in weekend.

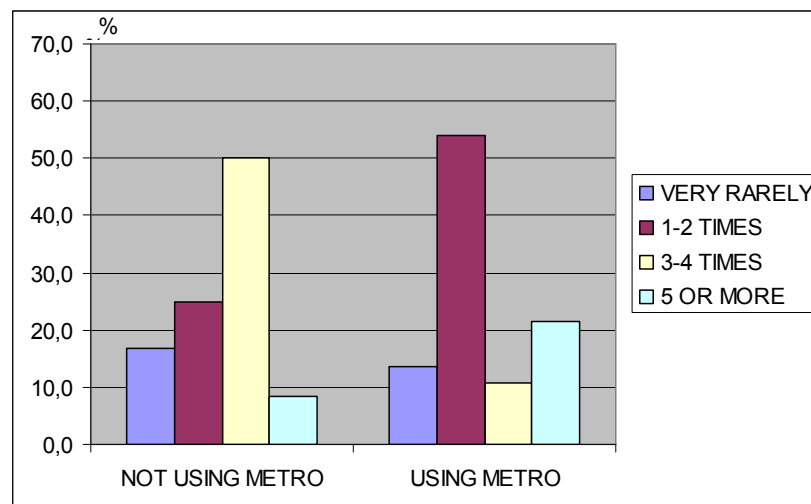


Figure 4.81: Weekday mobility of 26 aged and below by metro usage

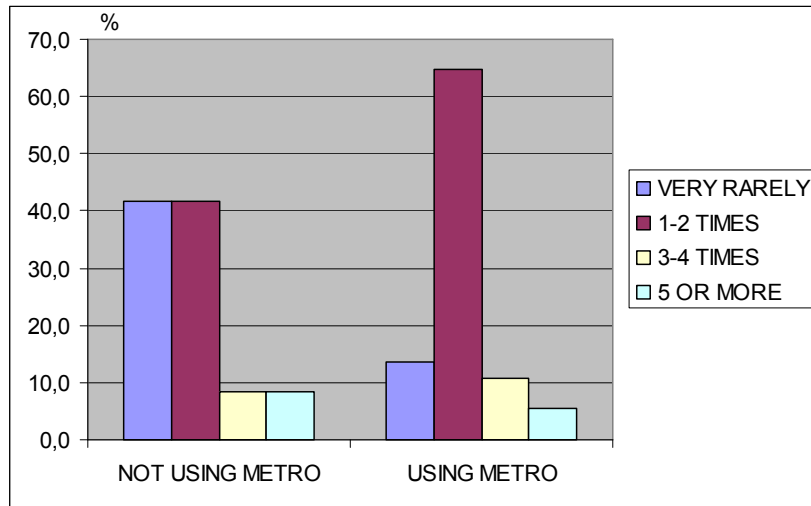


Figure 4.82: Weekend mobility of below 26 aged group by metro usage

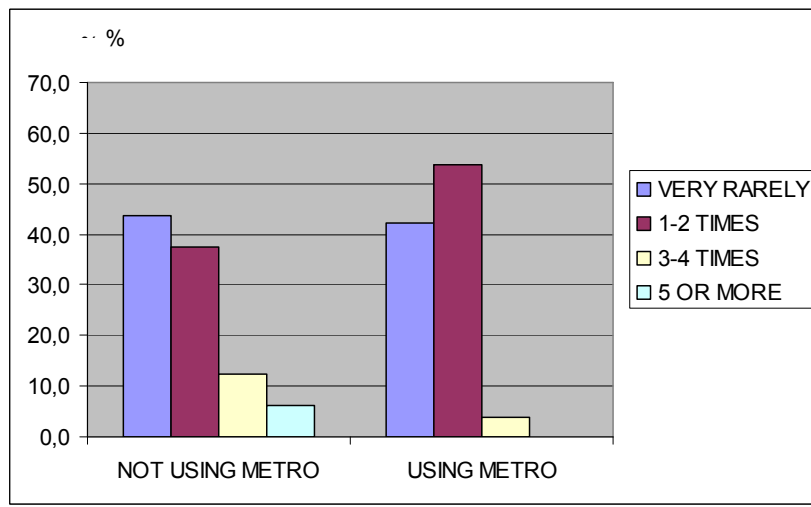


Figure 4.83: Weekday mobility of over 55 aged group by metro usage

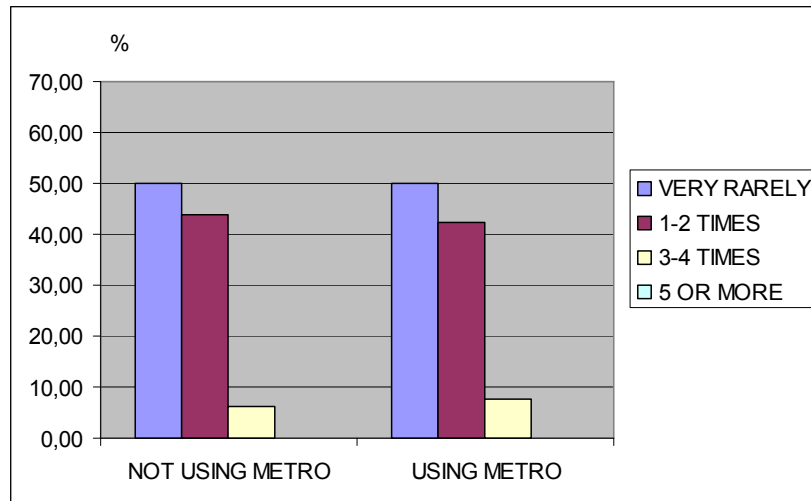


Figure 4.84: Weekend mobility of over 55 aged group by metro usage

Marital status is closely related with responsibility, as put before. While married women have more responsibility than unmarried, these responsibilities affect the travel patterns and mobility. In the previous section, we saw that single women are more mobile than married women. Here we need to look at whether married women are becoming more mobile by using metro or not.

Figure 4.85 firstly shows us that although metro usage rates are quite high in both married and single, single women use metro more than married. This difference maybe caused by children that married women have or their complex trip types because of having more responsibility. Therefore to find out the reason we can look at the having children by using metro (See for Figure 4.88)

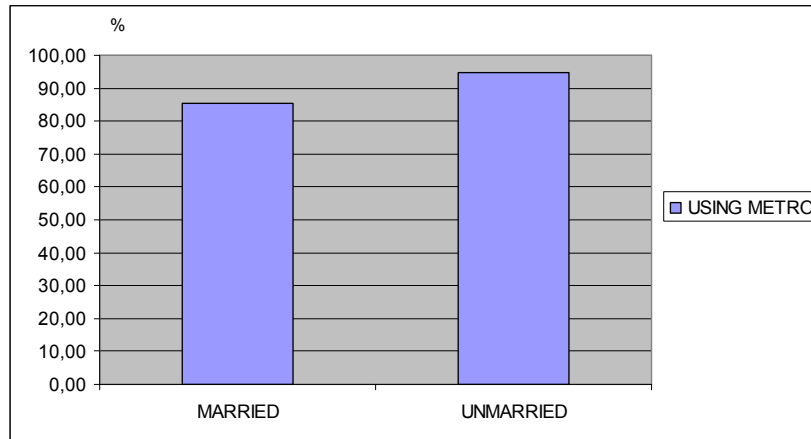


Figure 4.85: Metro usage rates by marital status

Figures 4.86 and 4.87 show the weekday and weekend mobility of married women, who were found to be less mobile than single women, in terms of their metro usage. It is seen that, metro usage does not have an effect in increasing their weekday mobility, but that it may be said to have a certain effect on weekend mobility. Figure 4.86 shows that married women who do not use the metro actually make more trips in the weekdays. (3 or more trips a day are significantly higher for this group). It may be argued that, due to working and other responsibilities, women make trips in weekdays regardless of metro access or metro usage; those are compulsory trips that are necessary to be made in weekdays. However, for the weekend days (Figure 4.87) mobility of married women who do not use the metro decreases, showing once again the positive effect of metro on mobility particularly for leisure trips in the weekend. The finding reveals that when compulsory trips are to be made, using a metro does not make a difference, but that when women use the metro, they tend to go out, possible for non-compulsory leisure trips, more often resulting in an increase in their mobility.

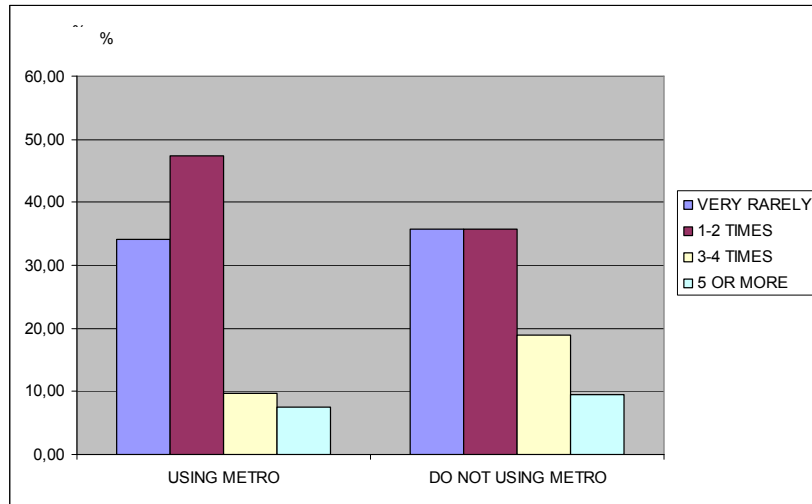


Figure 4.86: Weekday mobility of married women by metro usage

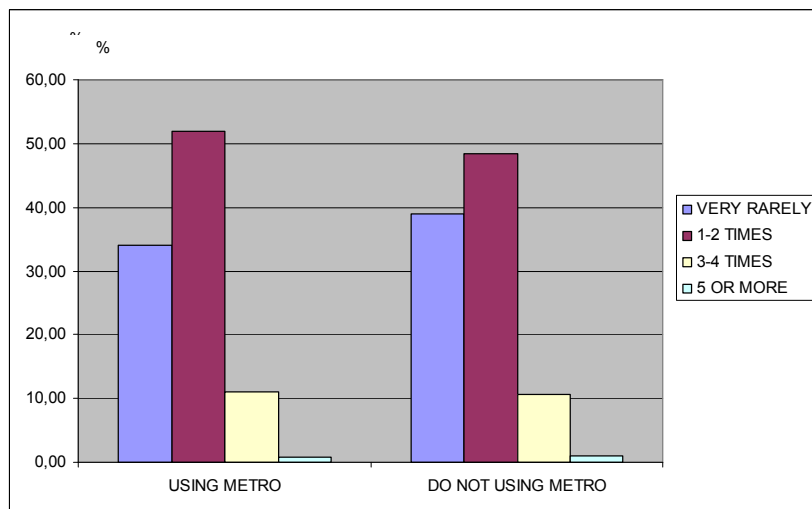


Figure 4.87: Weekend mobility of married women by metro usage

As shown in the Figure 4.88, women who have children use metro more when compared with the women who do not have children. That is to say having children is not a prohibitive factor for women to use metro. In the literature survey chapter it was mentioned that women with children have more cognitive constraints and

therefore they may be less inclined to use metro when compared with others. Furthermore women with children may be unwilling to use metro since taking metro with children is rather difficult. But in this case study we can understand from the results that the majority of women with children do not have such constraints and having children is not a preventive factor in using metro.

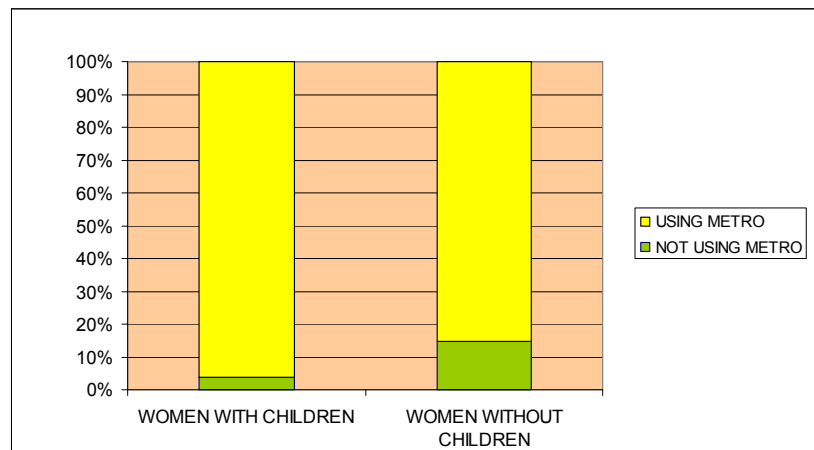


Figure 4.88: Metro usage rates by having children or not

It can, therefore, be argued that having children is not the reason for low metro usage rates of married women. Therefore we need to examine to find the reason of different metro usage levels of married and single women. Being married can bring additional responsibilities, as mentioned earlier in this research, therefore these may require to choose the destination point in walking distance; or due to complex trips they cannot use metro as often as single women.

As also Figure 4.88 shows the proportion of women who have children and not using metro is very small that examining the effect of metro usage on women who have children and use metro will be meaningless.

As another variable we mentioned the education level in the previous part, and we stated that with increasing education level mobility levels also increase. Therefore firstly we will look at the metro usage among different education levels and then we will examine the effect of metro on the mobility levels of the lowest, therefore the least mobile, education level group.

Figure 4.89 shows metro usage rates by education level. The previous section showed that the lowest mobility level was among the lowest education level, but here we can see that the women from the lowest education level groups use the metro with a ratio of 60% in average. In the literature survey chapter it was mentioned that “The knowledge of people is a very important factor affecting the usage of public transportation services (Beimborn, 2003)”. This may mean that metro is an easy perceived transportation mode, because metro usage rates are quite high among every education level; but we will also control this assumption in evaluation chapter (Chapter 6). The Figure also shows that the highest education group is the one that uses the metro most, which, to a certain extent, verifies the above argument. Nevertheless, the lower education groups’ metro usage is not low either, as already mentioned. Here we need to control whether or not metro usage increases the mobility levels of relatively lower education level groups.

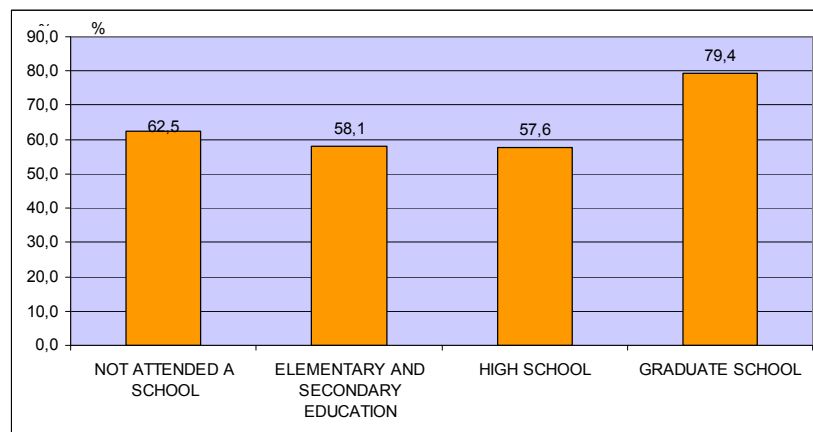


Figure 4.89: Metro usage rates by education level

When we assess the mobility levels according to education levels, it is obvious that in the most vulnerable group (elementary and lower education level), the weekday immobility levels (the ratio of declaring travel “very rarely”) are quite different when we consider metro users and non-users (47% in metro users and 56% in non-metro users) (Figures 4.90 and 4.91). In the other education group, in weekdays, using or not using metro do not differentiate among mobility levels. On the other hand, in weekend days, it can be seen that there is not a significant effect of metro usage or non-usage from the point of view of the lowest education level. However, for the higher education levels, metro using or not using creates a considerable difference in the weekend mobility levels. As we can see from the Figures 4.92 and 4.93, while the immobility level is 16% among metro users, non metro users’ immobility level is 31%).

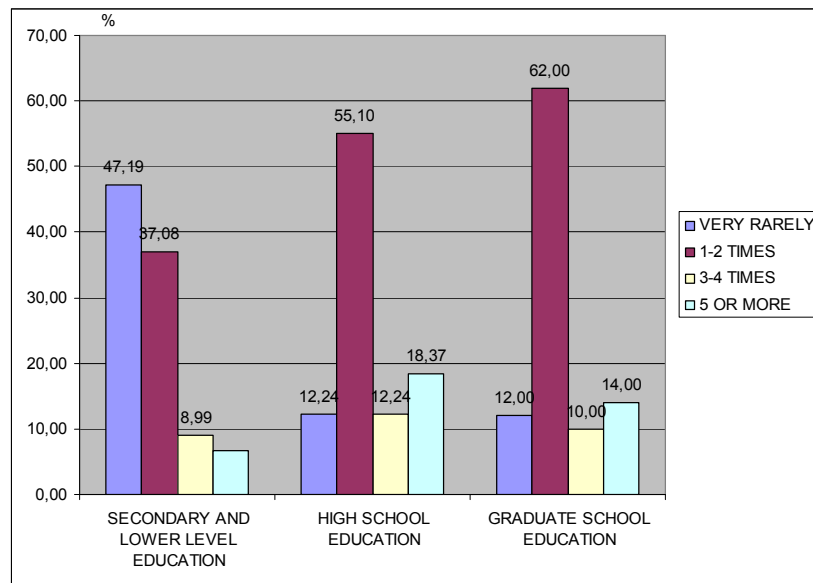


Figure 4.90: Weekday mobility of metro users by education level

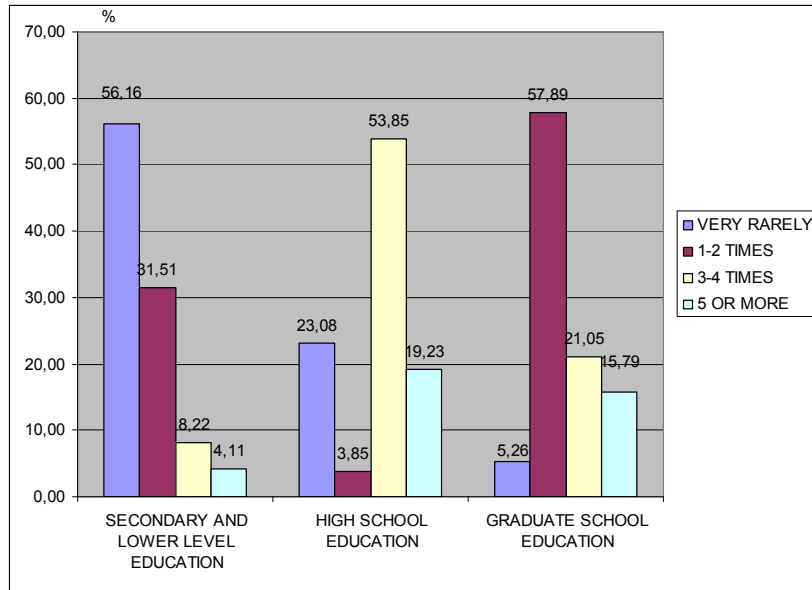


Figure 4.91: Weekday mobility of non-metro users by education level

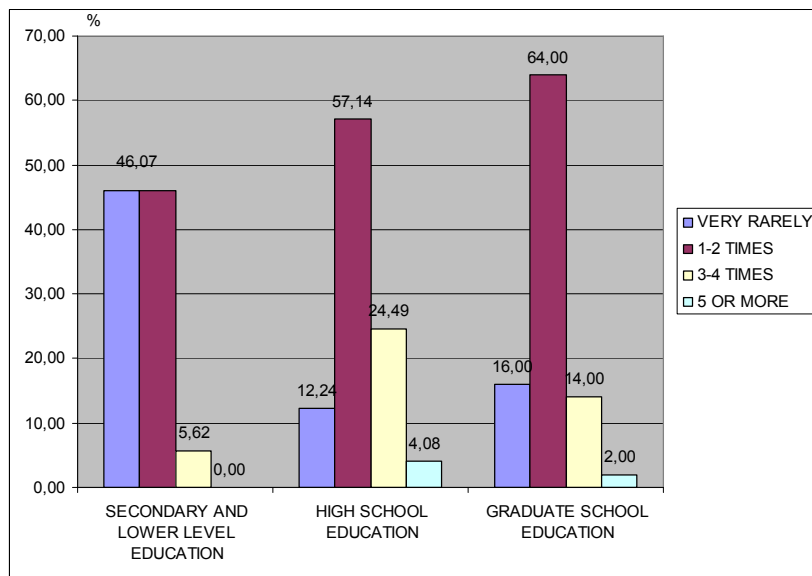


Figure 4.92: Weekend mobility of metro users by education level

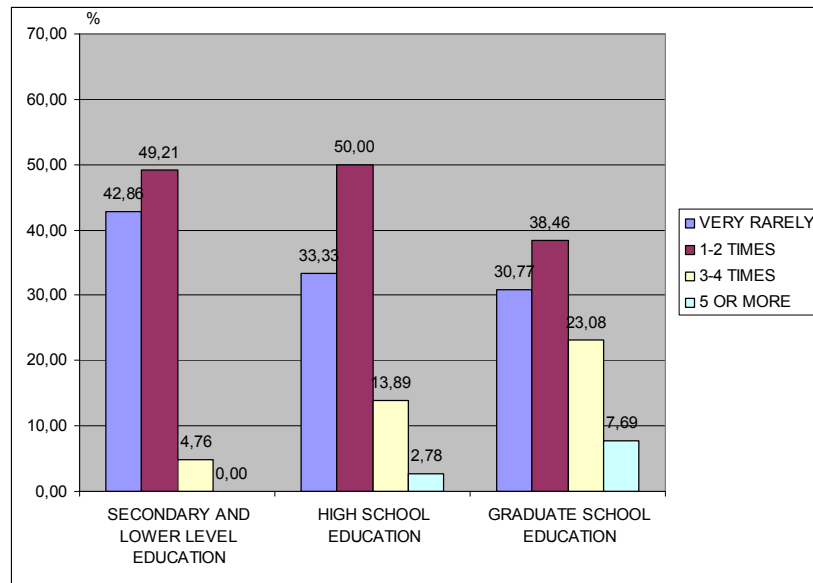


Figure 4.93: Weekend mobility of non-metro users by education level

4.4.General Mobility: Trip Making For Other Activities Other Than Working and Metro Usage

General mobility levels also change according to trip types of different women groups. There are 3 types of activities that require traveling, as we mentioned in Chapter 2, subsistence, maintenance and leisure activities. Working trips (subsistence activities), shopping trips (maintenance activities and leisure trips (leisure activities) will be examined with considering metro usage and non-usage from the point of view of vulnerable women groups, since the questionnaire give the geographies of different women groups. But since women were not asked where they go for non-work related activities, here we will examine non-work related activities (maintenance activities) without considering the geography according to some social factor like having a children.

Non-work related trips are expected to be mostly affected by having children or being married or not. That is because as we mentioned in the research chapter, these

two factors bring more responsibility and therefore more activities, which cause different daily activity schedules and trip types and so mode choices.

Figure 4.94 gives the ratios of non-work trips by travel modes for the sample women. We can see from the figure that metro is an important mode for most-non-work activities, except for market shopping and bank/bill payments. Since these latter two trip types are mostly made by walking (72% and 75% respectively), we can conclude that women choose the destinations for these activities within walking distance. Therefore, it can be said that for non-work activities, women mostly prefer using the metro unless the destinations are within walking distance. Therefore metro help women to fulfill their various household responsibilities.

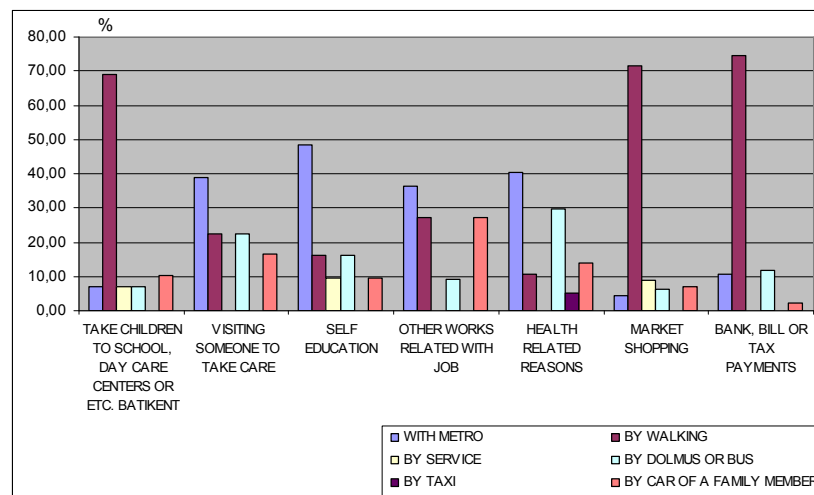


Figure 4.94: Modes used for non-work trips

Figures 4.95 and 4.96 give the modal choice for these activities in the two districts. It is clearly seen that, metro is an important (primary) and dominant mode in many daily activities of women on the Batikent corridor, particularly for visiting friends, education, work-related trips, and health trips. In the Keçiören Corridor, on the other

hand, for most of these activities walking appears to be the mode of travel, as well as bus and dolmuş for health and education trips. This is an important finding showing that in Keçiören, women mostly perform these daily activities in walking distance, whereas in Batıkent metro corridor, most women may be traveling further distances and experiencing a larger “part” of the city due to using metro. Such an effect on “geographies” of women are discussed later in Chapter 5. In addition, while in Batıkent women mostly prefer metro for the non-work activities that are not placed in walking distance, in Keçiören, since there is not a metro service nearby, they mostly prefer dolmuş or bus to places that are not in walking distance.

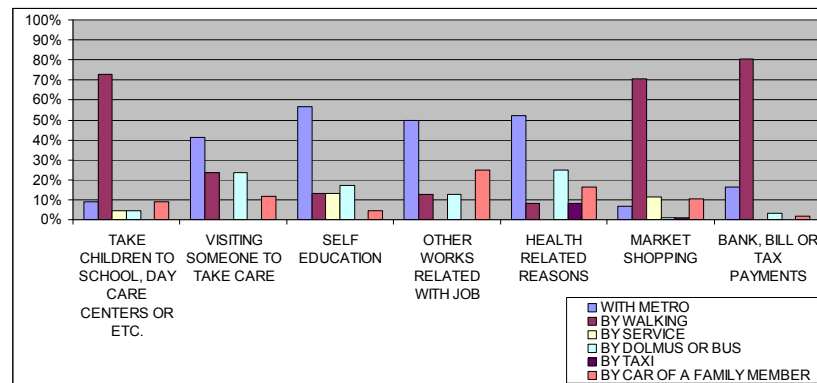


Figure 4.95: How to travel for other reasons on Batıkent metro corridor

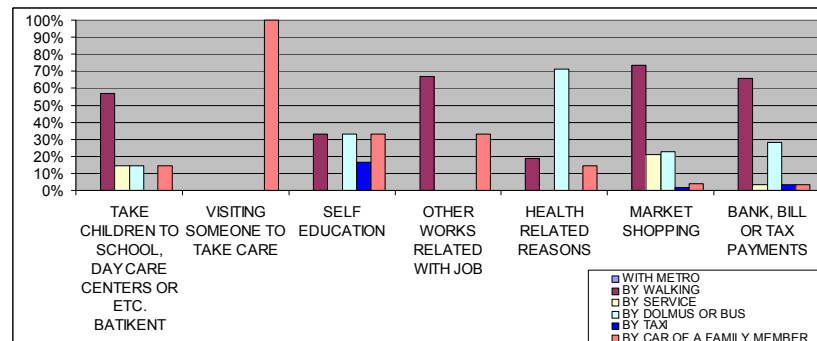


Figure 4.96: How to travel for other reasons on Keçiören corridor

It was illustrated earlier in Figure 4.61 (page 109), women who do not have children mostly performs non-related activities, such as market shopping, education and bank, bill or tax payment. On the other hand women who have children mostly perform non-work activities for market shopping, health related reasons and bank, bill or tax payments.

In this section we mostly intensified on metro usage and non-usage differences. As mentioned before non-work related trip types mostly differentiate according to having children and being married. Therefore in this section we will examine non-work related trip types by using or not using metro for these two women groups.

Figure 4.97 explicitly shows that among women who have children, those who use metro perform other activities more than non metro users. That is to say metro might have a considerable positive effect in fulfilling non-work related activities of women who have children, especially when we examine the non-work related activities performed out of walking distance like health related reasons and visiting someone to take care.

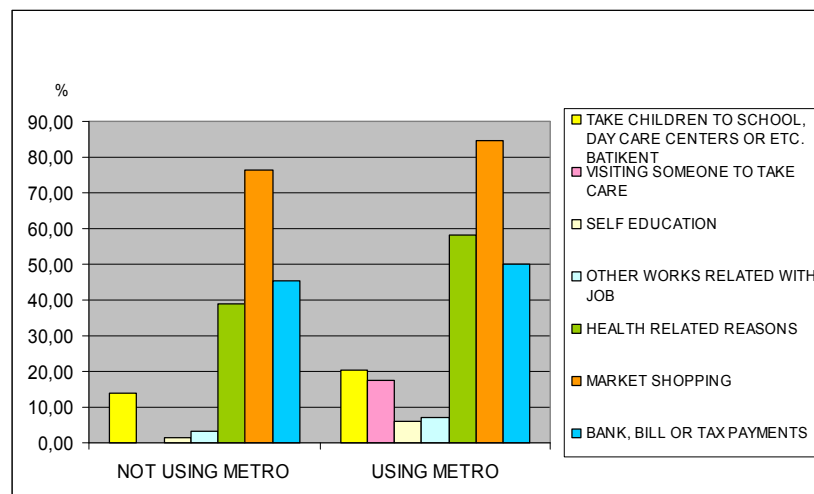


Figure 4.97: Non-work related trip types among women with children: metro users and non-metro users

Other work types also differentiate according to being married or not (See Figure 4.60, page 108). When we examine the effect of metro in performing daily activities among married women (Figure 4.98), we see that there is a significant difference between the ratios of performed non-work related trip ratios. Again here we see that married women who use metro might be supported by the metro, therefore they can travel more for such trips.

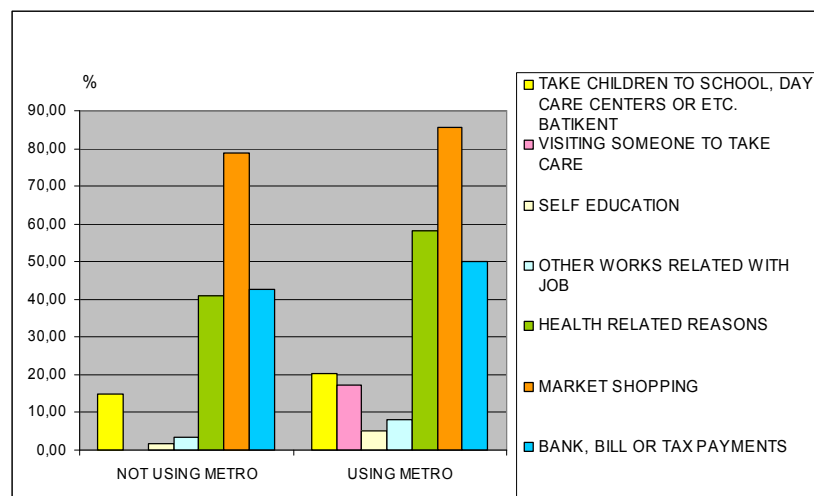


Figure 4.98: Non-work related trip types among married women: metro users and non-metro users

4.5. Women’s Statements Regarding Their Mobility In Relation to the Presence of the Metro System

One of the questions in the questionnaire was whether women would go out and travel at a similar frequency if there was no metro. In general 46,28% of women declared that they would not go out and travel with this frequency if there was no metro (Figure 4.99). This is an important rate, showing that, almost half of the women believe that they would travel less if there was not a metro system.

When we compare the two corridors, on Batıkent corridor 35,80% of women, on Keçiören corridor 8,30% of women said that they would not go outside and travel as often if there was no metro (Figure 4.100). This is a striking result indicating more than one-third of the women in the Batıkent metro route consider the metro system as a crucial transport mode, without which, their mobility would be reduced.

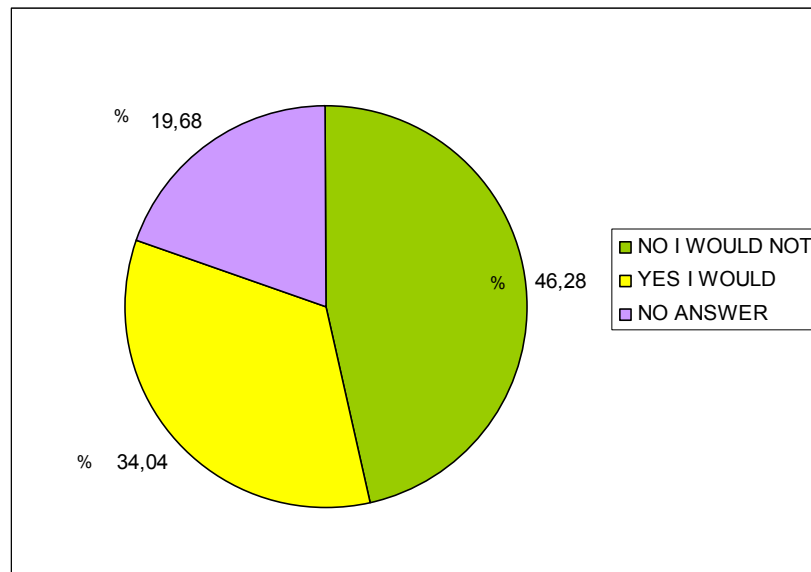


Figure 4.99: Would you go out and travel as often as now if there was no metro?

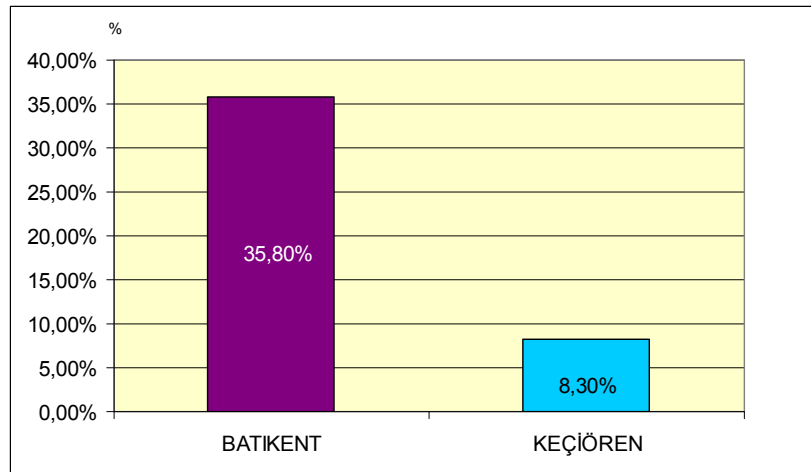


Figure 4.100: I would not go out and travel as often as now if there was no metro

Examining this question by marital status, having children or not, age group, income level, working status and education level will give us metro's effect on the mobility of relatively more vulnerable women groups, who have less mobility levels due to many reasons mentioned in literature survey chapter (married, having children, low income level, and non-working women).

Firstly we will examine the marital status. Figure 4.101 below shows the ratios of women who declared they would not go out and travel as often if there was no metro. The ratio is slightly higher for married women. This means that metro increases to a certain extent the mobility of women of married women, who may have more mobility barriers than single women.

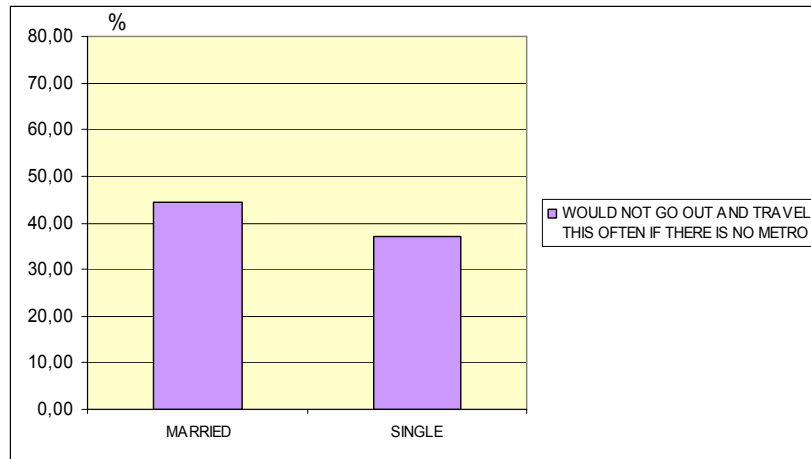


Figure 4.101: Effect on mobility if there was no metro: married and single women

Figure 4.102 is an important one, showing the metro's possible effect on the lives of women with children. While more than 45% of women with children said that they would not go out this often if there was no metro, this rate was only about 30% for women without children. This is important in showing metro has a positive effect on women who have children and therefore who are less mobile. The finding indicates that nearly half the women with children wouldn't be as mobile if there was no metro. This is a significant finding.

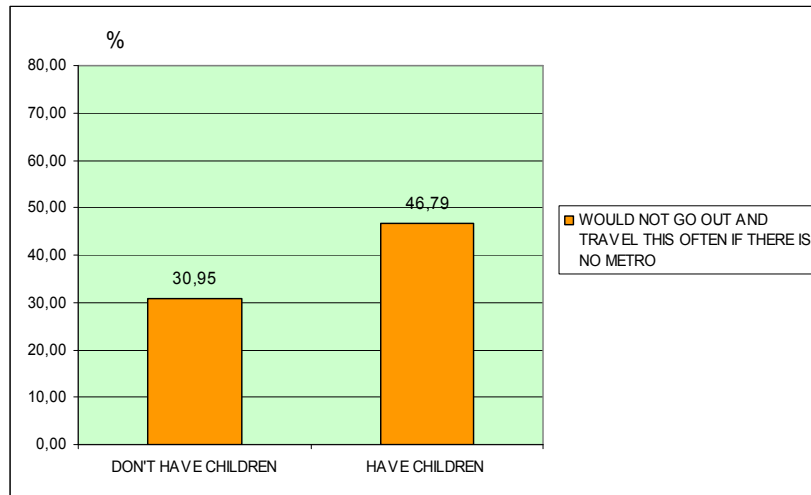


Figure 4.102: Effect on mobility if there was no metro: women with and without children

Income is another barrier from the point of view of mobility. It was shown that low income groups have less mobility. The ratio of women who declared that they would not go out if there was no metro, decreases with increasing income (Figure 4.103). Therefore low income women seem to be more mobile with the help of metro.

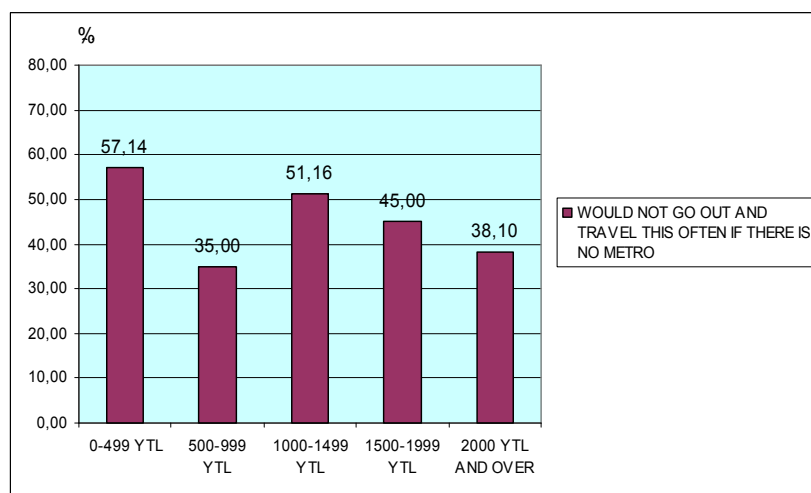


Figure 4.103: Effect on mobility if there was no metro: income levels

Among the different age groups, the least mobile is the age group of 56 and more, as seen in the previous section. Furthermore the previous section showed that mobility levels decreased with increasing age. Figure 4.104 shows that with increasing age groups there is an increase in the ratio of women who said they would not go out often if there was no metro. This means that metro helps to increase the mobility of more vulnerable older age groups.

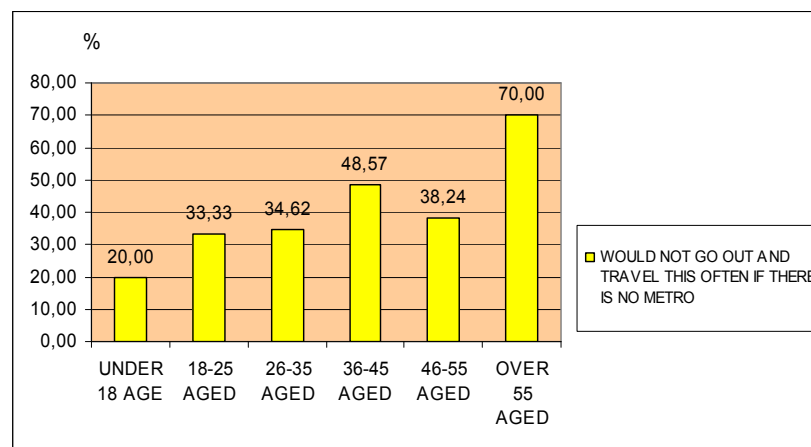


Figure 4.104: Effect on mobility if there was no metro: age groups

Women who do not work are less mobile than women do, as stated in the previous section and in the literature survey chapter. Figure 4.105 indicates the positive effect of metro on the mobility levels of women who do not work. It appears that about 45% of women who do not work, would not go out and travel as often if there was not a metro on this corridor.

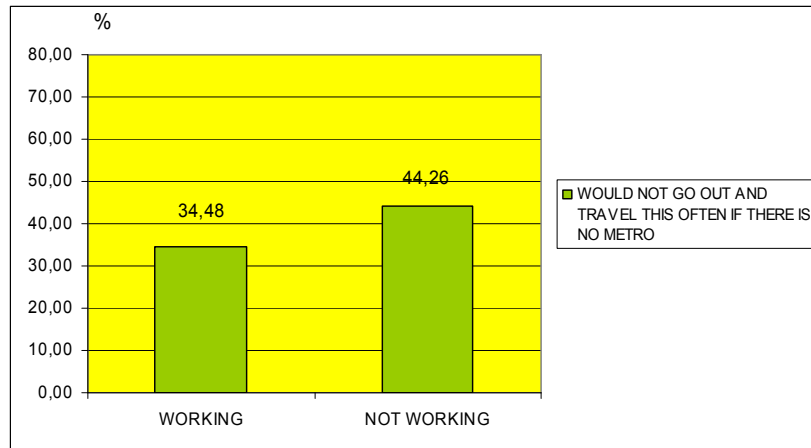


Figure 4.105: Effect on mobility if there was no metro: working status

From the point of view of education level, women who have low education levels seem to be more vulnerable when mobility is considered. As Figure 4.106 shows metro is more important transportation mode for low education women than the other education levels. Therefore metro, again, seems to have a positive effect on the mobility of one of the vulnerable women groups: low educated.

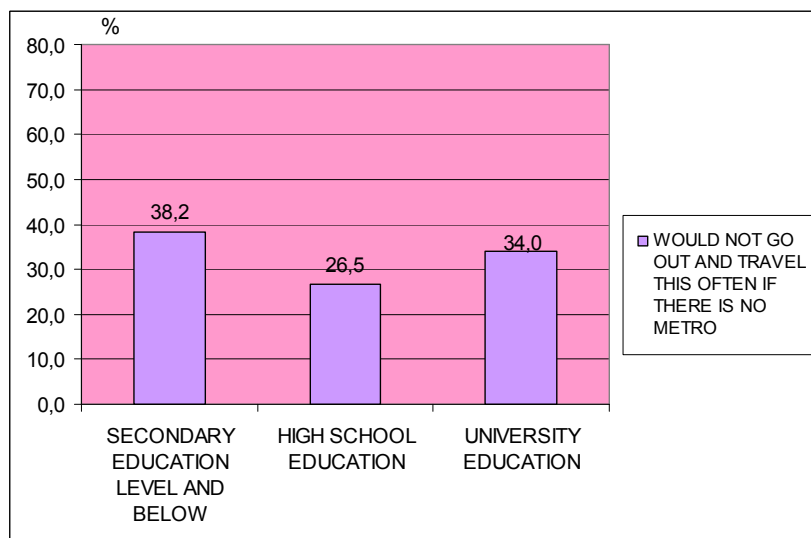


Figure 4.106: Effect on mobility if there was no metro: education levels

4.6. Summary of Findings

As a summary; the analysis of general mobility levels, and their comparison with various personal and household characteristics as well as the Batıkent –Keçiören corridors comparison reveal important results:

Without considering the actual metro usage, it is not possible to suggest with certainty that on a corridor with metro, the mobility levels of women will be high compared to other corridors without metro. Because women living on Batıkent corridor (which has a metro) are less mobile than those living at the Keçiören corridor (where metro does not operate yet).

Socioeconomic and demographic factors affect mobility levels of women. Of such other factors, age, income levels and education levels seem to be the most significant. Those who are elderly, with lower income and lower education level indicated that they very rarely made motorized trips. Also the most mobile group is the economically active age group (18-45) (with 3 or more trips a day). In fact the reasons are obvious, three of the groups have some constraints in terms of mobility. While the low mobility levels mostly might be caused by capability constraints from the point of view of low income women, the reason might be mostly cognitive constraints from the point of view of less educated women. On the other hand we can add that elderly women might mostly have both cognitive and capability constraints. These constraints do not allow them to be more mobile and furthermore we can interpret that their geographies might be narrower due to those capabilities (geography subject will be dealt in detail in Chapter 5 and perceptions and cognitive constraints will be studied in Chapter 6).

When socioeconomic and demographic factors are considered, Ankara Case showed that women with children, married women, women who do not work and women with low income are less mobile than women without children, single women, women who work and women with high income respectively. This can be explained as such: Having children, being married might increase the maintenance stops and therefore might make more complex trips due to trip chaining; or if women have to

fulfill those maintenance activities within the walking distance, that is to say with non- motorized trips, due to time limitation mobility levels might decrease. On the other hand women who work has regular trips for working and women with high income have the advantage of income level for being more mobile. As a summary, we can say that in the literature survey chapter (Chapter 2) it was stated that domestic responsibilities might increase the mobility levels of women, but field research in Ankara shows that increased domestic responsibilities, due to being married and/or having children, etc. causes a decrease in mobility levels, possibly because increased responsibilities limit women to perform these activities within walking distance.

When we study the metro usage levels among different socioeconomic and demographic groups, it has been showed that the youngest and the elderly, the middle income women, women with children and women with high education level use metro most.

After analyzing general mobility levels, this chapter also reviewed the effect of using the metro on mobility levels of different women groups. Generally we saw that using the metro positively affects the mobility levels of women. Although the trip frequency between metro users and non-metro users do not change as significantly as might be expected, metro users are more mobile than non metro users. That is to say metro users and non-users both make motorized journeys and have a certain level of mobility; however, in metro user group the ratio of women who “very rarely” travel is lower. Furthermore at weekends the difference between metro users and non-users is more, that is to say women who use metro are more mobile for leisure reasons in the weekends.

When we focus on different women groups we see that among vulnerable women, metro effect on mobility is very significant. The most positively affected groups from the existence of metro seem to be the elderly and women with low income. Women with children, women who do not work and women who are less educated also seem to be positively effected from the metro existence. Metro users of these groups are much more mobile than non-metro users.

“Whether women would go outside with this frequency if there were no metro” is an important indicator showing the exact effect of metro on vulnerable women groups’ mobility. When we examine generally it can be said that the number of women who declared that they wouldn’t go outside with this frequency if there were no metro constitute almost half of the sample group. This is a very important ratio, because nearly half of the women believes that they couldn’t be as mobile as now if there was no metro system. When we examine each vulnerable women group we can mention that metro has a positive effect on vulnerable women groups’ mobility levels. Because the ratio of declaring “I didn’t go outside with this frequency if there is no metro” is higher among relatively older, women who have children, low income women, women who do not work and women who have low education levels. This means that metro positively affects the mobility of more sensitive and therefore less mobile women. Mode choice theories showed that, in the literature survey chapter, although conventional modeling techniques mostly take travel time and travel cost as determinant factors, in recent years socioeconomic and demographic factors have been added in mode choice models. However, the measurement and calculation problems caused the widely usage of time and cost still as main determinant. The Ankara case study gave in this respect that metro is a very important mode from the point of view of women with different constraints, both capability and cognitive. That is to say taking into account different socioeconomic and demographic factors are very important in mode choice studies and transportation investments when women are considered. Ankara case study showed that women with low income, the elderly and the youngest women, women who do not work, less educated women and women who have children are more vulnerable groups, who have less mobility levels when compared with others. The analysis explicitly showed that the usage of metro positively affects the mobility levels of these vulnerable groups.

CHAPTER 5

CASE STUDY QUESTIONNAIRE RESULTS: WOMEN'S LEVEL OF USING AND EXPERIENCING THE CITY (THEIR TRAVEL GEOGRAPHY) AND THE EFFECT OF METRO

5.1. INTRODUCTION

It was discussed in the literature survey chapter that travel need is created by activity needs; and therefore many researchers made different categorizations of activities. Although different researchers give different names, there are 3 main activity categories created by different types of needs: subsistence, maintenance and leisure activities. Subsistence activities are created by basic needs and activities of human being. They are related with working, going to school and etc. Maintenance activities are related with consumption needs of people, that is to say food and clothing shopping, bank or bill payments, etc. These two type of activities are obligatory activities and serve mostly for all household members. As mentioned in the literature chapter leisure needs are different from the other two types in terms of time and gender. Those needs are mostly fulfilled in times remaining from the other two needs, and people mostly satisfy their leisure needs on weekend and men's portion in the leisure related travels are more than women due to their traditional role and some other reasons.

From the point of view of women, there are different travel patterns, not only due to personal and household characteristics, but also due to activity types. In addition different women groups have different travel patterns for different activities. In the following sections, we will deal with the spatial aspect of mobility, considering both different activity types and the effect of metro on urban geography. The analysis intends to show the "geography" of women, i.e. their extent of using and

experiencing the city, while performing a variety of different activities and trip making. The differences in women's geographies are also analysed with respect to various socio-economic and demographic characteristics, and more importantly with respect to metro usage. A major aim of this chapter is to find out whether different women groups especially the vulnerable ones (which are determined in the previous chapter) who use the metro have wider urban geographies, i.e. experience more areas of the city, and whether metro is effective in enlarging the geography of women, particularly the vulnerable.

5.2. WORKING TRIPS AND THE GEOGRAPHY OF WOMEN

It will be remembered from Chapter 4 that majority of women both in Batikent and Keçiören Corridor do not work, and working women only constitute 19,5% on Batikent Corridor and 10% on Keçiören Corridor. However we can see that more women work on Batikent corridor than on Keçiören corridor when the interviewed women are considered. However although women who are working declared the data about working trips' mode choice on Batikent corridor; women, in work, who are living on Keçiören corridor did not give this data. Therefore working trips are only examined from the point of view of women who live on Batikent corridor.

Women, who work, mostly work full time (Figure 5.1.). This means that women have limited time for other activities when compared especially with part time workers, and probably they integrate other type of trips into work trips, causing trip chaining, at least in weekdays.

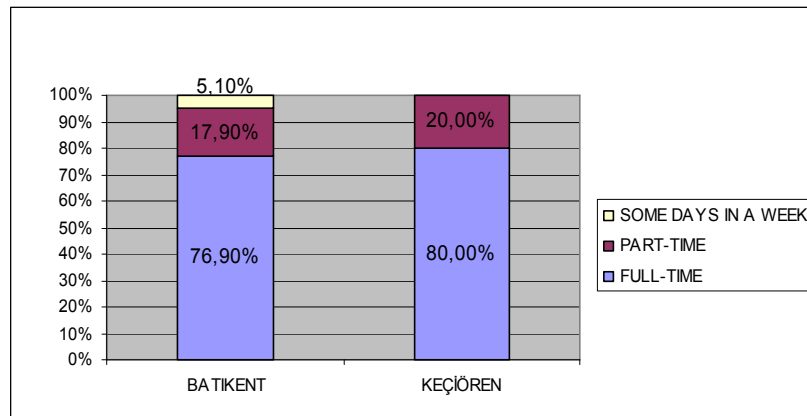


Figure 5.1: Daily working time of women in work

Figure 5.2. shows the places where women go for working. It can be seen that on Batikent route women work mostly in Yenimahalle and Çankaya (here we need to notice that Çankaya is a large geography), whereas women on Keçiören route mostly work in Keçiören. These figures show that women tend to choose to work nearby their residential area. Especially Keçiören figures are very significant from this point of view. However, there is another interesting point; the ratio of women on Batikent route who work in Çankaya is also high, although Çankaya is not very close to their residential area. This might be the positive effect of metro on working trips; because metro enables a direct connection to Çankaya.

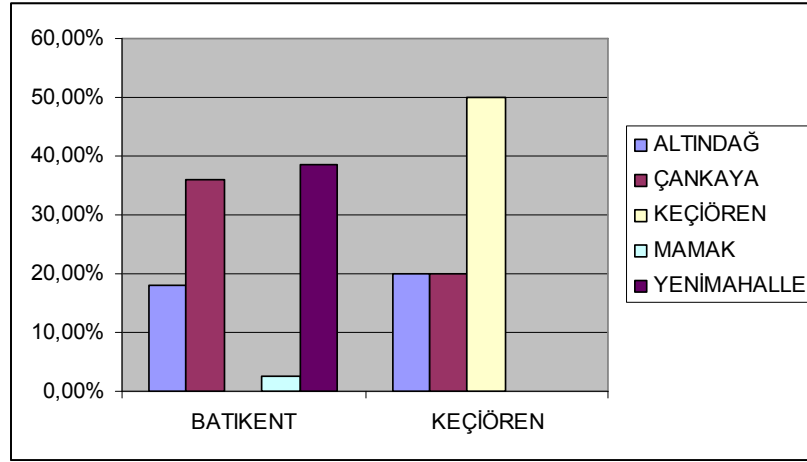


Figure 5.2: Working area of women in work

Therefore it is important to look at metro usage ratios for working trips. On Batikent route we see that nearly half of women who work use metro for working trips (Figure 5.3). But on Keçiören no women had declared that they used metro for work trip.

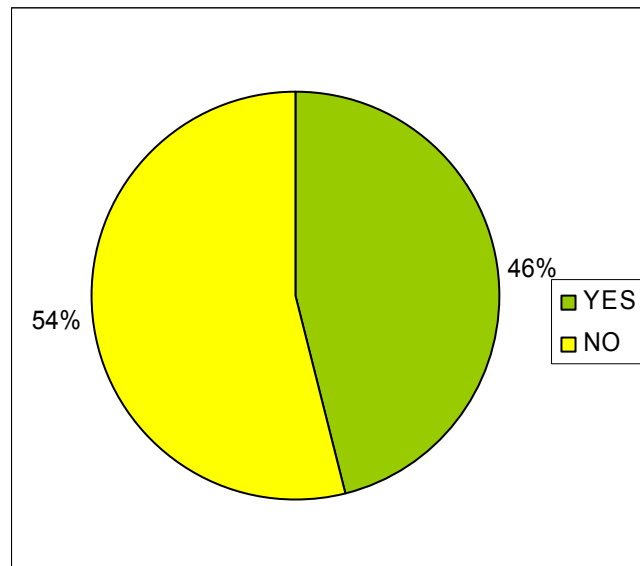


Figure 5.3: Metro usage rates for working trips on Batikent corridor

We see that among women who work in Çankaya and Yenimahalle metro usage rates are high (Figure 5.4), which may suggest that metro may have an effect on the choice of working places since it appears that women tend to work in places where there is a metro connection however, it should also be noted that metro provides access to central working areas, hence to areas with working opportunities.

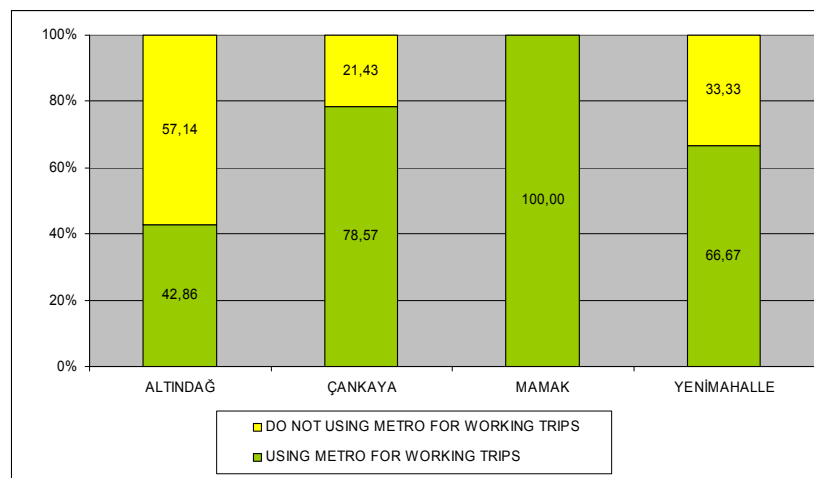


Figure 5.4: Metro usage rates for working trips by working area on Batıkent corridor

Women who do not choose metro for working trips on Batıkent corridor mostly work within the walking distance of their residential area, as Figure 5.5. shows.

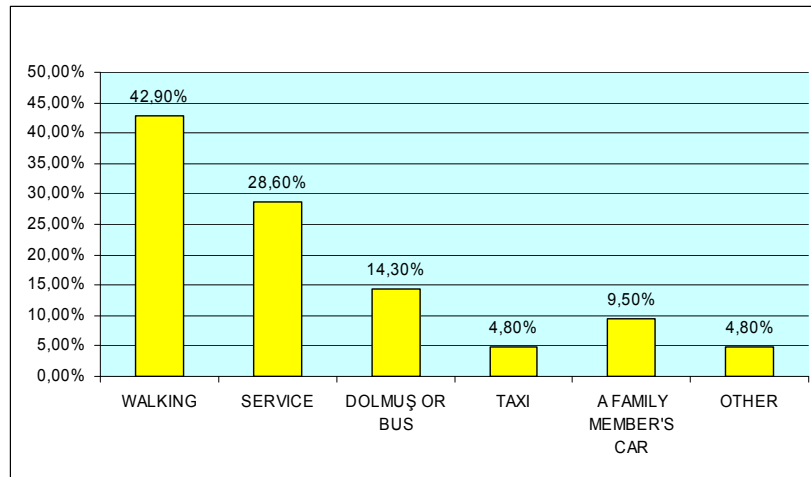


Figure 5.5: Mode choice for working trips of non metro-users on Batkent corridor

From Figure 5.6. we see that low income women mostly work in Çankaya where they travel mostly with metro. It will be remembered from the previous chapter that low income women have low mobility levels. In spite of this, most of them work in Çankaya, which may be considered as the positive effect of metro on mobility (Figure 5.8. also shows this result, because those with 1000-1499 YTL income, who work mostly in Çankaya use metro with a 88,89 % rate for work trips).

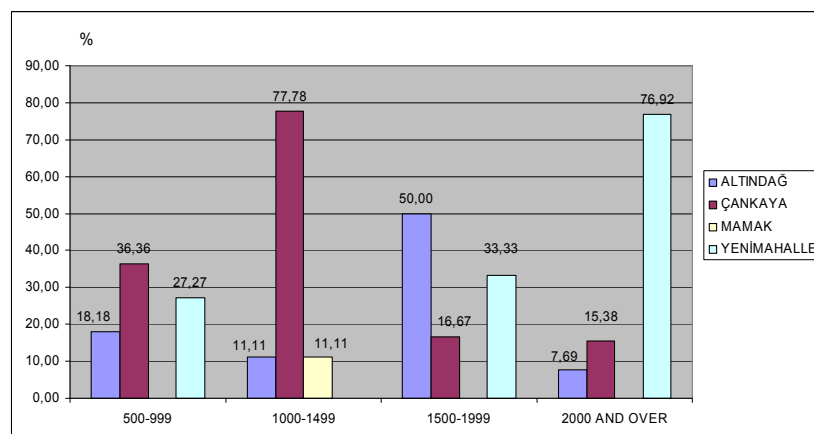


Figure 5.6.: Working place by income on Batkent corridor

It is important to analyze the working mobility of low income women considering metro users and non-users, to understand the metro effect. We can see from Figure 5.7 that low income women who use the metro have a larger working geography than non-users. Therefore it can be said that metro has a positive effect on vulnerable women group's working mobility and geography.

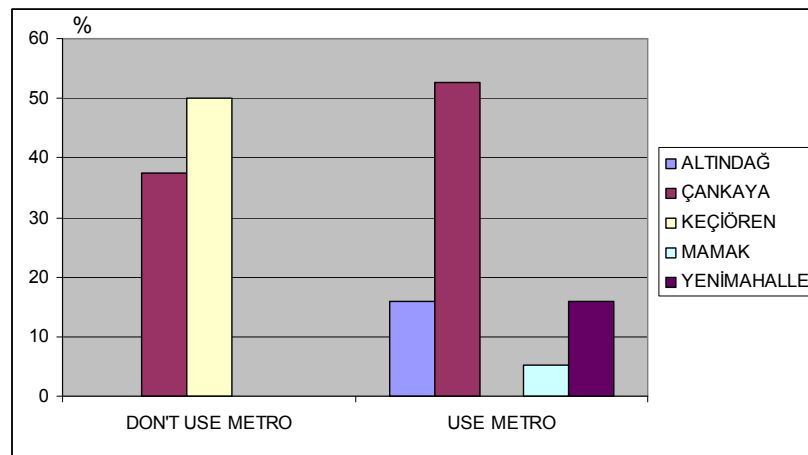


Figure 5.7: Working place of low income women workers: metro users and non-users

Figure 5.8. also shows that mostly low and middle income women use metro for work trips and they work in Çankaya and Altındağ mostly. This shows that metro enables vulnerable women group to be more flexible from the point of view of working place, giving the chance of working in farther places, which means more mobility.

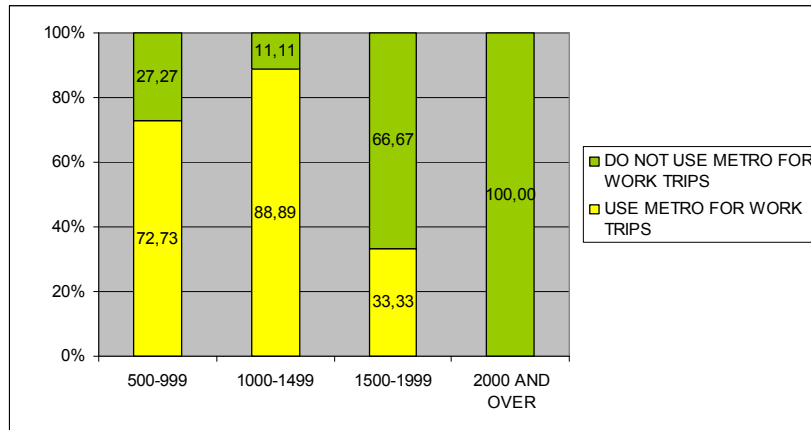


Figure 5.8: Metro usage for work trips by income among women who live on Batıkent corridor

Women living on Keçiören corridor stated that they did not use the metro for work trips. Women on this corridor need to use at least one vehicle to reach metro. Therefore if one use metro for working trips, she needs to transfer vehicle both in the morning and in the evening, which cause an increase both in time and money cost of mode. In research chapter it was mentioned that low income people need to minimize money cost of travel, therefore it is not very surprising to get such a result. When we examine where low and middle income women work (Figure 5.9) we can see that they mostly work in Keçiören, where probably placed in walking distance, and then in Çankaya where they can reach with one vehicle, perhaps with bus or dolmuş.

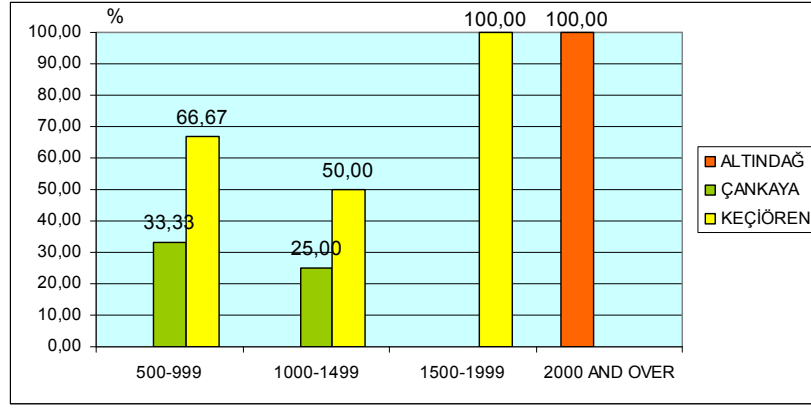


Figure 5.9: Working places by income of women living on Keçiören corridor
 (Among interviewed women on Batıkent metro corridor, the proportion of women who work is very low; while 161 women declared that they did not work, only 39 of them declared that they worked among 200 interviewed women)

Figures 5.10, 5.11, 5.12, 5.13, 5.14 and 5.15 show that especially women who have children, elderly and with low education levels are vulnerable from the point of view of working geography, that is to say they have narrower working geographies. But Batıkent-Keçiören comparison reveals that women living on Batıkent corridor have wider working geographies, including vulnerable women.

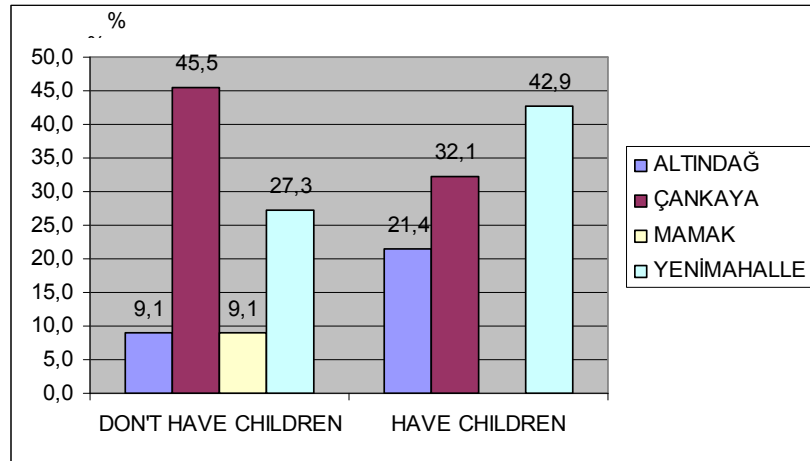


Figure 5.10: Working places of Batıkent corridor women: have or don't have children

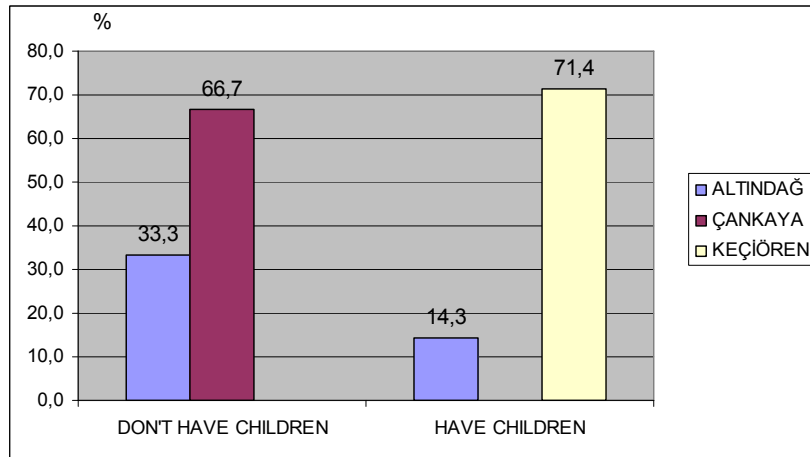


Figure 5.11: Working places of Keçiören corridor women: have or don't have children

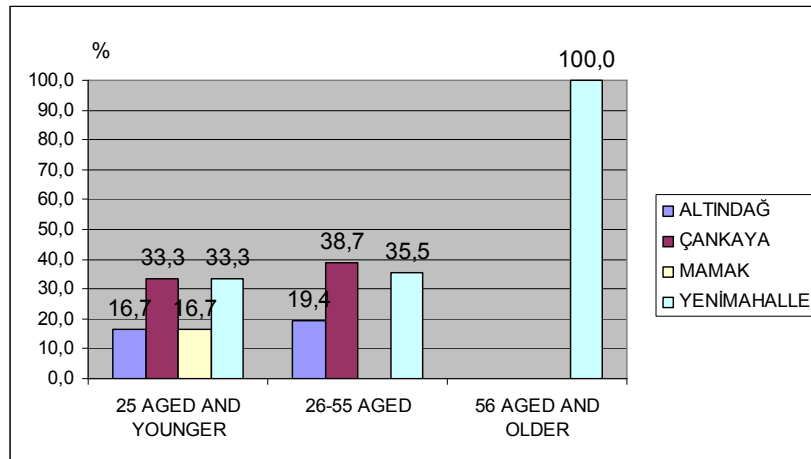


Figure 5.12: Working places of Batıkent corridor women: age groups

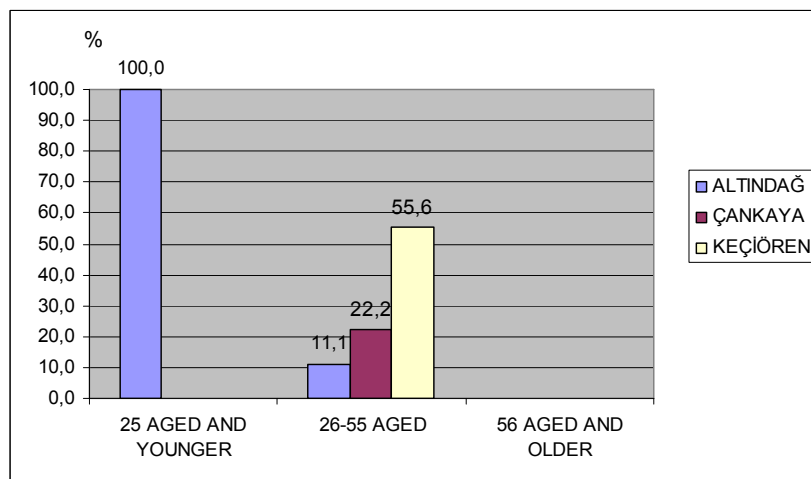


Figure 5.13: Working places of Keçiören corridor women: age groups

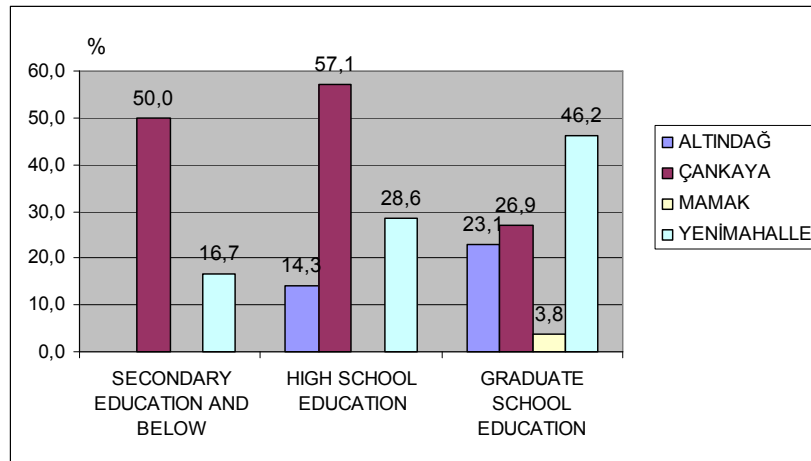


Figure 5.14: Working places of Batıkent corridor women: education levels

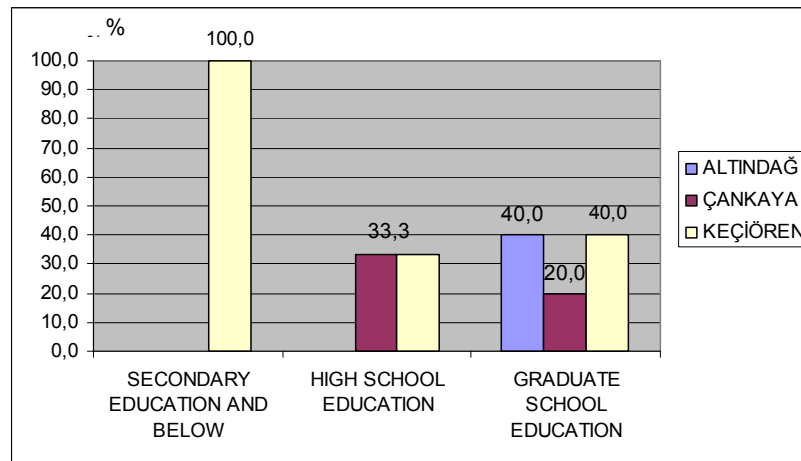


Figure 5.15: Working places of Keçiören corridor women: education level

When we examine other women groups metro usage rates for work trips, we come across with interesting results. Metro usage ratios are quite high among women who have children, who are the younger and elderly, who have low income and who are less educated. This shows that metro is an important transportation mode for

vulnerable women and that their working geography has been widened by the help of metro usage (Figures 5.16, 5.17 and 5.18).

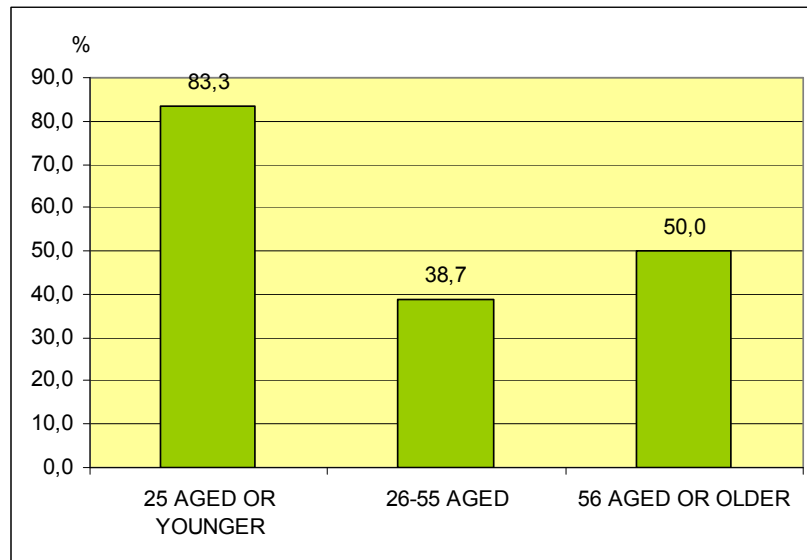


Figure 5.16: Metro usage for work trips: Age groups

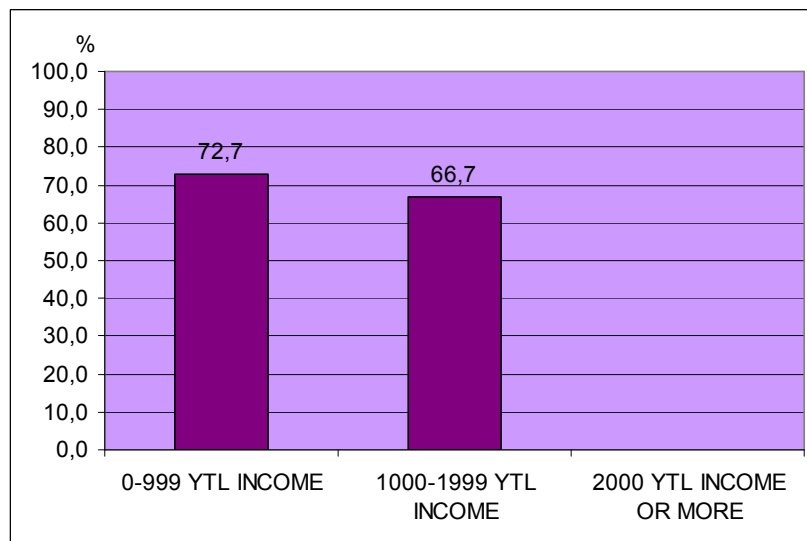


Figure 5.17: Metro usage for work trips: Income groups

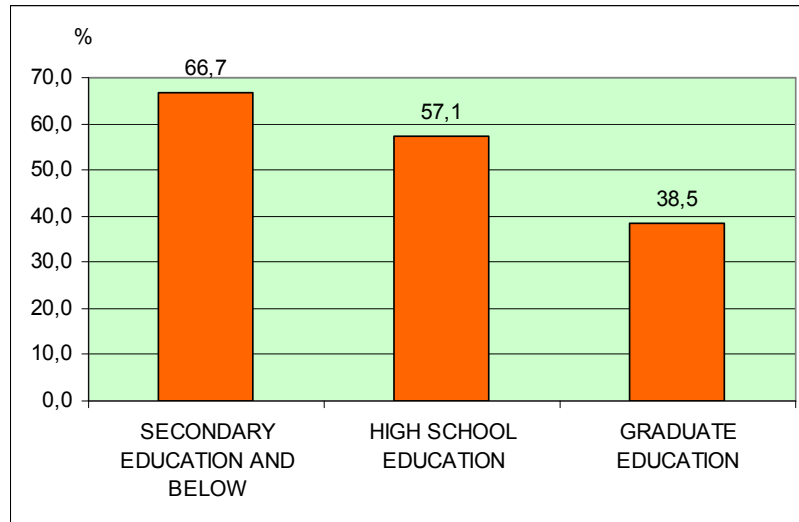


Figure 5.18: Metro usage for work trips: Education level

Figure 5.19 shows why women do not prefer to travel with metro for work trips. The striking result is that more than half of working women work in walking distance, or they use service vehicles. This shows that metro remains to be an important mode in motorized trips, and those women who choose not to go to work with the metro do so either because their work place is in walking distance or because they use company service vehicles, which may provide a more convenient door-to-door service.

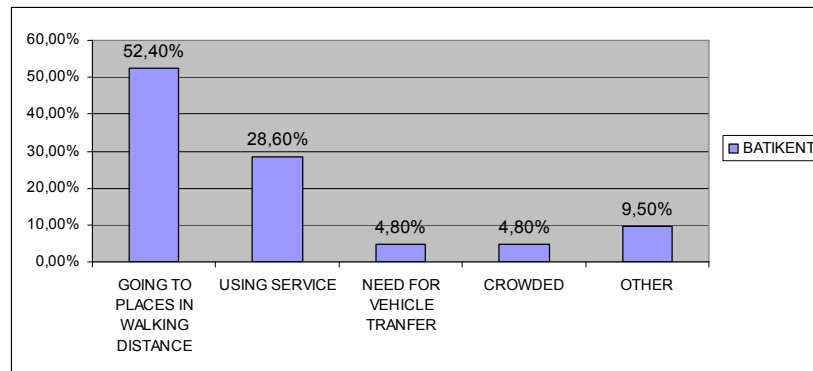


Figure 5.19: Reasons for not using metro for working trips on Batikent metro corridor

Working trips are related with subsistence needs. Working trips are mostly realized in weekdays. Weekday trips of women in work might be more complex than non-working women; because working women already have one destination point (work place) and then a final destination point (home again). That is to say they already make 1 round trip every day. Therefore other trips, like taking children to or from school, shopping, etc., have to be integrated to this round trip and so trip chaining probability increases and complex trip types occur. This may create a time limitation for women who work for leisure activities; therefore it may be thought that women who work are less mobile for leisure trips. But chapter 4 showed us that women who work are more mobile both in weekdays and weekends. Therefore the field study showed that women who do not work is a more vulnerable group in terms of mobility than those who work.

When we consider metro usage effect on working geography we can say that the metro has a positive effect. Especially when we analyze vulnerable women groups , such as low income, less educated and relatively younger and older women, we see that those women use metro for working trips more and especially on Batikent corridor low income women could work in farther places when compared to those living in Keçiören. Furthermore, the ratios of workers in youngest age group and elderly group were much higher in Batikent corridor when compared to Keçiören.

When we assess their metro usage for work trips, their metro usage ratios seem to be very high. This means that metro user vulnerable women group's working geography is larger than non-metro users; and furthermore the amount of workers among relatively older and younger women groups is higher among metro users.

5.3. SHOPPING TRIPS AND THE GEOGRAPHY OF WOMEN

In this research we did not investigate food shopping trips. Because these trip types are more likely to be fulfilled within walking distance as a non-motorized activity. Therefore in this analysis we take clothing shopping as the shopping activity, since women mostly make motorized trips for clothing shopping trips.

Clothing shopping is considered as a maintenance activity, as mentioned in literature chapter. When we examine times of clothing shopping of women by districts, two corridors (Batikent, Keçiören) show some similarities besides some differences. Women living on both corridors mostly make clothing shopping in day times, but although women living on Keçiören corridor mostly fulfill those activities in weekdays, their day time weekend clothing shopping rates are less than women living on Batikent corridor (Figure 5.20). Women living in the Batikent corridor women seem to go outside more for clothing shopping at weekends, as well as in evenings. Indeed this is an important finding, because it seems that metro enlarges the time geography of women, because shopping rates for evenings are high. That is to say women utilize more time during a day for shopping reasons, with the help of metro.

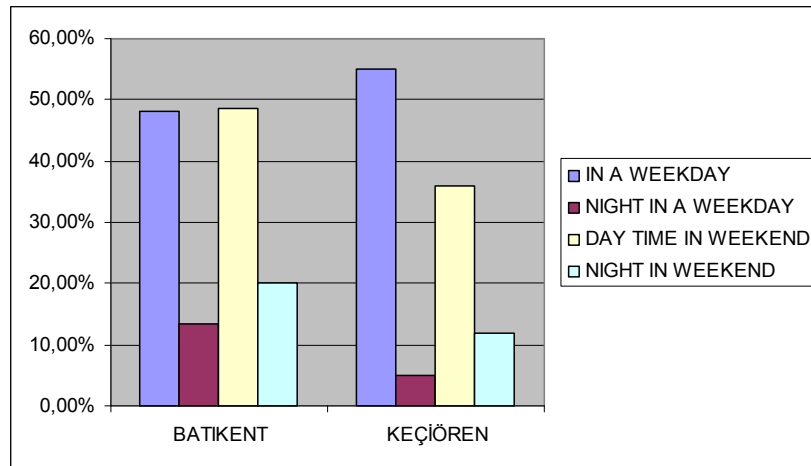


Figure 5.20: Shopping times by the two corridors

Metro usage rates for clothing shopping is given in Figure 5.21, which shows that the majority of women who have been interviewed prefer to travel with metro for clothing shopping.

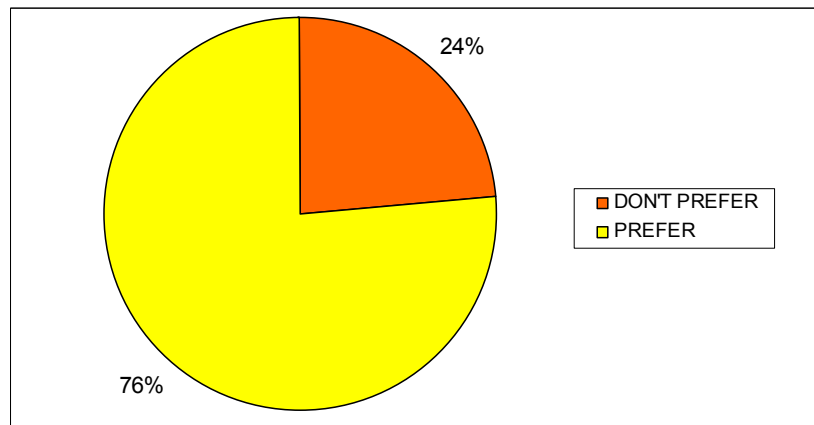


Figure 5.21: The ratio of metro preference for clothing trips

Figure 5.22 gives us preferred shopping places and their ratios within the two districts. We can see from the figure that Ankamall and Kızılay are two places, which women living on both Batıkent corridor and Keçiören prefer to go for shopping. Women living on Keçiören corridor also prefer to go to Ulus for shopping purposes. When we examine women on Batıkent corridor, other shopping places they prefer are Demetevler, Yenimahalle and Batıkent (Carrefour and other places), where there is a metro connection. Furthermore it appears that more women living on Batıkent corridor mostly prefer shopping in places where there is a direct metro connection.

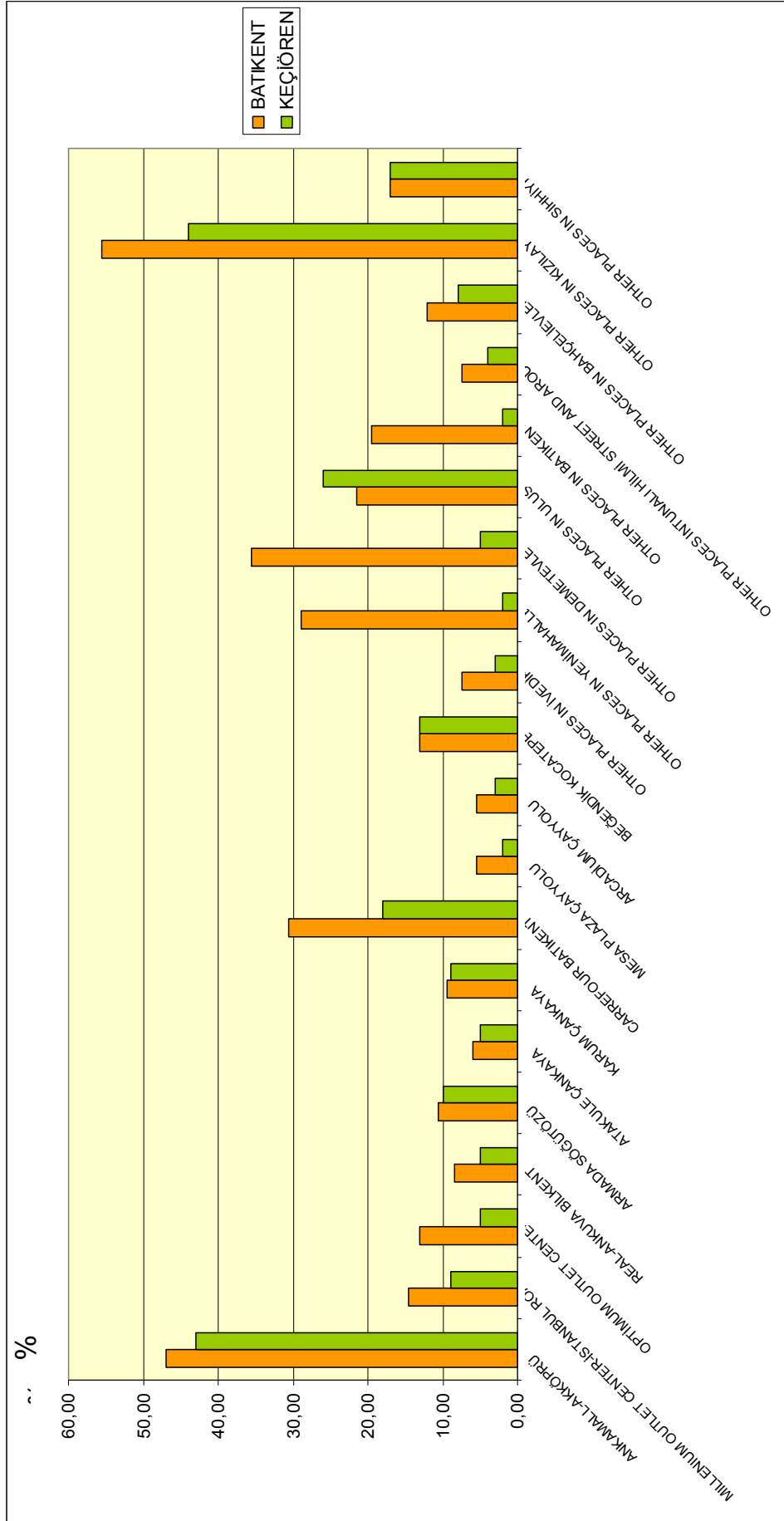


Figure 5.22: Preferred shopping places of women: Batikent and Keçiören Corridor

Figure 5.23 and 5.24 give preferred transportation mode for shopping in both districts. It is seen that: while women living on Batıkent corridor mostly choose metro, women living on Keçiören corridor mostly choose dolmuş or bus to travel for shopping. Family car's alternative is metro on Batıkent corridor, on Keçiören corridor, whereas family car's opponent is dolmuş or bus.

It is particularly important to note that, the two leading shopping places that women in Batıkent corridor use for shopping are also the ones that they use the metro access: 81% of those who go to Ankamall in Akköprü use the metro, and almost 90% of those who go to Kızılay for shopping use the metro. It is possible that they prefer these locations because they can be accessed by the metro.

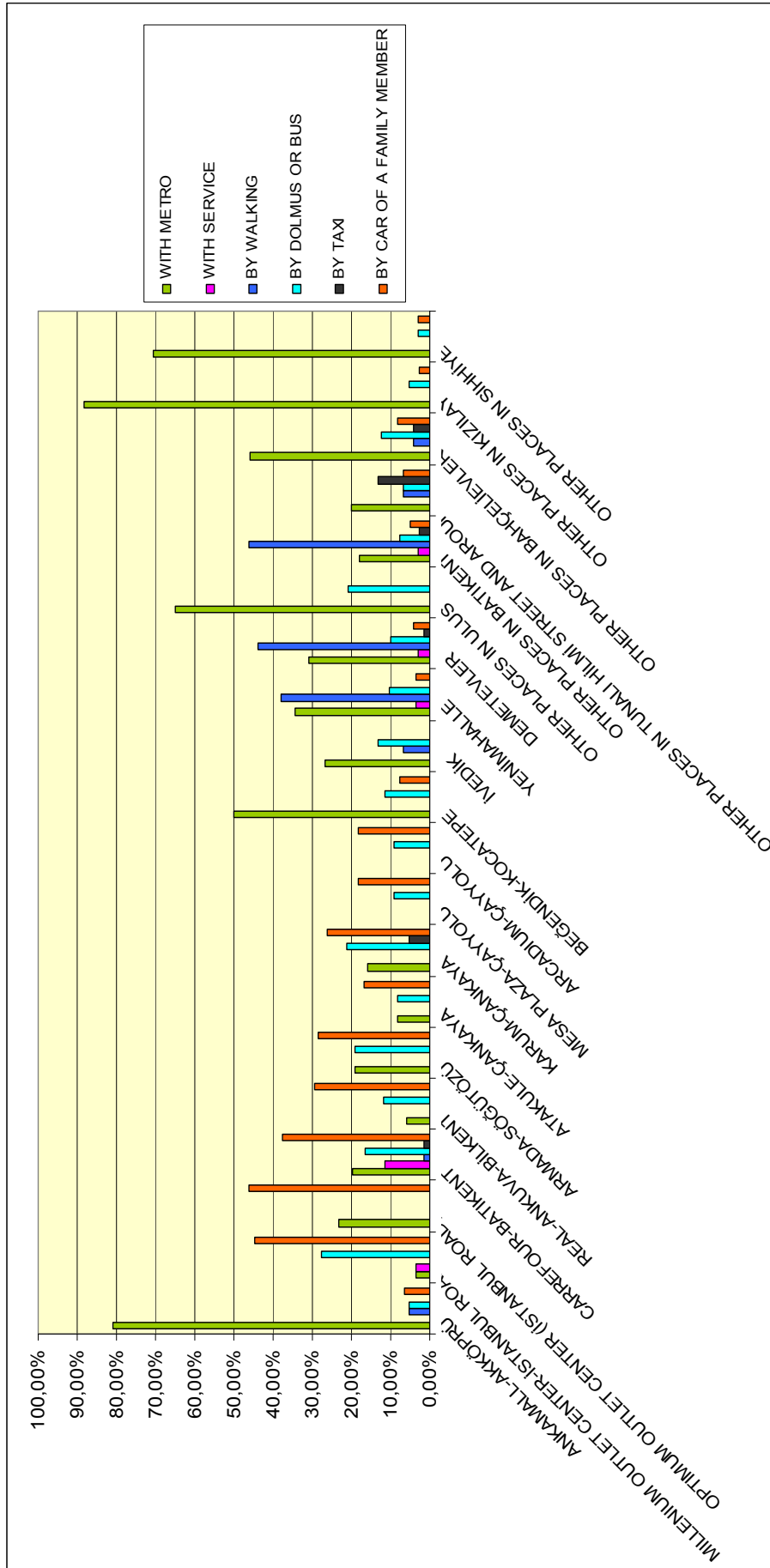


Figure 5.23: Preferred transportation mode for shopping purposes on Batikent corridor

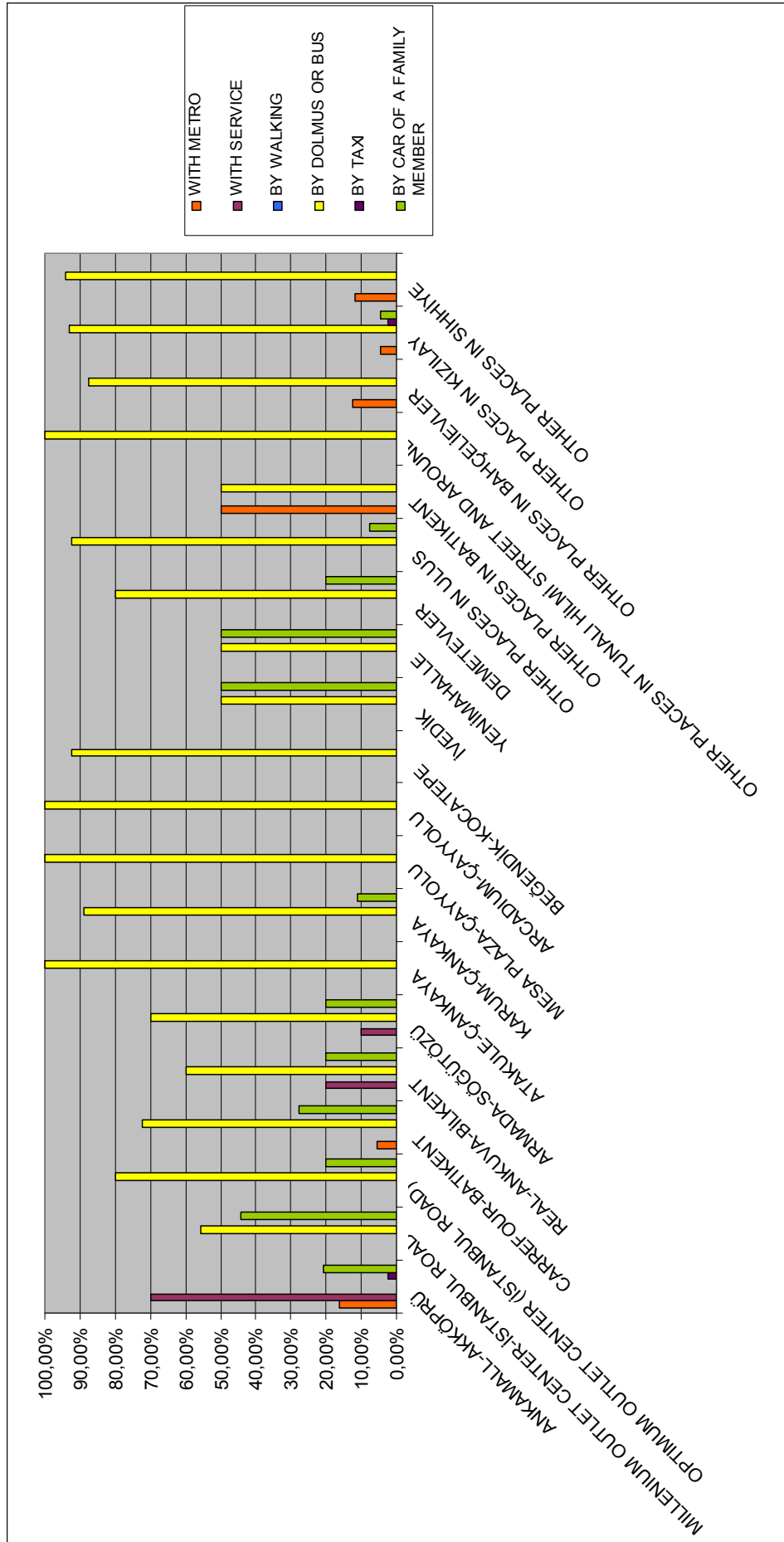


Figure 5.24: Preferred transportation mode for shopping purposes on Keçiören corridor

Figure 5.25 shows that metro user women go to more places for shopping than non-users. Among the interviewed 300 women, there are 188 women who use metro and 112 who do not use. When we compare shopping places among metro users and non users, the result is striking: while 188 metro users pointed out 600 preferred places in total, 112 non-users declared only 200 places where they prefer to go for shopping. This is a very important result, showing that, on average, women who use the metro travel to 3.2 different shopping locations, as opposed to the average of 1.8 for women who do not use the metro, this can be considered as an indicator of higher mobility for metro user women when shopping trips are considered. From the point of view of their geography, metro users and non-metro users seem to travel to same places. But we can say that a higher proportion of women who use metro goes to those places. That is to say, more women from metro users group have larger geographies than the groups of women who do not use metro.

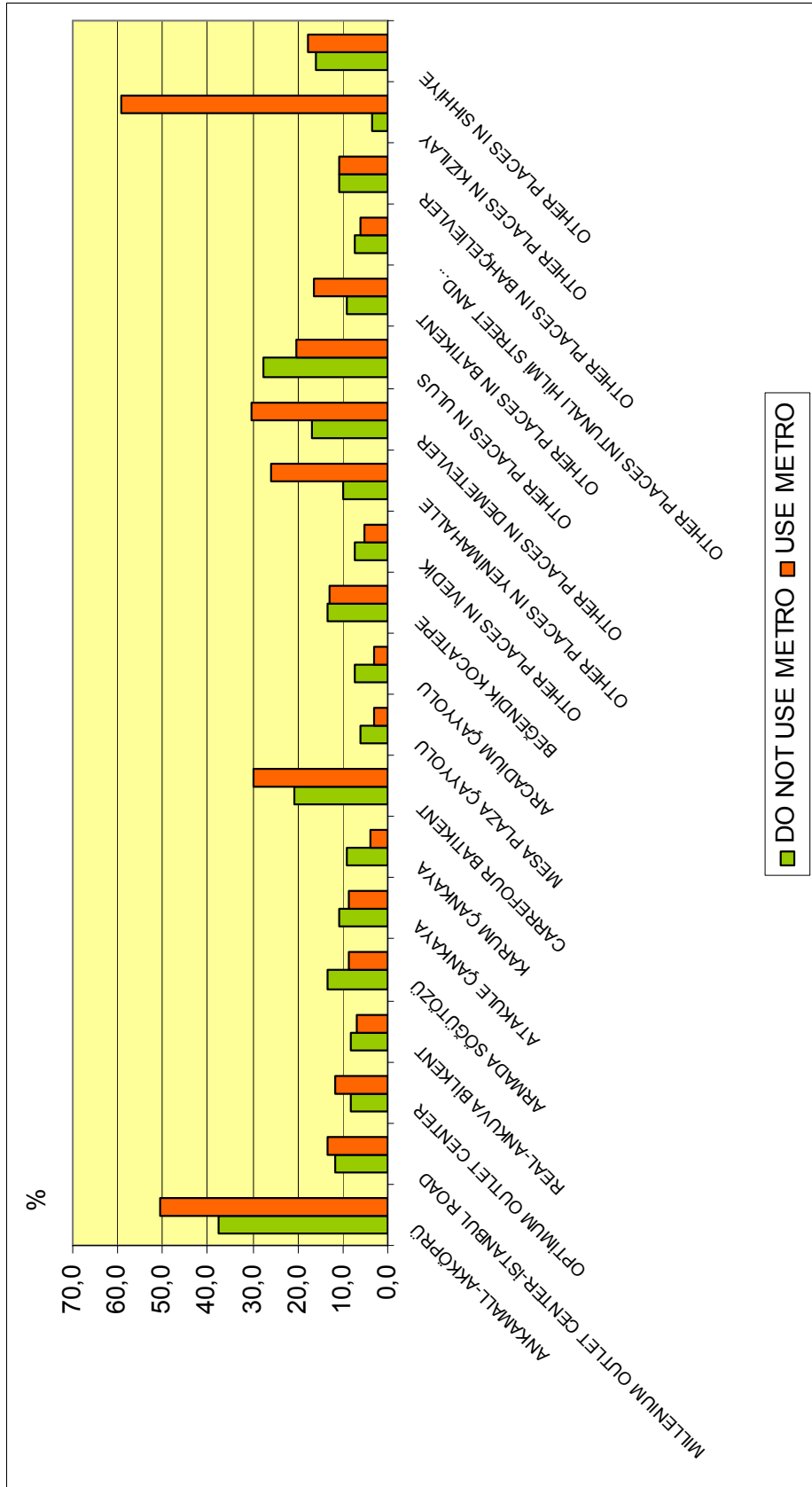


Figure 5.25: Preferred shopping places of women: metro users and non-metro users

As mentioned earlier, there are relatively more vulnerable groups among women, namely non-working, elderly or the youngest, those with children, and those with low income. Those groups' mobility was identified to be much lower in the previous chapter. Therefore in this section, we will narrow the focus of the analysis to deal with those vulnerable groups and observe whether metro has a positive effect on their mobility and geography or not.

Firstly we know that women who do not work are less mobile than workers. Figure 5.26 shows that workers use metro more for shopping reasons than non-workers. This supports the above finding that non-workers are more vulnerable than workers from the point of view of shopping trips.

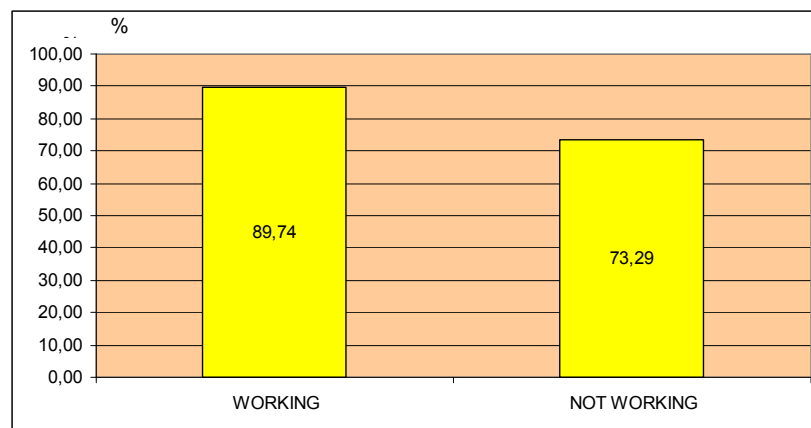


Figure 5.26: Metro usage rates for shopping: workers and non-workers

As we saw in the previous section, working status is an important factor in determining other activity times. Figure 5.27 shows that while women who work mostly make clothing shopping in the day time in weekends, non-working women mostly go clothing shopping in a day time in weekday. From the point of view of women in work, this means that they have travel needs created by maintenance needs

not only in weekdays but also in weekends too, on the other it might be due to lack of time in weekdays and therefore they make shopping activities in weekend days.

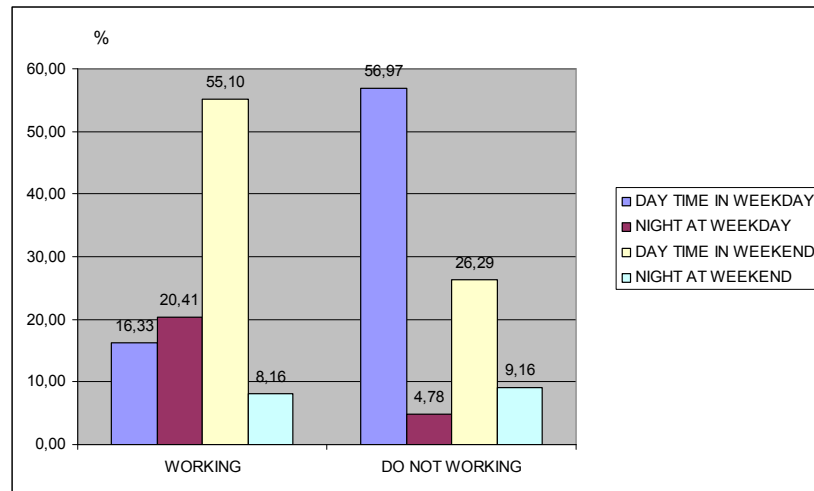


Figure 5.27: Clothing shopping trip times by working status

There are 49 women who work and 251 women who do not work in sample women. Figure 5.28 shows the two groups' (workers and non-workers) shopping place preferences. While 49 women who work marked 157 places for shopping, 251 women who do not work marked 813 places for shopping. This means that women who work and women who do not work both travel to 3,2 places for shopping. It is an interesting result showing that woman who works does not travel more for shopping than woman who does not work. When we examine workers and non-workers shopping geography, we see that women who do not work mostly prefer Kızılay, the city center, Ankamall, Batıkent-Carrefour, Yenimahalle, Demetevler, Ulus and Batıkent for shopping. When we assess the shopping geography of both groups, we see that non-workers experience a larger urban geography for shopping reasons. It is very interesting that women who do not work have lower mobility levels than women who work. But in this case, from the shopping activity point of

view, we can say that non-worker women are not vulnerable both for shopping mobility levels and shopping geography. This may be caused by the time limitation of workers and therefore time geography of workers seems to be narrower.

Therefore we can say, as mentioned in literature survey chapter, working women have narrower geography, due to having more responsibility, working and domestic responsibilities, than non-workers.

Having a larger shopping geography still does not mean that women who do not work are less vulnerable. Vulnerability is a more complex phenomenon that requires more factors to be examined other than shopping geography. Therefore we still need to examine the effect of metro on the shopping geography of women who do not work.

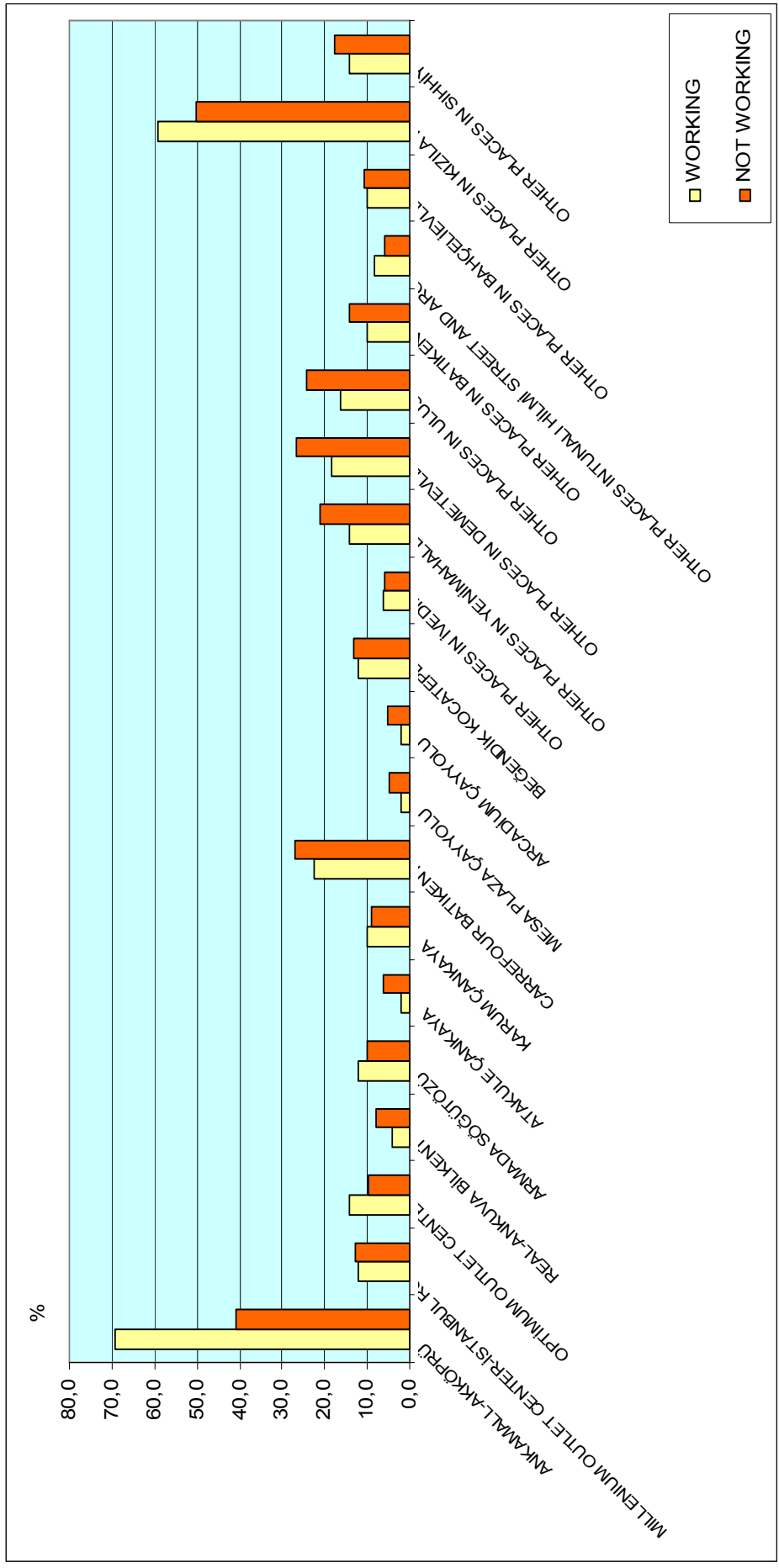


Figure 5.28: Preferred shopping places: workers and non-workers

Figure 5.29 shows us that women who do not work and use the metro are much more mobile than women who do not work and do not use the metro. There are 251 interviewed women who do not work. 152 of them use the metro, 99 of them do not. From the point of view of their preferred shopping places, we see that while 152 metro users pointed 534 places for shopping, 99 non-users pointed only 287 places. This indicates 3,5 different shopping destinations for metro-users on average, as opposed to 2,9 for non-users. This shows the metro's positive effect on more vulnerable women's mobility and urban coverage.

Figure 5.29 gives us the preferred places and their preference ratios. As can be seen from the figure, metro users travel more for shopping. Although in general non-workers constitute a vulnerable group, that is to say they travel less and are less mobile than workers in general, they have a larger urban shopping geography and metro users among non-workers are more mobile and have larger urban shopping geographies than non-users. Therefore metro has a positive effect and although in general women who do not work have lower mobility levels, by the help of metro they have larger shopping geography and the same mobility levels for shopping. Figure 5.30 gives the urban geography of metro users and non-users. This map also shows that shopping destinations of those who do not use the metro tend to be in central city, which is served with other public transport modes. This limits them to these locations in central city, whereas metro users seem to make use of other alternatives too, and experience other places in the city too. These other destinations are mostly served by the metro.

(During the interview in field research women were asked about places where they prefer for shopping and every woman had the opportunity to mark more than one place. Therefore when calculating the ratios, the declared figures for each place is divided by the number of metro users or non-users of the group that is being examined, in this case generally metro users and non users of women who do not work; 152-99 respectively. Therefore the total for the percentages does not amount to 100).

Although non-metro user women who do not work travel less, they seem to travel to

various locations in the city too, for shopping reasons: Kızılay, Ankamall, Ulus and Carrefour are their leading destinations. However, the leading destinations for shopping of metro user women who do not work are mostly Kızılay, Ankamall, Ulus, Sıhhiye, Demetevler, Carrefour-Batıkent, and other places in Batıkent. Kızılay, the city center and Ankamall, one of the most preferred shopping place for all women groups, appear to be the most important shopping destination for them. In sum, metro user women who do not work experience a slightly wider geography for shopping than non-metro user women who do not work; while both groups go to similar places in the city, a larger ratio of metro-users go to shopping places that are far from the city center; the ratio of non-users who travel to shopping places in various different places of the city (non-central places) is much lower.

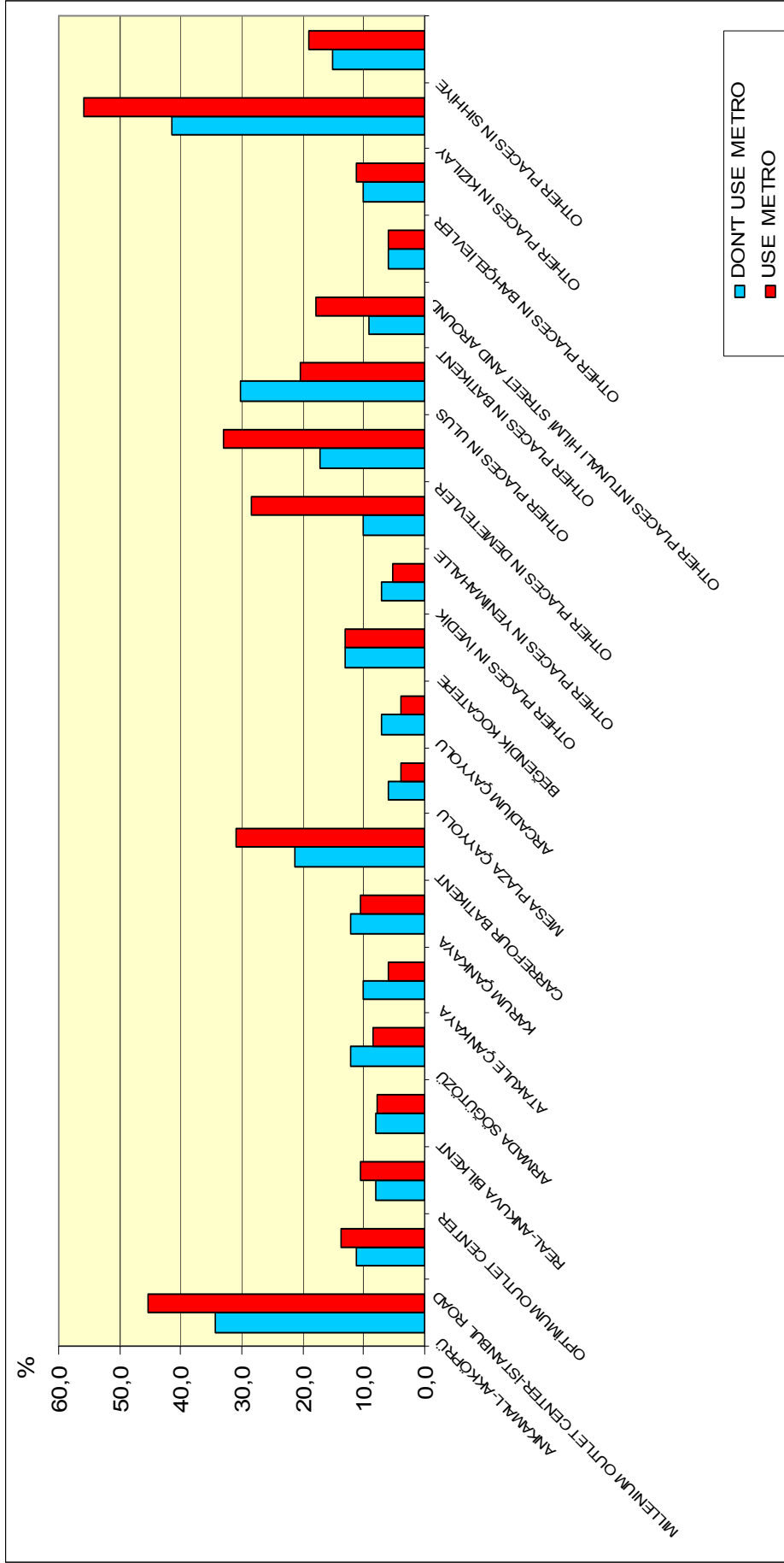


Figure 5.29: Preferred shopping places of women who don't work: metro users and non-metro users

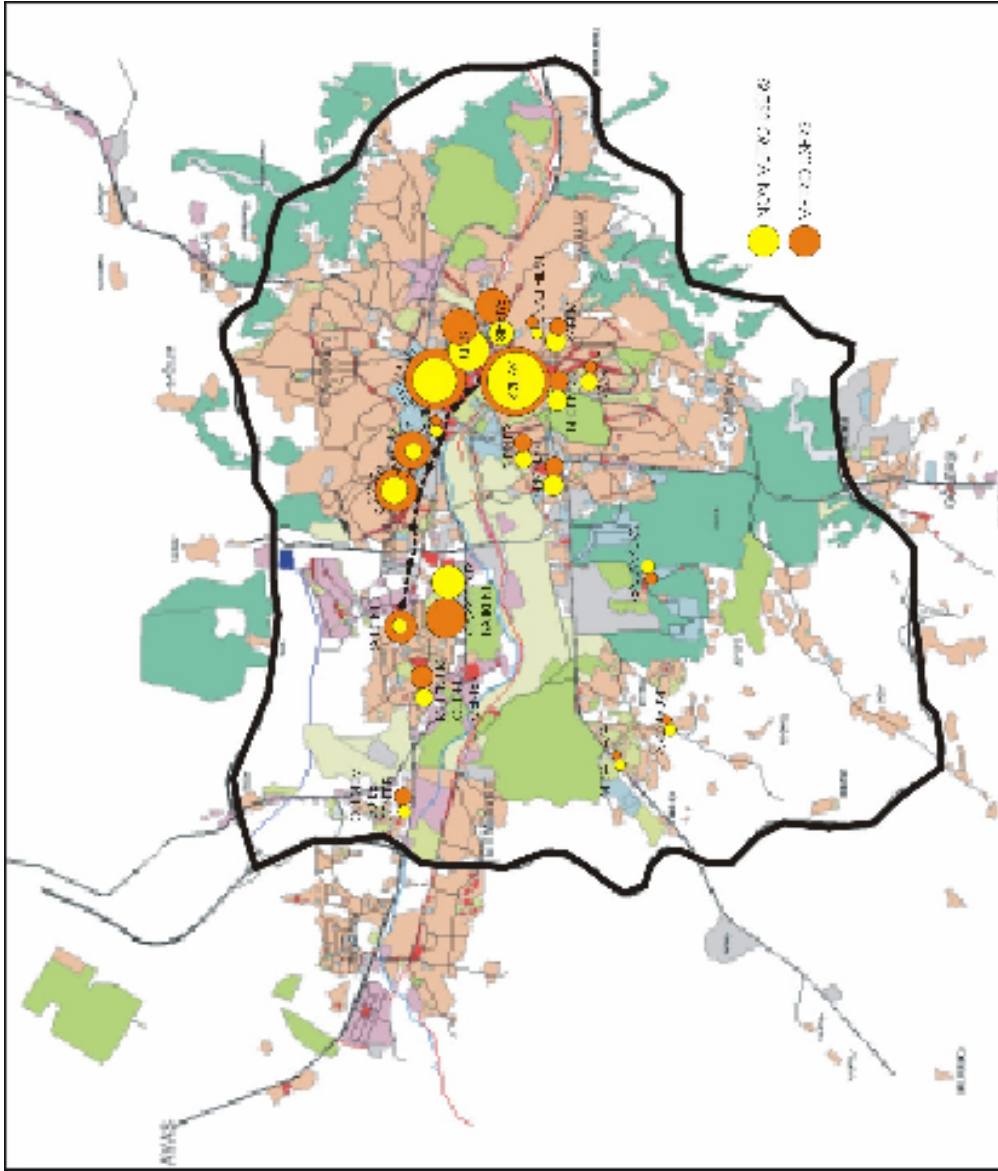


Figure 5.30: The geography of women who don't work for clothing shopping: metro users and non-users

The other vulnerable group of women is the relatively younger and the elderly. As seen in the previous chapter those groups are less mobile than the other age groups, due to social or physical reasons. When we study their metro usage rates and patterns for shopping younger women use metro with the highest ratio (Figure 5.31). In fact all age groups use metro with very high ratios.

There are 49, 62, 78, 63 and 42 women in “younger than 26, 26-35, 36-45, 46-55 and older than 55” age groups respectively. On the other hand their preferred shopping places are 134, 195,303, 169 and 139 again respectively. These figures show that woman from each age groups travel to 2.7, 3.1, 3.9, 2.7 and 3.3 places for shopping respectively. The figures show that the youngest group is the most vulnerable group because they travel less for shopping. Indeed Chapter 4 stated that among the age groups, the youngest group seems to be the most mobile group, that is to say they do not seem to be a vulnerable group from the point of view of general mobility levels. However this chapter stated that the youngest group seems to be the most vulnerable group when we consider shopping geography. This shows that the highest general mobility levels of the youngest group seems to be due to either working trips or most probably due to education trips. That is to say their shopping geography is narrower than other age groups, due to some constraints mentioned in time-geography theory, particularly related with the capability and cognitive constraints.

Figure 5.32 shows that in most cases the youngest group is also the most vulnerable group in terms of experienced shopping geography, because there are some places where the youngest group even do not go like Mesa Plaza, Çayyolu-Arcadium and İvedik.

In this respect it is important to analyze the urban experiences of women of who constitute the youngest and the oldest groups for metro users and non-users, whether metro makes a difference or not.

When we examine the women who are younger than 26 (Figure 5.33) we can see that there are 49 women in this group and 37 of them use metro while 12 of them do not. Of course there is a remarkable difference between users and non-users. However,

when we assess their shopping places, there is a much higher difference between metro users and non-users. While women using metro in this group (37 women) pointed 107 places for shopping, non-users (12 women) pointed only 27 places. This is an important result, showing that metro users in the youngest age group travel, on average, to 2,9 places per person, while this average is 2,3 for those who do not use metro. Metro users within the relatively younger women group travel more for shopping. Although they travel less, the younger women who do not use the metro seem to travel to various locations in the city too: Ankamall and Carrefour are their leading destinations. Young metro users also go to these shopping places, but Kızılay, the city center, appears to be the most important shopping destination for them. It is also interesting to see that young metro users travel more to the shopping areas of the more affluent southern parts of the city, namely Karum, Tunalı Hilmi, Bahçelievler, Armada, Real-Ankuva and Atakule. These places in the south are not served by a metro system; however, it is still an important finding that metro users travel more to those affluent shopping areas, while most of the non-metro users do not even go to these places. It may be argued that using the metro helps expand the urban geographies of women, and as a result of this increased mobility they tend to travel to additional and new places that may not even be served by the metro.

Another point we need to mention is that; when we examine non-metro user younger women's shopping geography, they mostly tend to go to places probably where there is service: Ankamall, Carrefour, Millenium, and Armada. Therefore we can say the shopping geography of non-metro user younger women are mostly limited with shopping place service (Figure 5.34).

In this case being younger seems to be an important personal incapability. Because in this group among non-metro users there are many places where no one prefer for shopping, like Real, Atakule, Tunalı Hilmi, Ulus and Bahçelievler for shopping and Millenium Outlet Center, Real Ankuva, Mesa Plaza, Arcadium, Beğendik, Kurtuluş Park, Abdi İpekçi Park, Tunalı Sıhhiye, etc. for shopping (Figure 5.34).

Figures 5.35 and 5.36 give us the mobility levels and urban geography of women over the age of 55, who are another vulnerable women group. There are 42 women

who are older than 55, 26 of which use the metro, 16 of which do not. While 26 metro users pointed 97 places in total, 16 non-users only pointed 42 places. That is to say among relatively older women, woman who uses metro travels to 3,7 different shopping places on average, while this rate is 2,6 for those who do not use the metro. It is also important to note that elderly women who do not use the metro seem to be limited to the shopping areas in Kızılay, Ankamall, Ulus and Sıhhiye (Figure 5.33). Elderly women who use the metro, on the other hand, travel more to further (and western) places in the city, most of which appear to be along the metro line. This map (Figure 5.36) indicates that urban geographies of elderly women can be increased with a metro system, when shopping activities are considered.

Nevertheless, when we compare the two vulnerable age groups from the point of view of shopping geography, women aged 56 and older seem to be less vulnerable than the younger women. Because, although elderly women who do not use metro experience a narrower geography than metro users, they still experience the urban geography more than younger women who do not use metro.

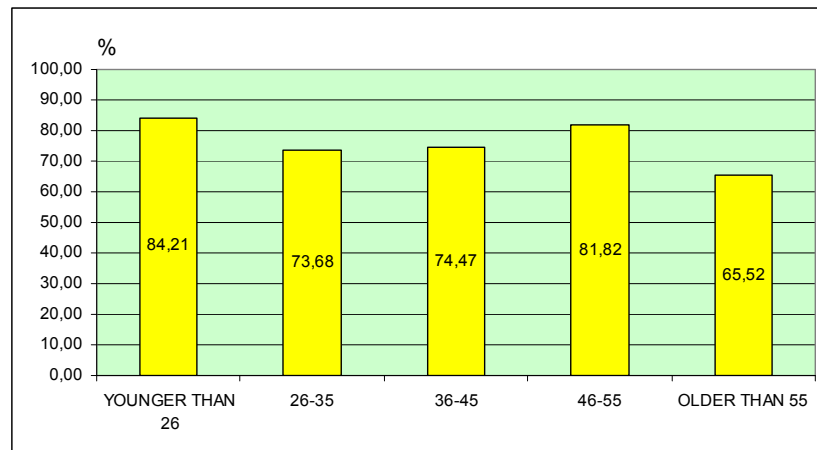


Figure 5.31: Metro usage rates for shopping: age groups

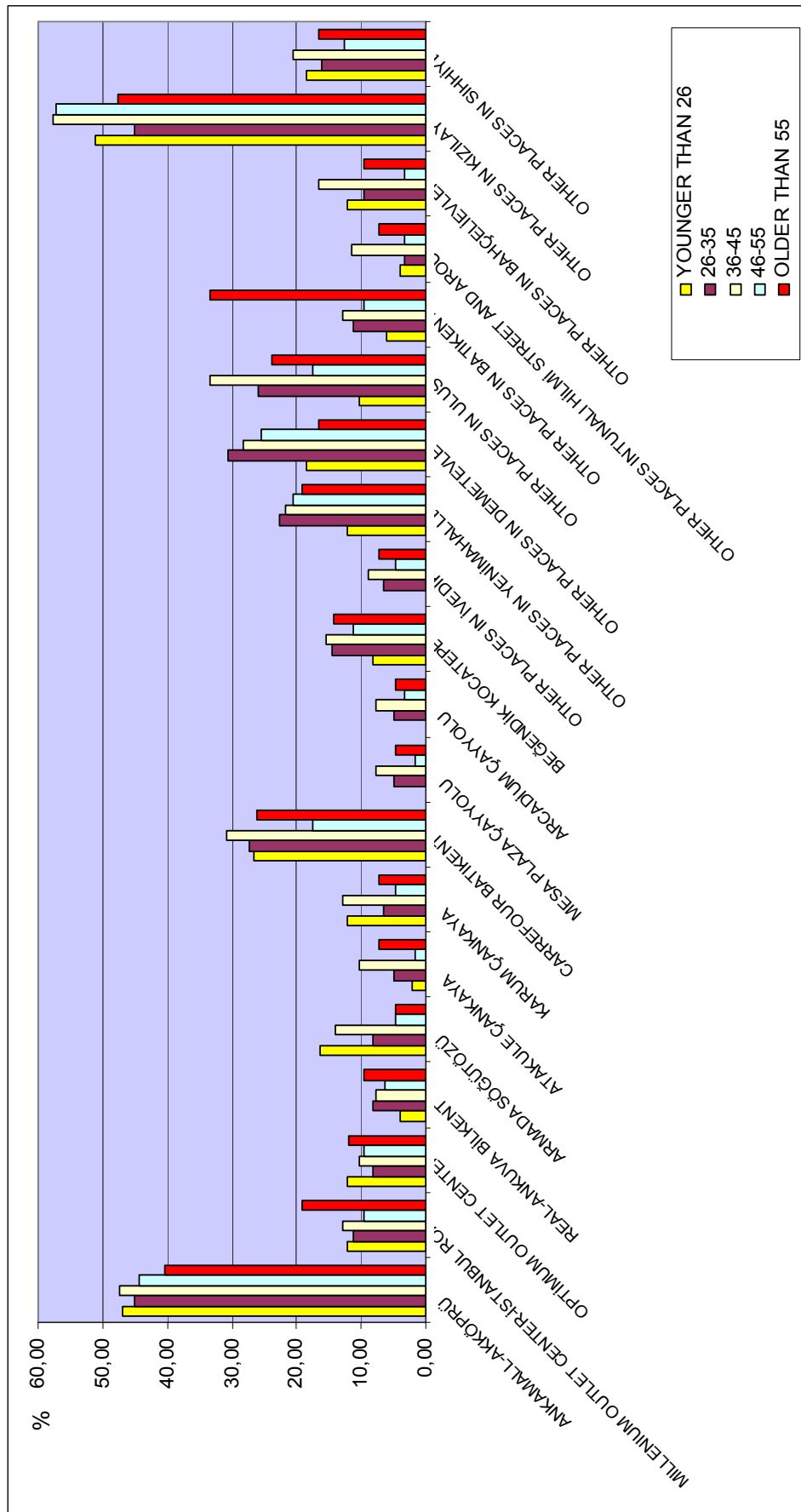


Figure 5.32: Preferred shopping places: age groups

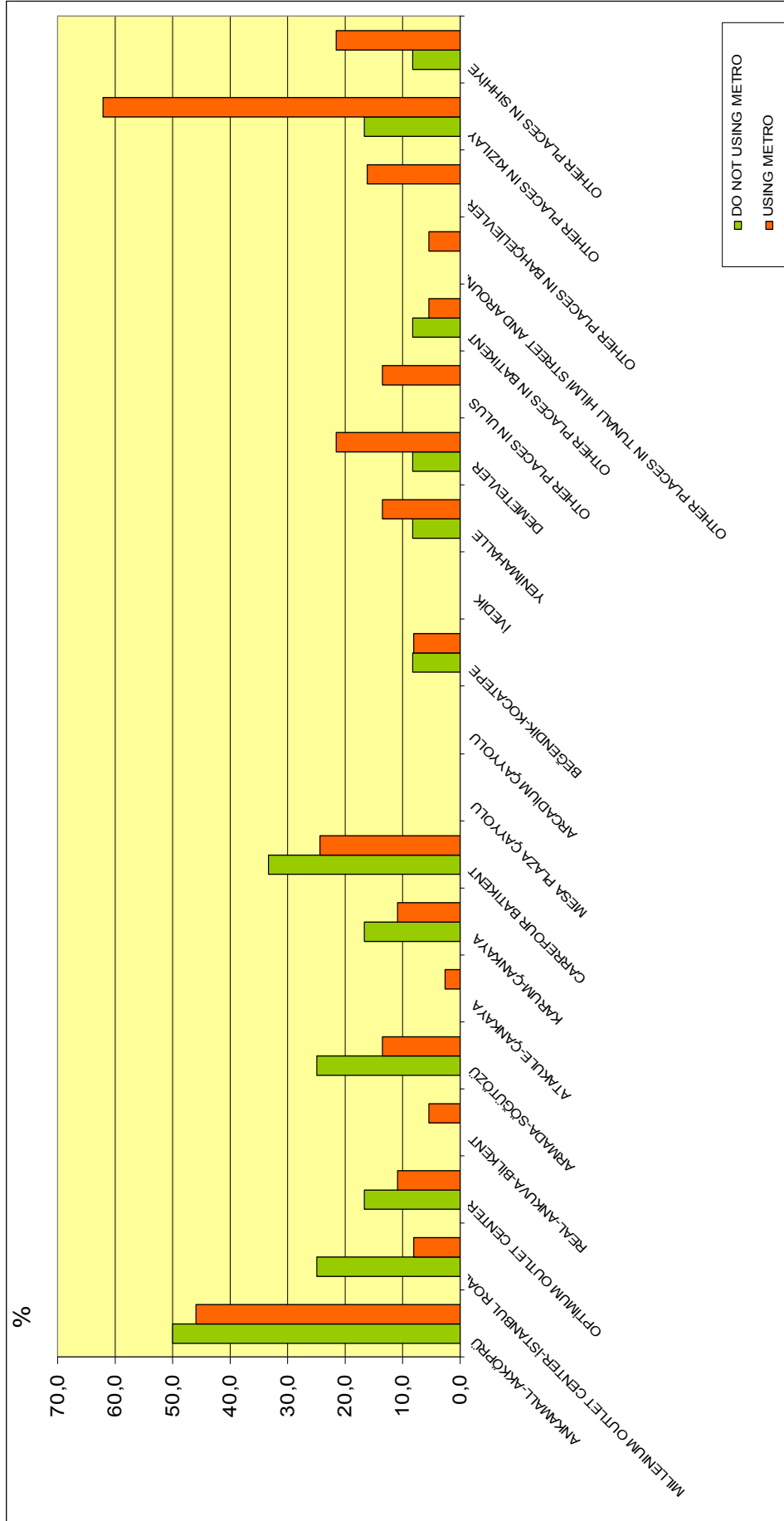


Figure 5.33: Preferred shopping places of 25 aged and younger women: metro users and non-metro users

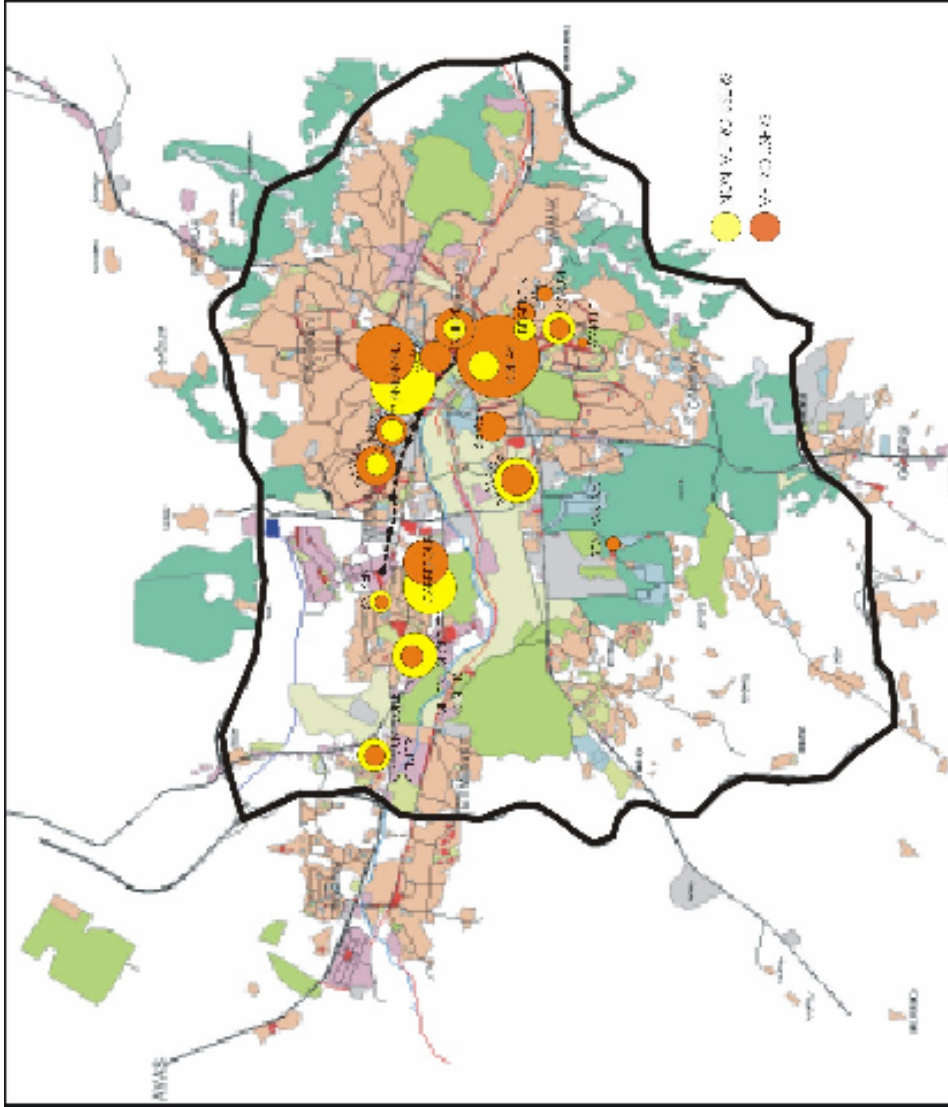


Figure 5.34: The geography of women aged 25 and under: metro users and non-users

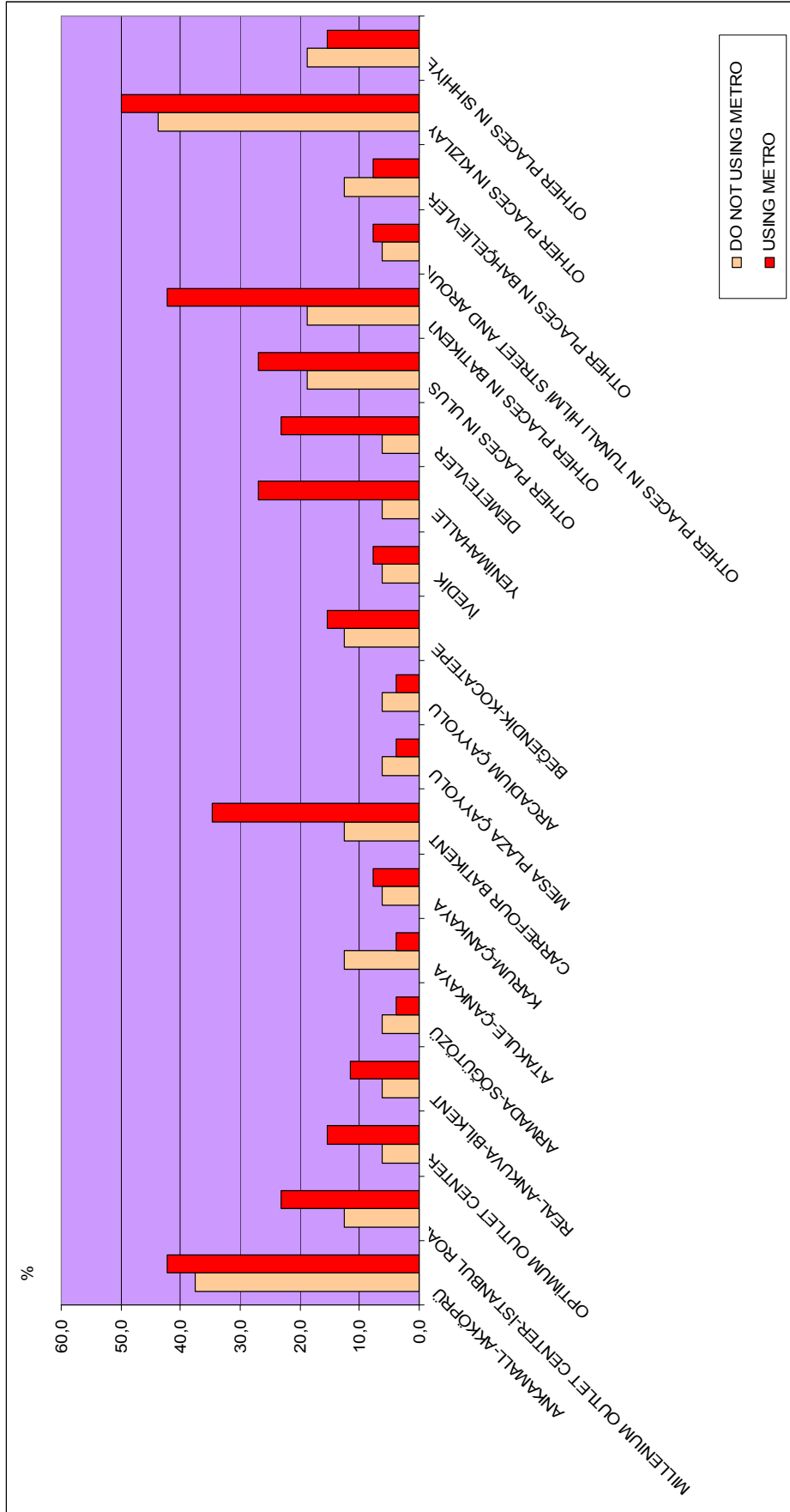


Figure 5.35: Preferred shopping places of 56 aged and older women: metro users and non-metro users

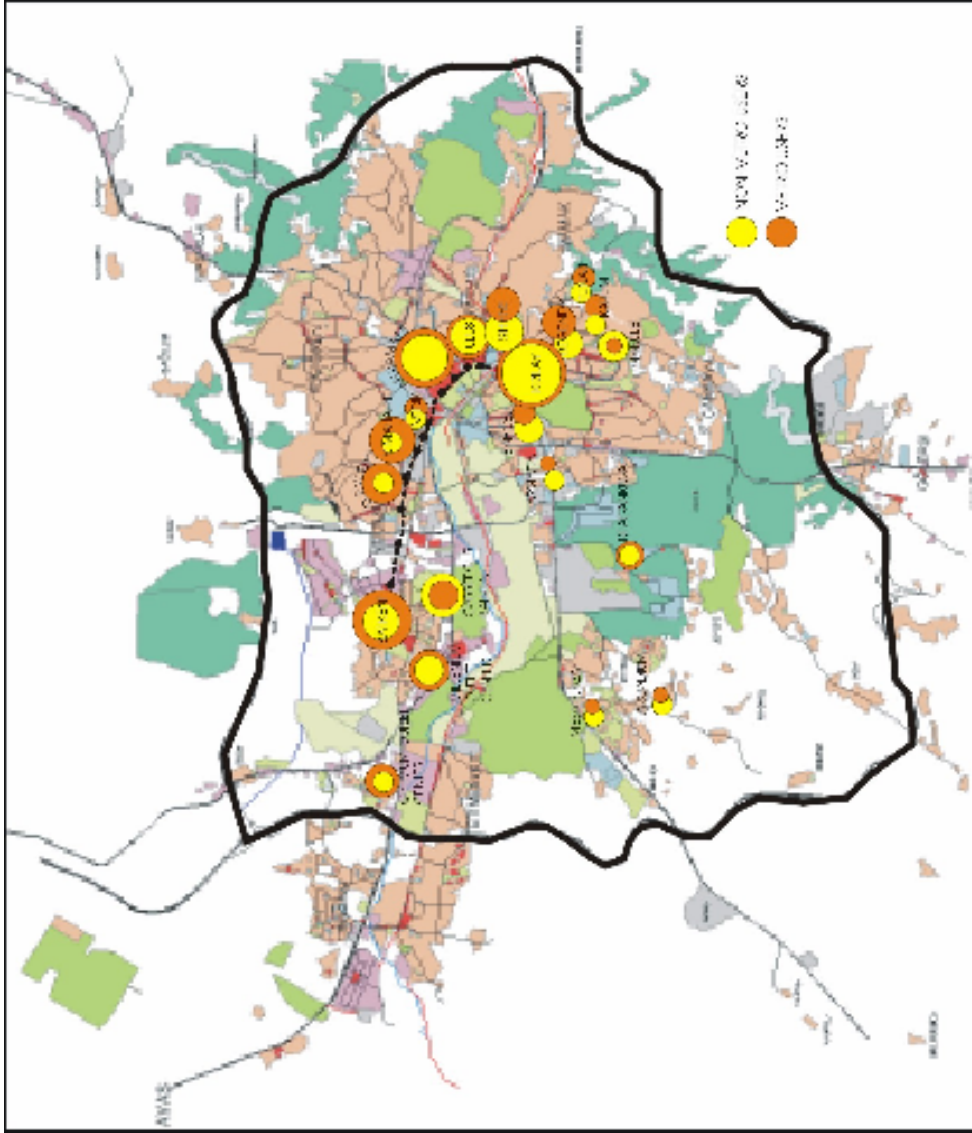


Figure 5.36: Preferred shopping places of women aged 56 and over: metro users and non-metro users

There is a third group, who were identified in the previous chapter to be more vulnerable in terms of mobility: low income women. In other parts of this study, it was stated that low income women travel less than other income groups, due to monetary reasons. In this part we will review whether or not metro usage makes a change on low income women's mobility levels and geography for shopping reasons.

In the sample group there are 146, 80, 39 and 35 women in 0-999 YTL, 1000-1499 YTL, 1500-1999 YTL and 2000 YTL and more income groups respectively. Their preferred shopping places are 426, 271, 130 and 141; so woman from each group approximately seems to travel to 2.9, 3.4, 3.3, and 4.0 places for shopping again respectively. This is a very important result revealing that the lowest income group travels with the least ratios.

We will firstly analyze the two corridors in terms of preferred shopping places for different income groups (Figure 5.37 and Figure 5.38), because there is an important difference between the shopping geography of the two corridors where metro exist and non-exist. Batıkent and Keçiören corridor comparison reveals a very striking result from the point of view of 0-499 YTL income (low income) women. Although low income women seem to travel more for shopping on Batıkent corridor, the same group living on Keçiören corridor seem to be less mobile, preferring only 3 places for shopping: AnkaMall, Batıkent Carrefour and Kızılay; probably because these places have services that provide free travel from various locations. That is to say, their urban coverage is narrower than their counterparts living on Batıkent corridor.

Secondly we need to look at metro usage ratios of women from different income levels. Figure 5.39 shows that, middle and higher income groups use metro with high ratios. Although lower than these, low income women also use metro with a 44% ratio, which shows us that metro is considered as a convenient transportation mode for almost half of the low income women, from the point of view of monetary reasons. Therefore it is possible that the difference that Figures 5.37 and 5.38 reveals is caused from metro usage.

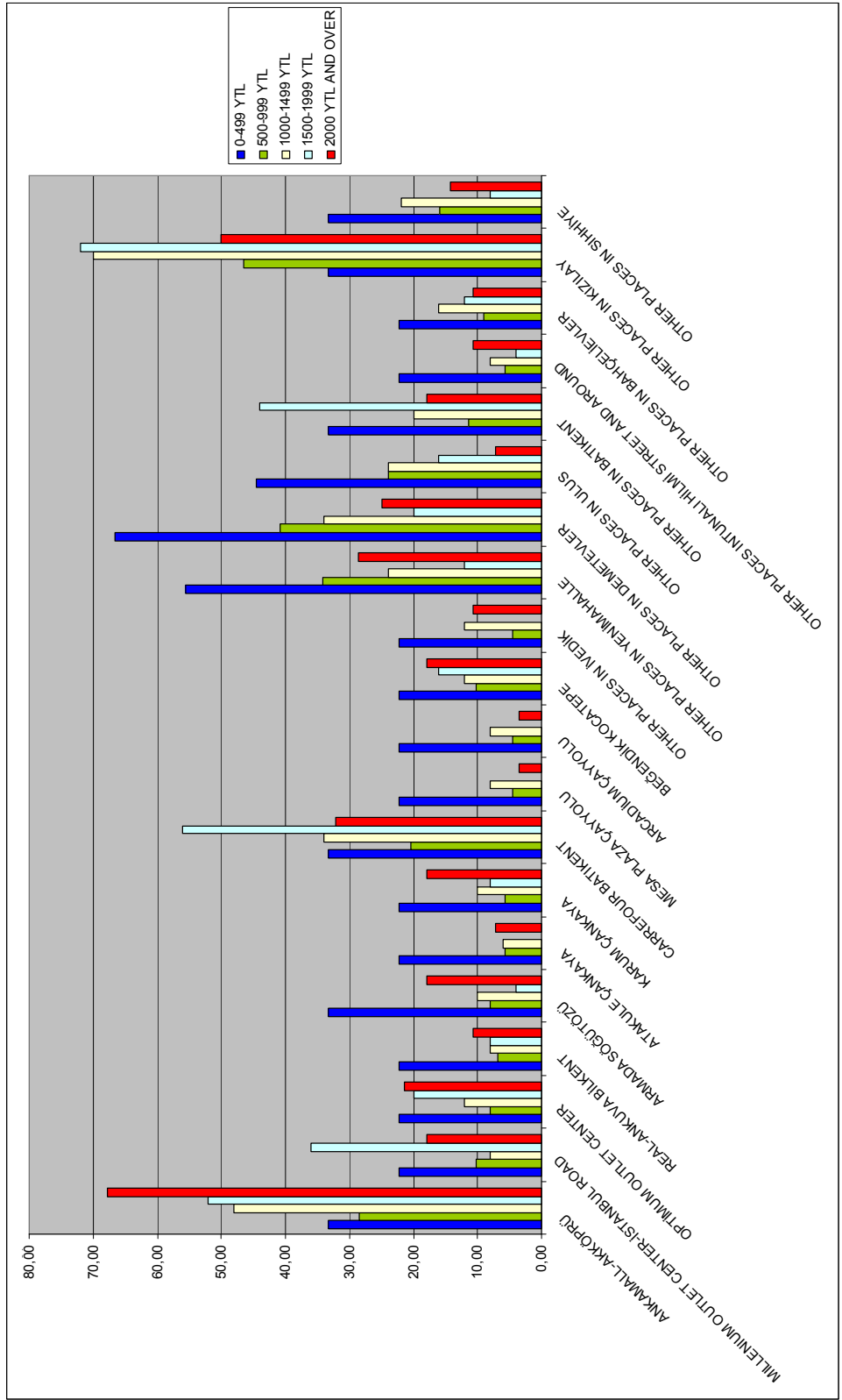


Figure 5.37: Preferred shopping places of income groups: Batikent corridor

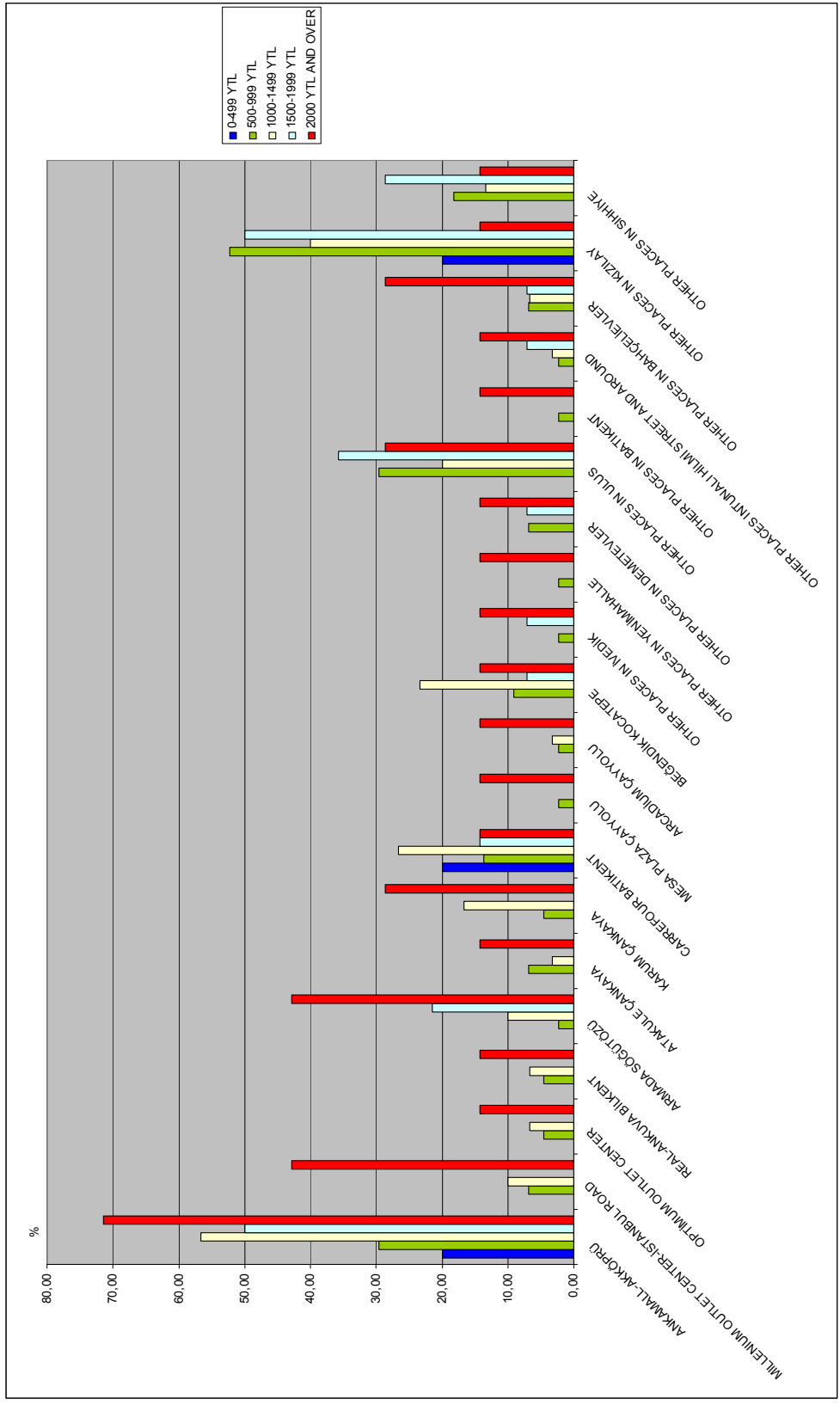


Figure 5.38: Preferred shopping places of income groups: Keçiören corridor

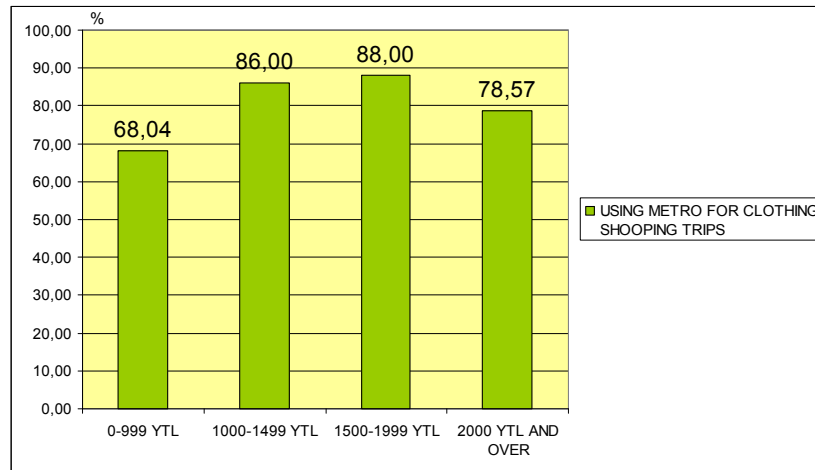


Figure 5.39: Metro usage rates for clothing shopping by income

Among all those income groups we consider 0-999 YTL as the low income group in this thesis, as mentioned before. Therefore, here they constitute another vulnerable group, for which we need to assess metro usage effects for shopping trips.

0-999 YTL income group consists of 126 women, 87 of which use metro, 59 of which don't use metro. An important point of this analysis is that while 87 women declared 263 preferred places of shopping, 59 of them declared 165 preferred shopping places, which shows that metro usage enlarges the geography of low income women. While women using metro in this group (87 women) pointed 263 places for shopping, non-users (59 women) pointed only 165 places. This is an important result, showing that metro users in the lowest income group travel, on average, to 3,02 places per person, while this average is 2,8 for those who do not use metro. Metro users within the relatively lower income women group travel more for shopping.

Figure 5.40 and Figure 5.41 show low income metro users and non-metro users' shopping place preferences. As can be seen from the figure both metro users and non-users experience similar places in the city, although metro-users go in higher frequency to the western shopping centers that are along the metro corridor.

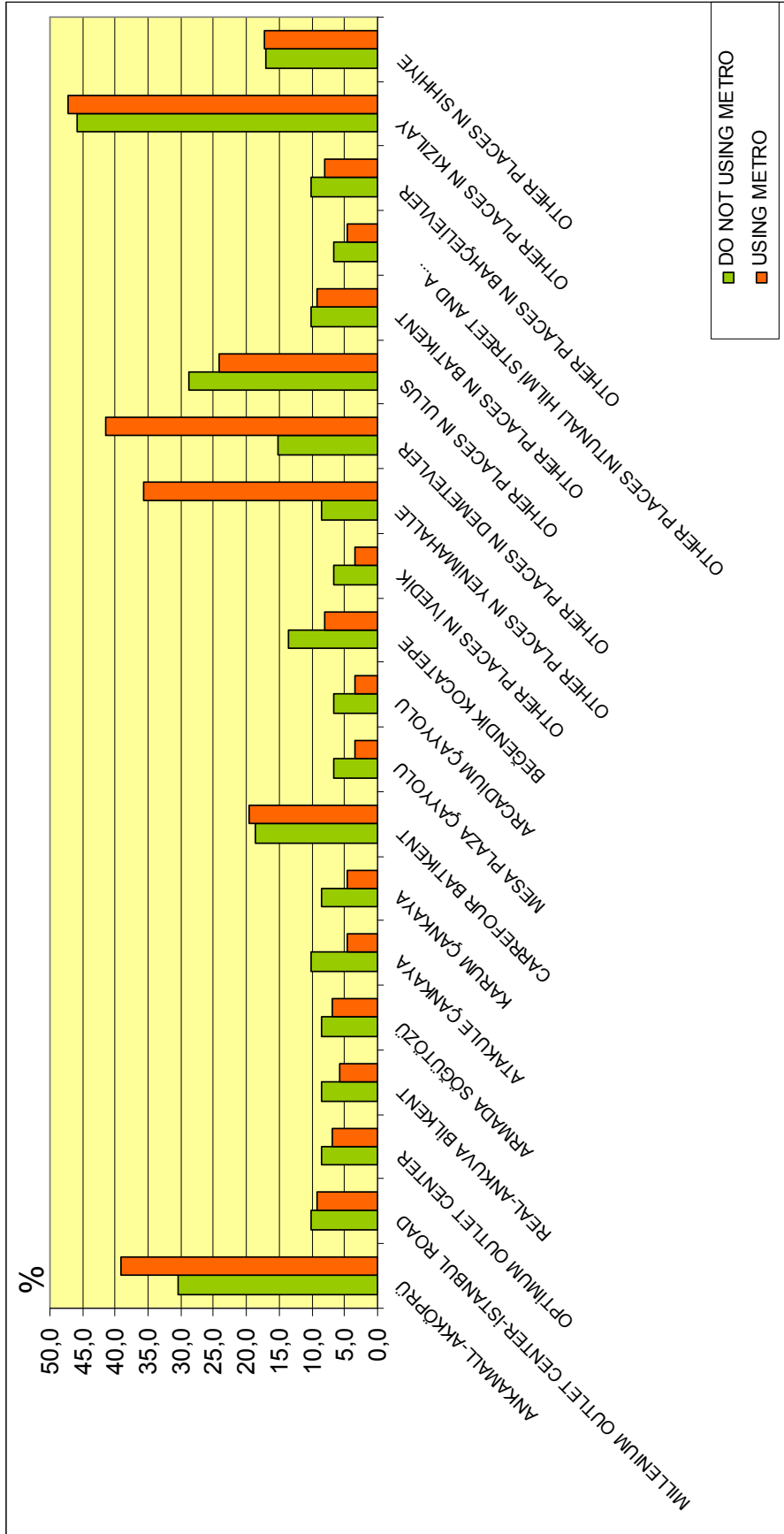


Figure 5.40: Preferred clothing shopping places of 0-999 YTL income women: metro users and non metro users

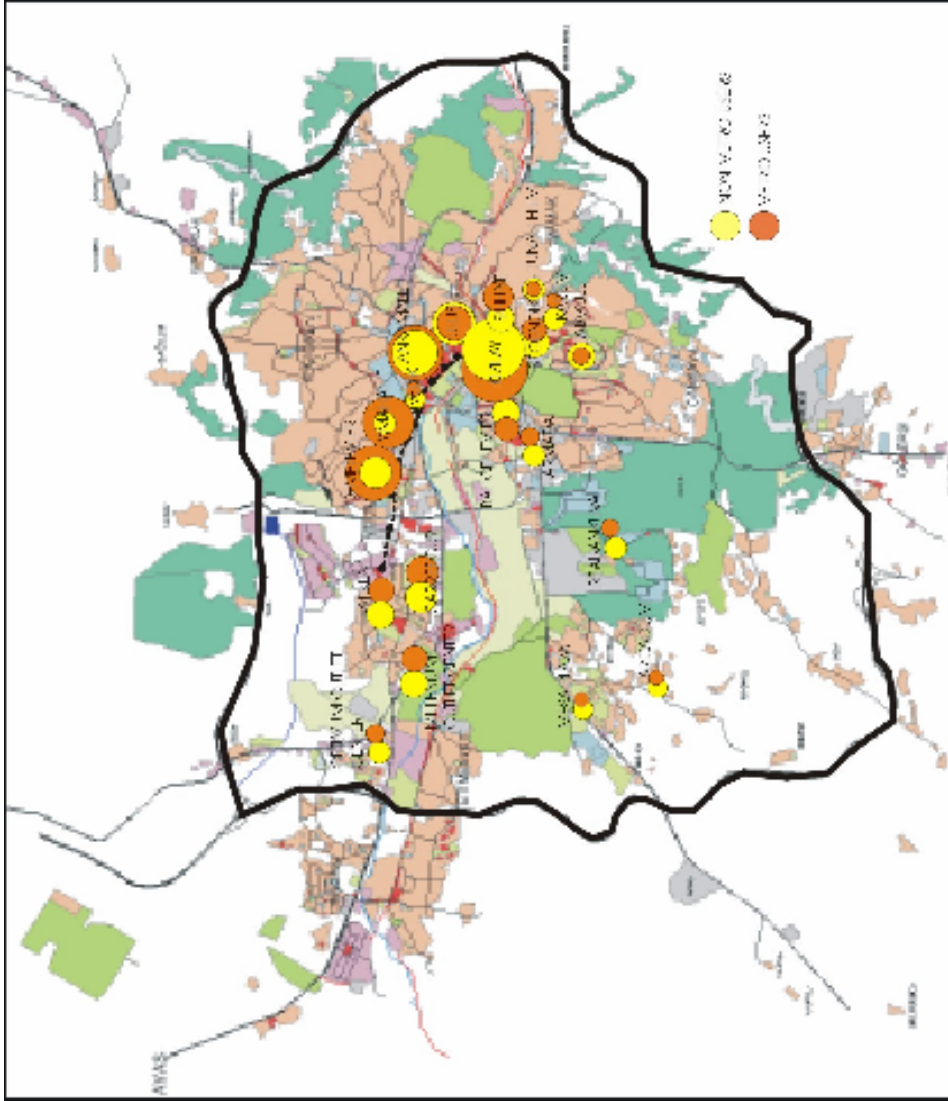


Figure 5.41: The shopping geography of women with 0-999 YTL income: metro users and non metro

Another factor affecting vulnerability of women is having children. As mentioned in previous chapters having children may be a barrier for mobility, because women who have children are less mobile than women who don't have. From the point of view of women's metro choice, Figure 5.42 shows us that the two groups mostly choose to travel with metro for shopping trips, but women with children use less.

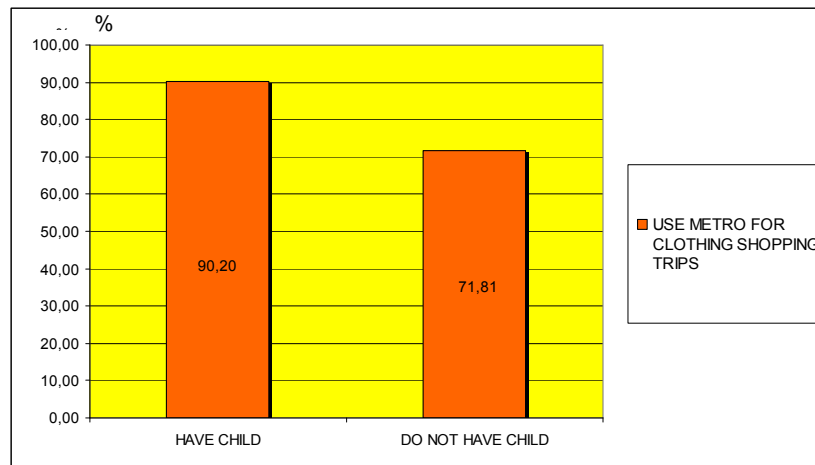


Figure 5.42: Preferred transportation mode for shopping trips: women who have child and don't have child.

There are 65 women who do not have children and 235 women who have children in the sample group. They prefer 160 and 785 shopping places respectively. This means that woman who do not have children travels to 2.5 places and woman who has children travels to 3.3 places for shopping. It is interesting because women who have children seem to travel more for shopping. This result is interesting because when we consider their general mobility levels, women without children seem to be much more mobile. But here we see that women with children have a larger shopping geography and more trip frequency (Figure 5.43). This may be because women who have children also shop for their children and therefore their trip rates are higher than women who do not have children. In this respect we can say that women with

children cannot be considered as a vulnerable group from the point of view of shopping. Furthermore it is important to say that there are some places where women without children even do not go, like Mesa plaza and Arcadium. On the other hand women with children go to the other shopping places more than women without children. But it is still important to examine the effect of metro on the shopping trips and shopping geography of women with children.

Figure 5.44 explicitly shows that metro user women with children are more mobile than non-users. Figure 5.45 gives the shopping geography of women who have children, comparing metro users and non-users. 235 of interviewed women have children and 137 of them use the metro, while 98 of them do not. While the 137 metro users women 510 preferred shopping places, 98 non-metro users pointed 296 places as those traveled shopping. That is to say among women who have children, woman who uses metro travels to 3.72 different shopping places on average, while this rate is 3.02 for those who do not use the metro. Women with children who use the metro travel to various places in the city in a higher frequency; most of these places appear to be along the metro line. In fact, non-metro user women with children also go to these places but at a lower rate: the Figure shows that the ratio of non-metro user women with children who travel to further non-central shopping places in the city is less than the metro users of the same group. In other words, non-metro users among women who have children mostly use the city center for shopping reasons, and they experience the other parts of the city at smaller ratios when compared with city center.

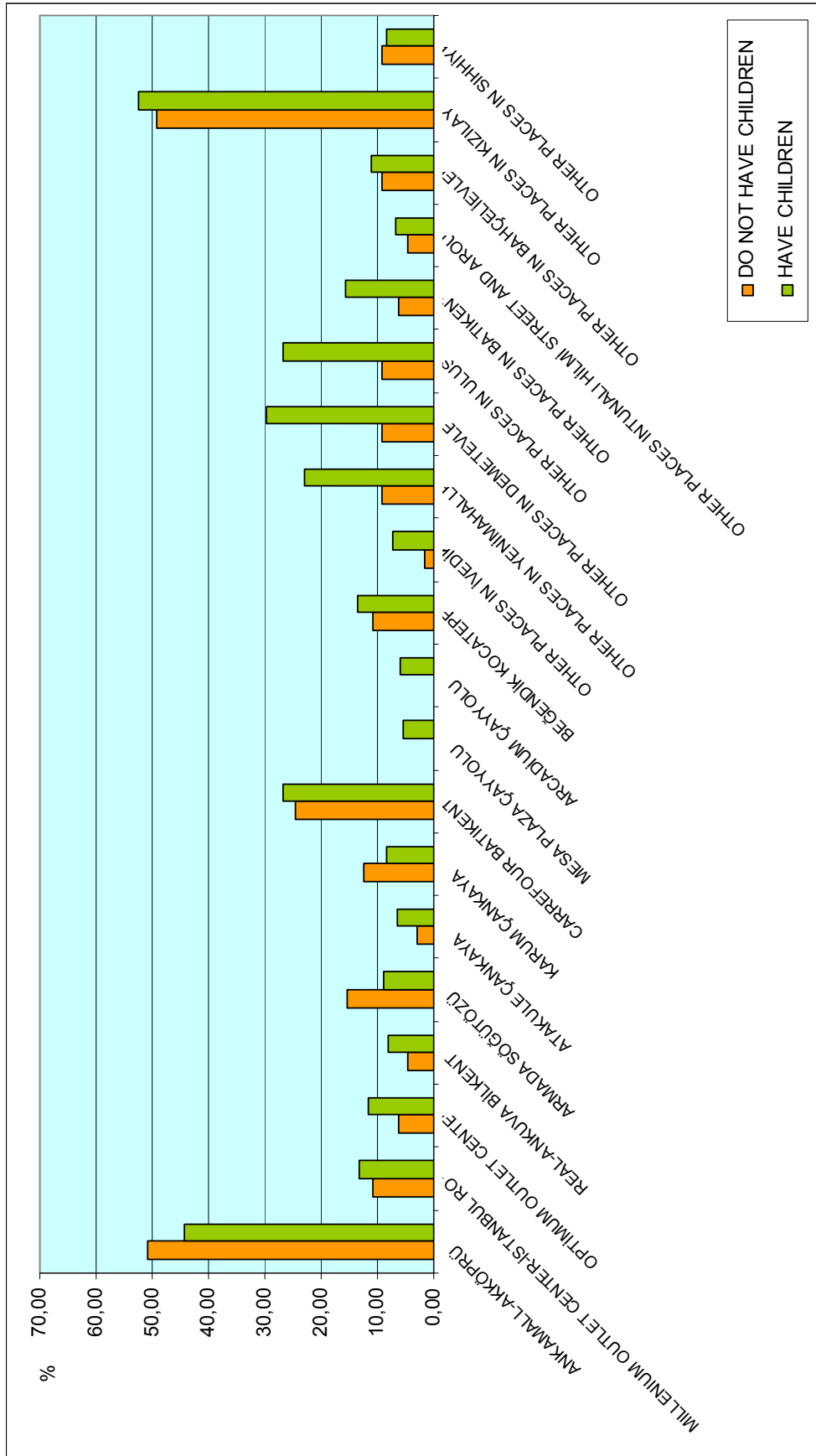


Figure 5.43: Preferred shopping places of women: who have and do not have children

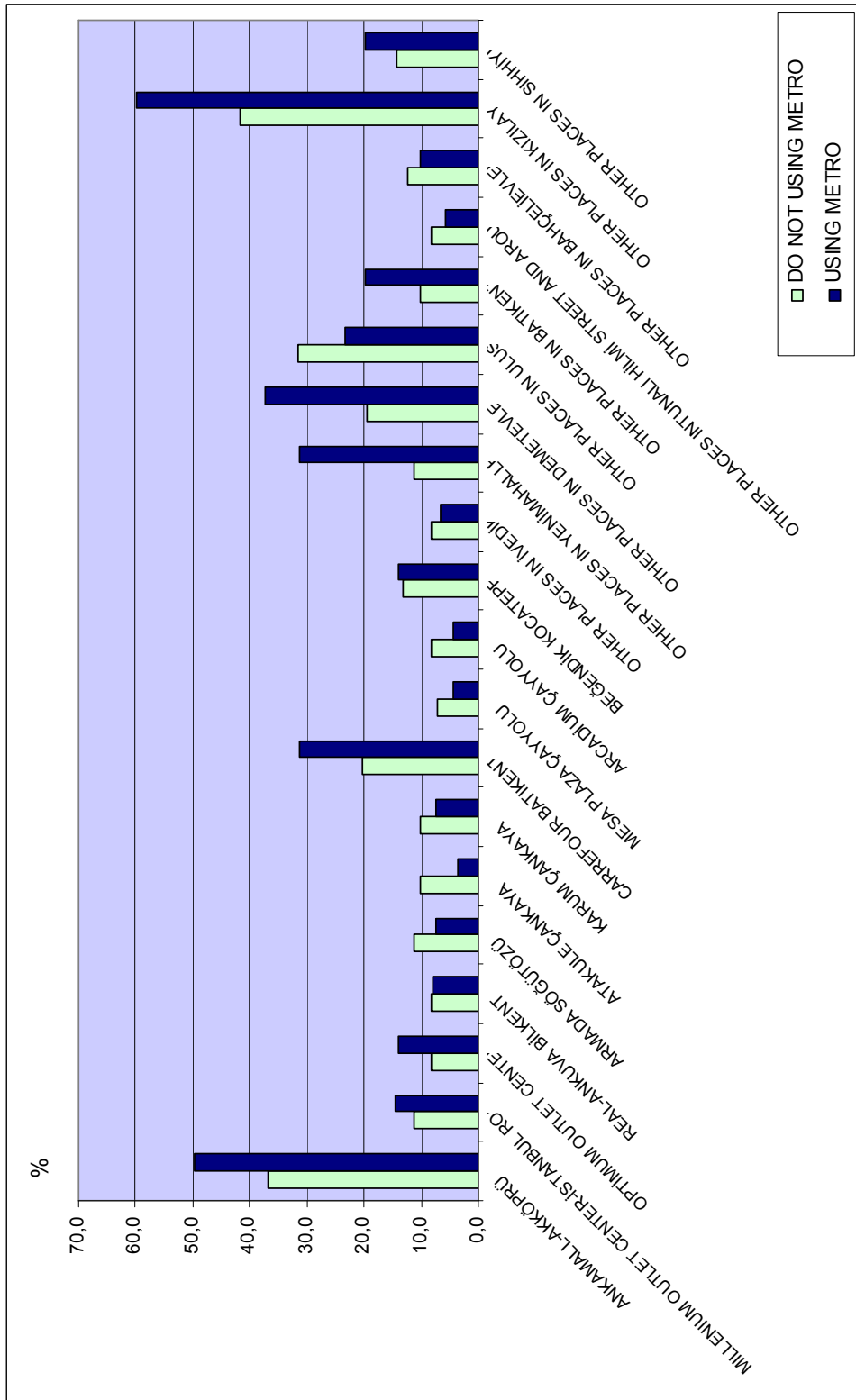


Figure 5.44: Preferred shopping places of women who have children: metro users and non-users

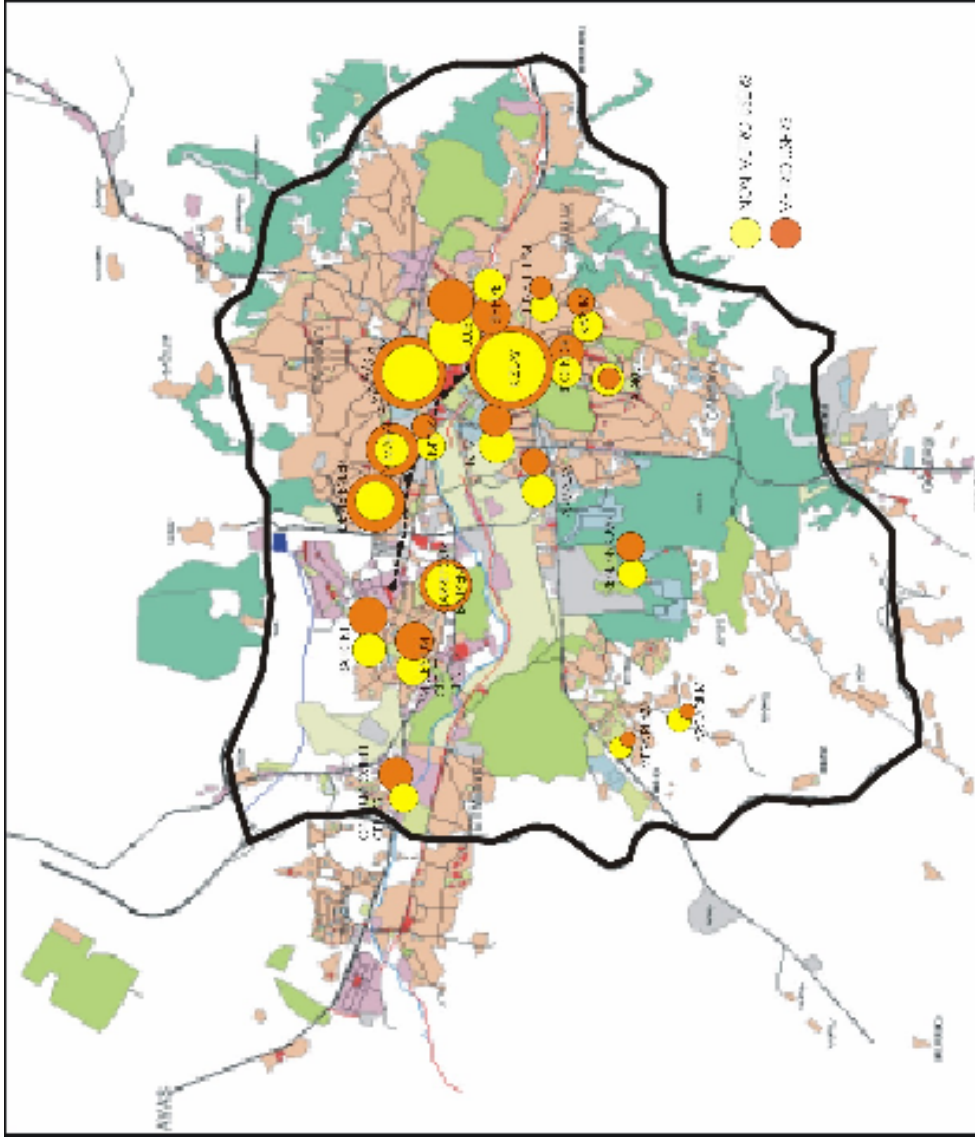


Figure 5.45: Shopping geography of women who have children: metro users and non-metro users

The last factor affecting vulnerability of women is being less educated. The previous chapters showed that less educated women are less mobile than others. Figure 5.46 shows that metro usage rates of less educated women are also seem less. This might affect their mobility levels negatively.

However, in general firstly we need to examine the shopping mobility and geography of women. There are 152 women who are less educated among interviewed women. They declared that they go 497 shopping places (Figure 5.47). On the other hand there are 232 university graduate women who declared 232 shopping places. That is to say among women who have different education levels, woman who are less educated travels to 3.3 different shopping places on average, while this rate is 3.7 for those who are university graduate. In other words this means that less educated women experience a narrower geography than more educated.

Figures 5.48 and 5.49 reveal the shopping geography of less educated women considering metro usage and non-usage comparison. We can see from the figures that there is not a significant difference in the shopping geographies of metro-users and non-users among the less educated. Both groups mostly prefer using the city centre shopping areas (Ulus and Kızılay) and Ankamall.

Among 152 less educated women 63 of them do not use metro and 89 of those use metro. While 63 non-metro users declared 184 shopping places, 89 metro users declared 313 shopping places. This means that among less educated women, while woman who do not use metro travels to 2,9 places, woman who use metro travels to 3,5 different shopping places. Therefore it can be mentioned that among one of the vulnerable groups -less educated- metro users go to a higher variety of places for shopping.

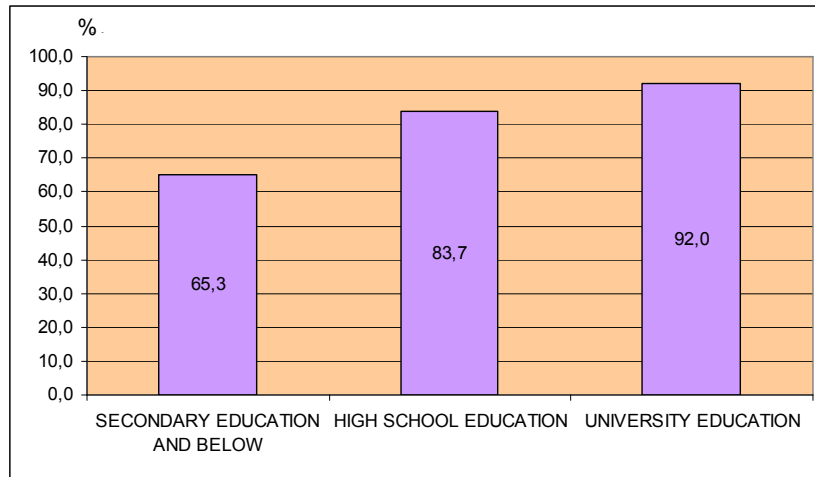


Figure 5.46: Metro usage rates for shopping: education levels

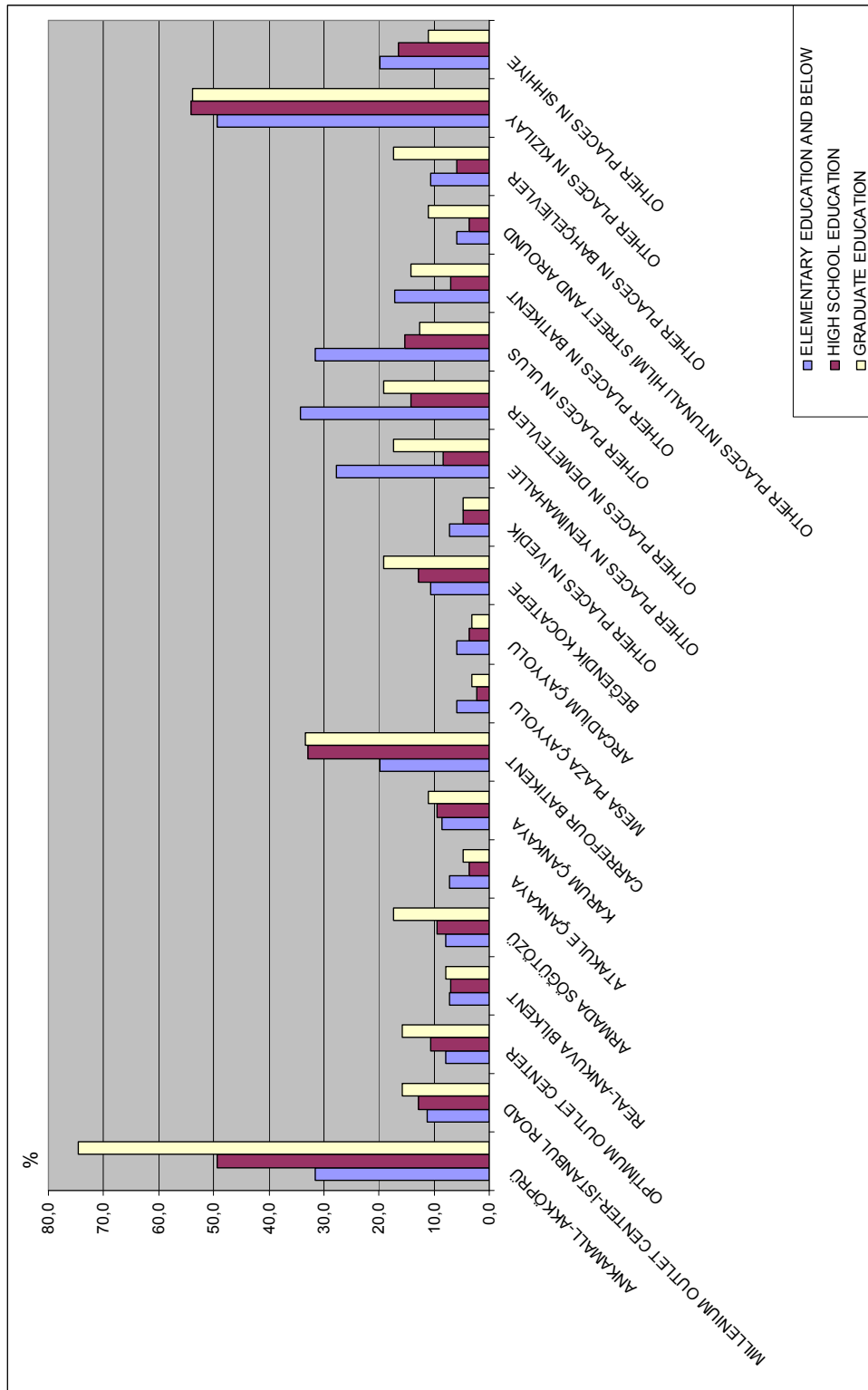


Figure 5.47: Preferred shopping places of women: education level

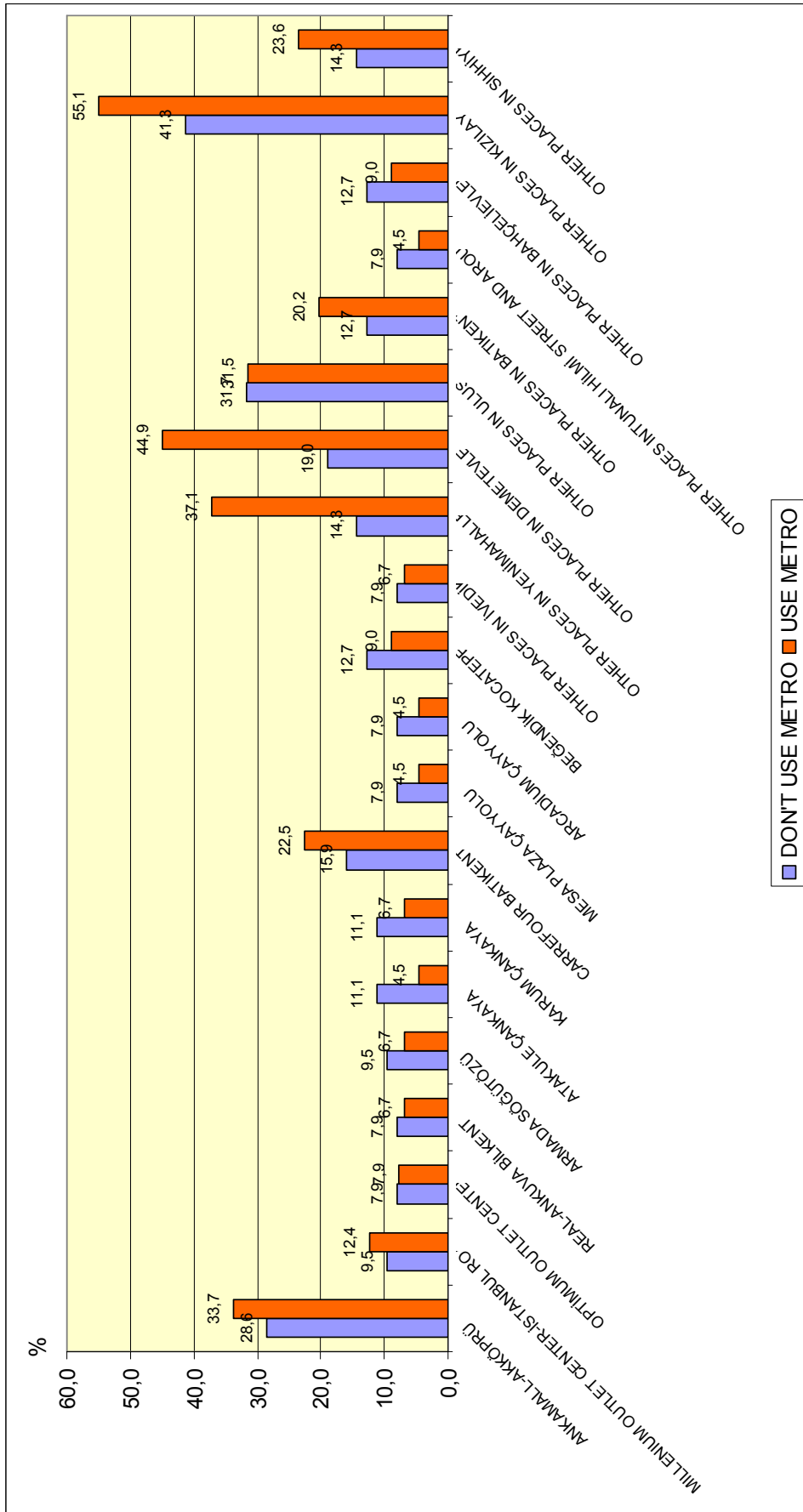


Figure 5.48: Preferred shopping places of less educated women: metro users and non-metro users

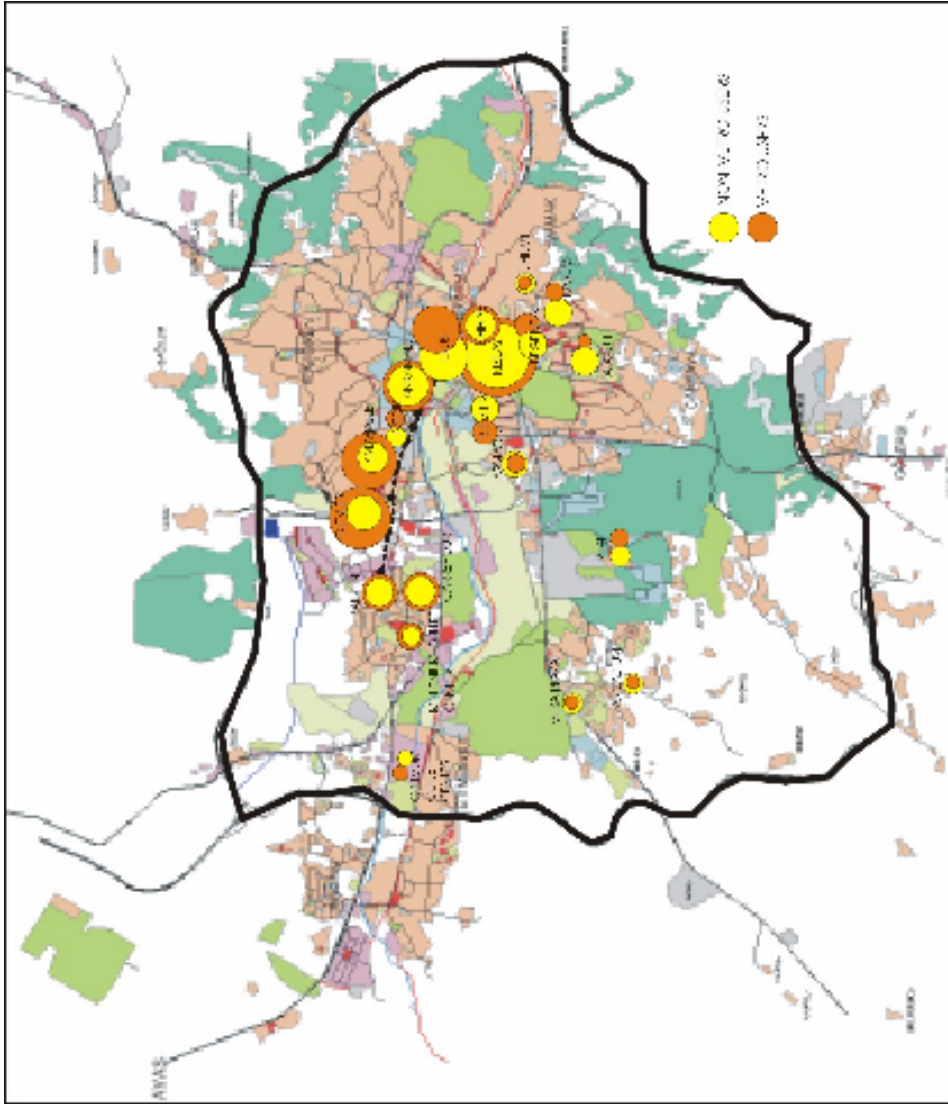


Figure 5.49: Shopping geography of less educated women: metro users and non-metro users

5.4. LEISURE TRIPS AND GEOGRAPHY OF WOMEN

Leisure needs are discretionary as mentioned in research chapter, and they do not always serve for all household members, and mostly satisfied in the time remaining from the other two activities. Leisure needs related trips, in fact, are indicators of one's participation to urban life. From this point of view it is very important for this research, which observes women's mobility and their experience of city. Different women groups, of course, have different activity participation rates. To assess this, we need to look at different leisure trip types, mode choices and leisure geography of different women group. But here again we will deal with the more vulnerable groups and effects of metro on those groups' mobility.

Figure 5.50 shows leisure trip times for two corridors separately. It has been stated in Chapter 4 that, the ratio of women who work on Batıkent corridor was more than on Keçiören corridor; as a result of this women on Batıkent corridor travel for leisure needs mostly at the weekend.

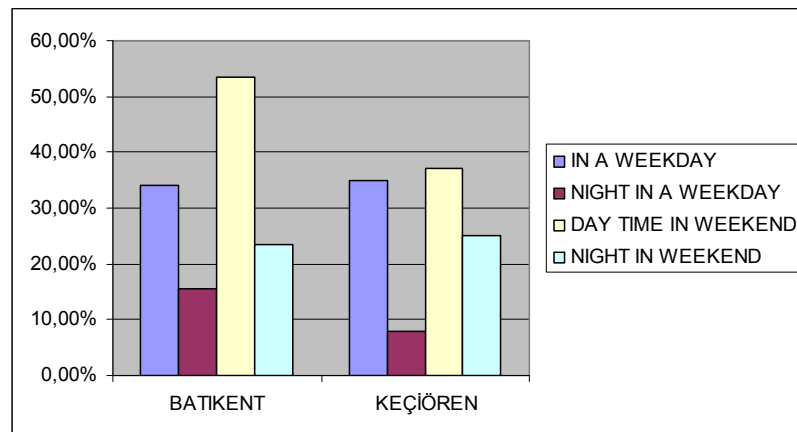


Figure 5.50: Leisure trip times

The preference of metro for leisure trips question was only asked to Batikent corridor, and 64% of the women declared that they prefer metro for leisure trips (Figure 5.51).

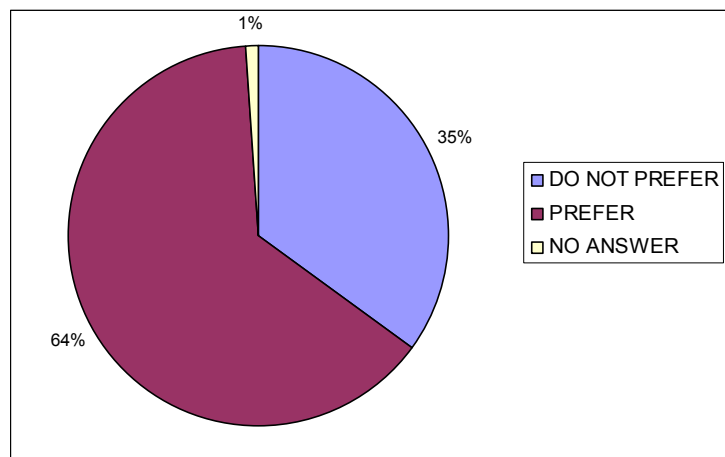


Figure 5.51: The ratio of metro preference for leisure trips on Batikent corridor

There are 300 interviewed women in this study as mentioned before. 188 of them use metro and 112 of them do not. While 188 metro users marked 648 places as leisure destinations; 112 non-metro users marked 248 leisure places. This is an important result, showing that metro users, on average, travel to 3,45 places per person, while this average is 2,21 for those who do not use metro, that is to say metro users travel more for leisure. Figure 5.52 shows preferred leisure places of metro users and non-metro users in general. In this figure we can again see that metro users' leisure geography is larger and women who use metro travel for leisure more.

(During the interview in field research women asked about places where they prefer for leisure and every woman had the opportunity to mark more than one places. Therefore when calculating the ratios, the declared figures for each place is divided by the number of metro users or non-users of the group that is being examined, in this case generally metro users and non users 188-112. Therefore the total does not give 100).

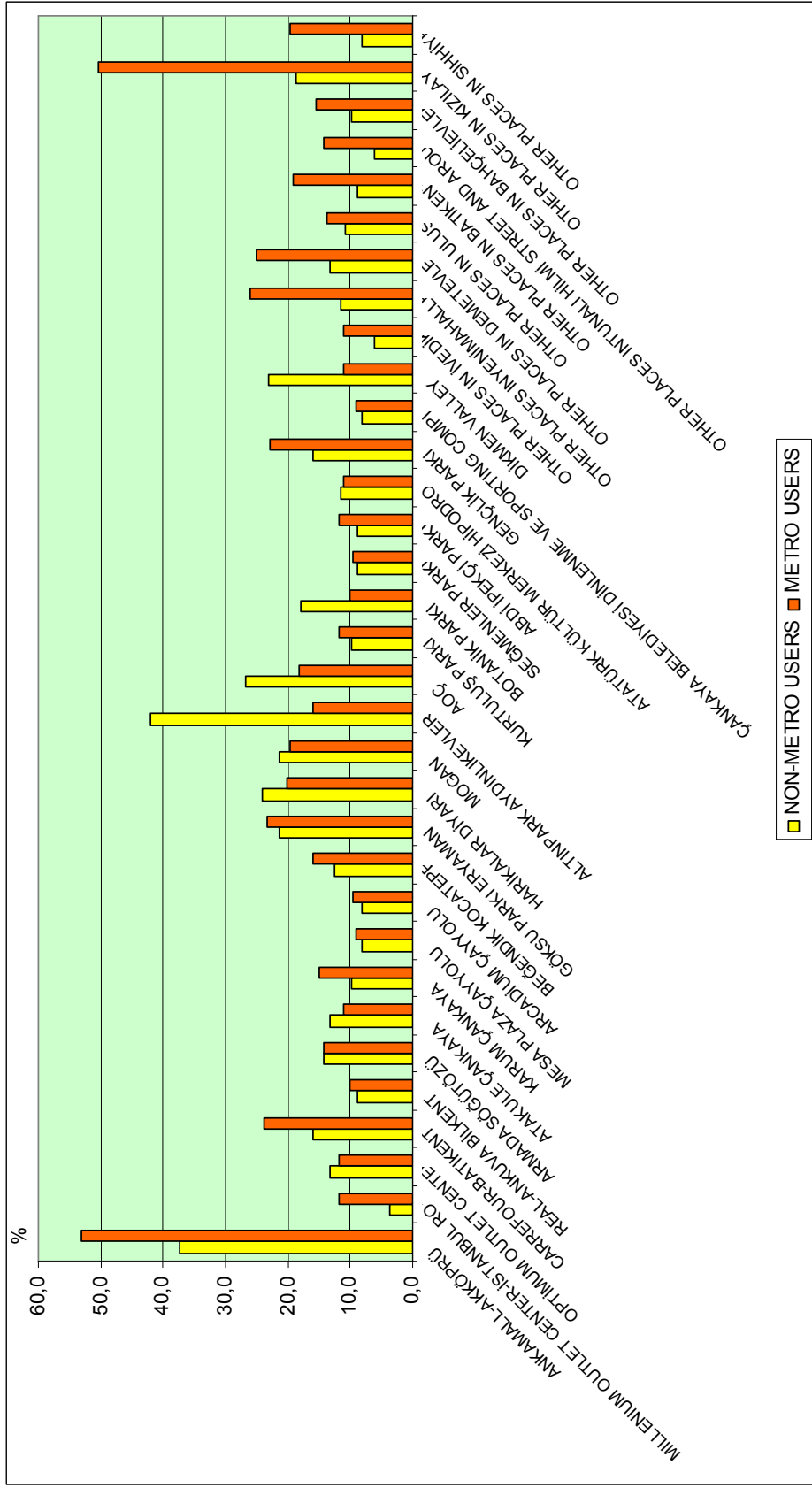


Figure 5.52: Preferred leisure places: metro users and non-metro users

In order to analyse vulnerable groups' leisure mobility and geography and metro's effect on them, we first assess the leisure geography of women who work and do not. In previous chapters it was mentioned that women who do not work are less mobile than workers. In this section as Figure 5.53 also shows that women who do not work travel with metro less for leisure reasons. Figure 5.54 shows the leisure geography of women who work and do not work.

There are 49 women who work and 251 women who do not work in total sample. while 49 worker marked 175 leisure places, 251 non-workers marked 1445 places, that is to say woman who work travels to 3.6 leisure places, however woman who do not work travels to 5.8 places for leisure (Figure 5.54). This is very interesting. Because in the previous chapters the general mobility of women who do not work seem to be low than women who work. But this chapter shows that women who do not work are not vulnerable from the point of view of shopping and leisure mobility and geography. Furthermore non-workers have wider urban geographies from the point of view of shopping and leisure. The high level of mobility of women who works, seems due to working than.

But it is still important to understand the metro effect on the leisure mobility of women who do not work. Figure 5.55 gives preferred leisure places of women who do not work comparing metro users and non-users. As mentioned before, the sample includes 251 women who do not work, 152 of which are metro users, 99 of which are non-metro users. It is important to note that while 152 metro users marked 538 leisure places in total, 99 non-metro users marked 181 leisure places. It can be said that while metro user woman who do not work travels to 3,54 places on average for leisure reasons, non-metro user woman travels to only 1,83 places for the same reasons. In other words we can say that metro user women experience larger geographies for leisure reasons; they travel to a larger number and a higher variety of places. Their preferred places and their preference ratios within total marked leisure places are given in Figure 5.55. The figure also shows that non-working women who use metro travel more for leisure reasons. Therefore we can say that their urban activity participation rates are more and urban leisure geographies are larger than women who do not work and do not use the metro.

Figure 5.56 shows the leisure geography of women who do not work with a comparison of metro usage and non-usage. When we examine the map it can be seen that non-metro users travel to similar places to those traveled by metro-users but by lower rates. They mostly prefer to travel to Altınpark (probably mostly Keçiören women prefer) and Ankamall (where probably there is company service). On the other hand women who use metro travel more for leisure and their urban leisure geographies are larger, because the ratio of metro users who travel to further places (as well as central places such as Kızılay) is much higher than non-users. In other words, a higher ratio of metro-user women experience wide urban geographies when compared to non-metro users.

Another important point occurs when we compare the shopping geography and leisure geography of women who do not work. The difference between metro users and non-users are more explicit when leisure trips are considered. That is to say women who do not work and do not use metro are more vulnerable about leisure activities than shopping activities. In other words women who do not work and who use metro travel much more than non-metro users; however the difference is not as much in shopping trips. In this context leisure trips are important for women in terms of urban life participation and metro seems to be important in increasing urban life participation rates.

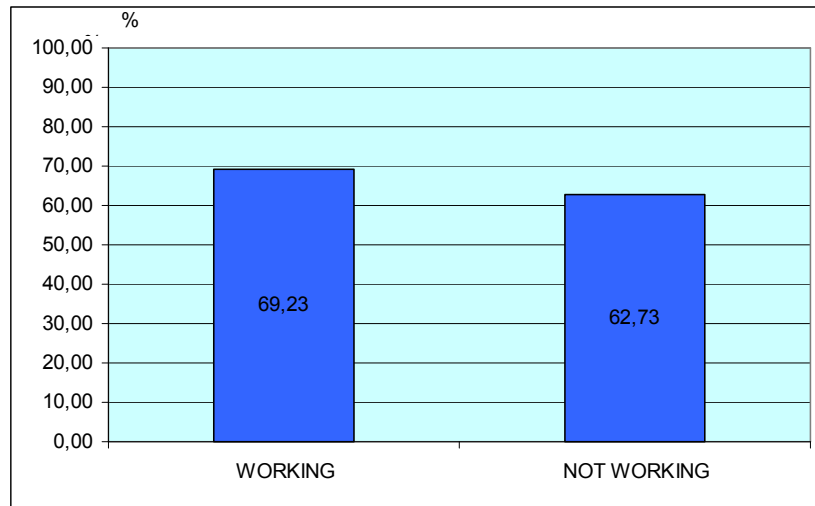


Figure 5.53: Metro usage rates for leisure trips: workers and non-workers

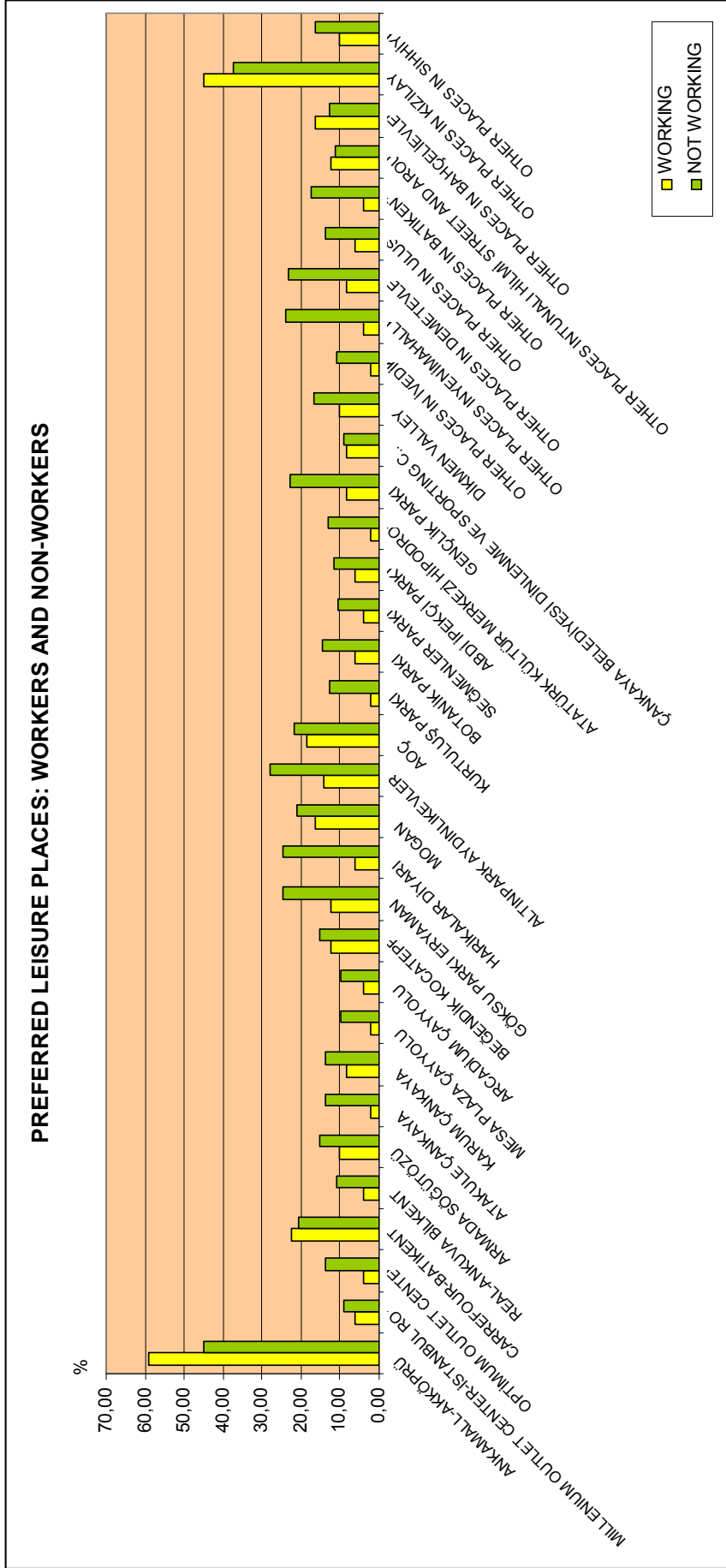


Figure 5.54: Preferred leisure places: workers and non-workers

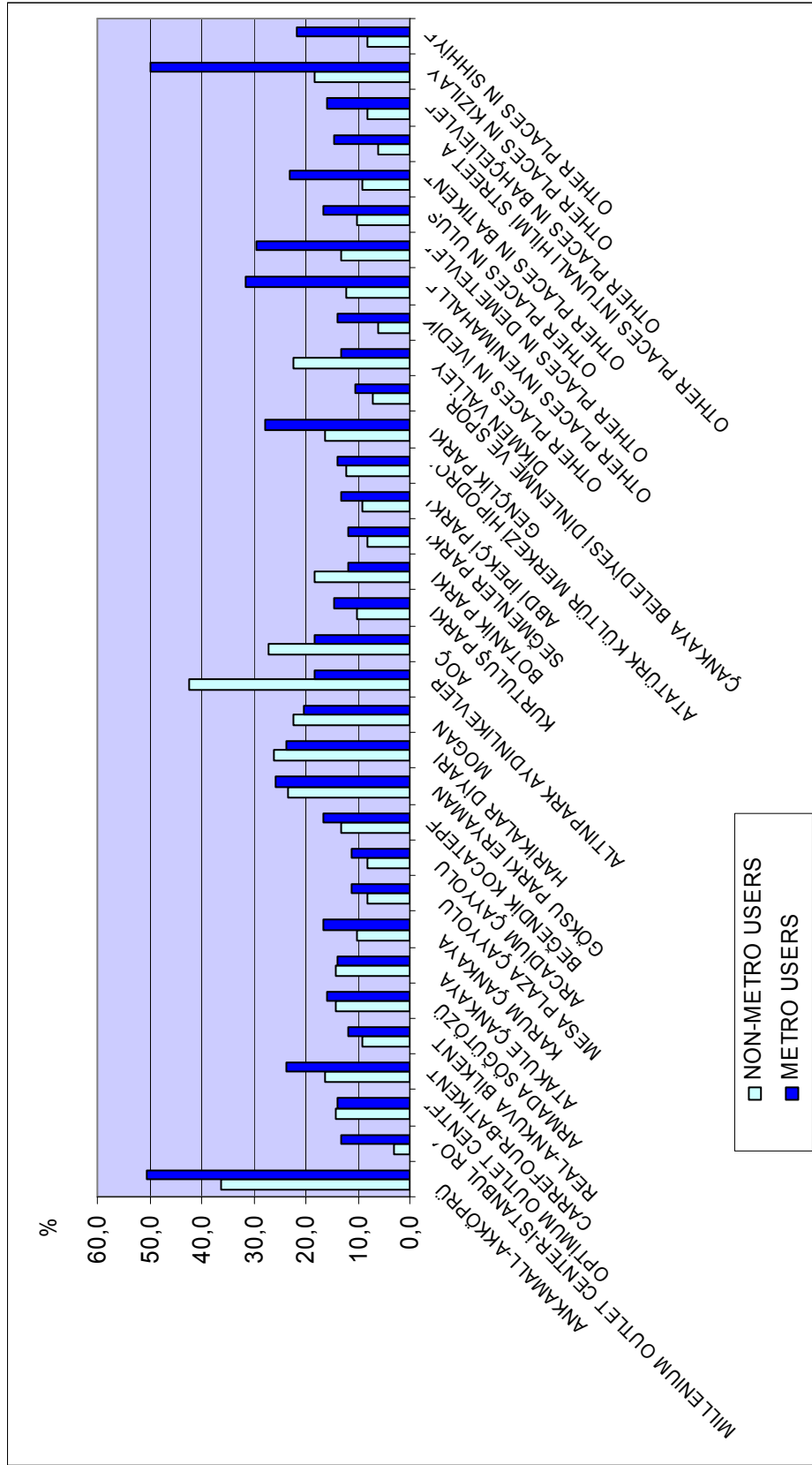


Figure 5.55: Preferred leisure places of women who do not work: metro users and non-metro users

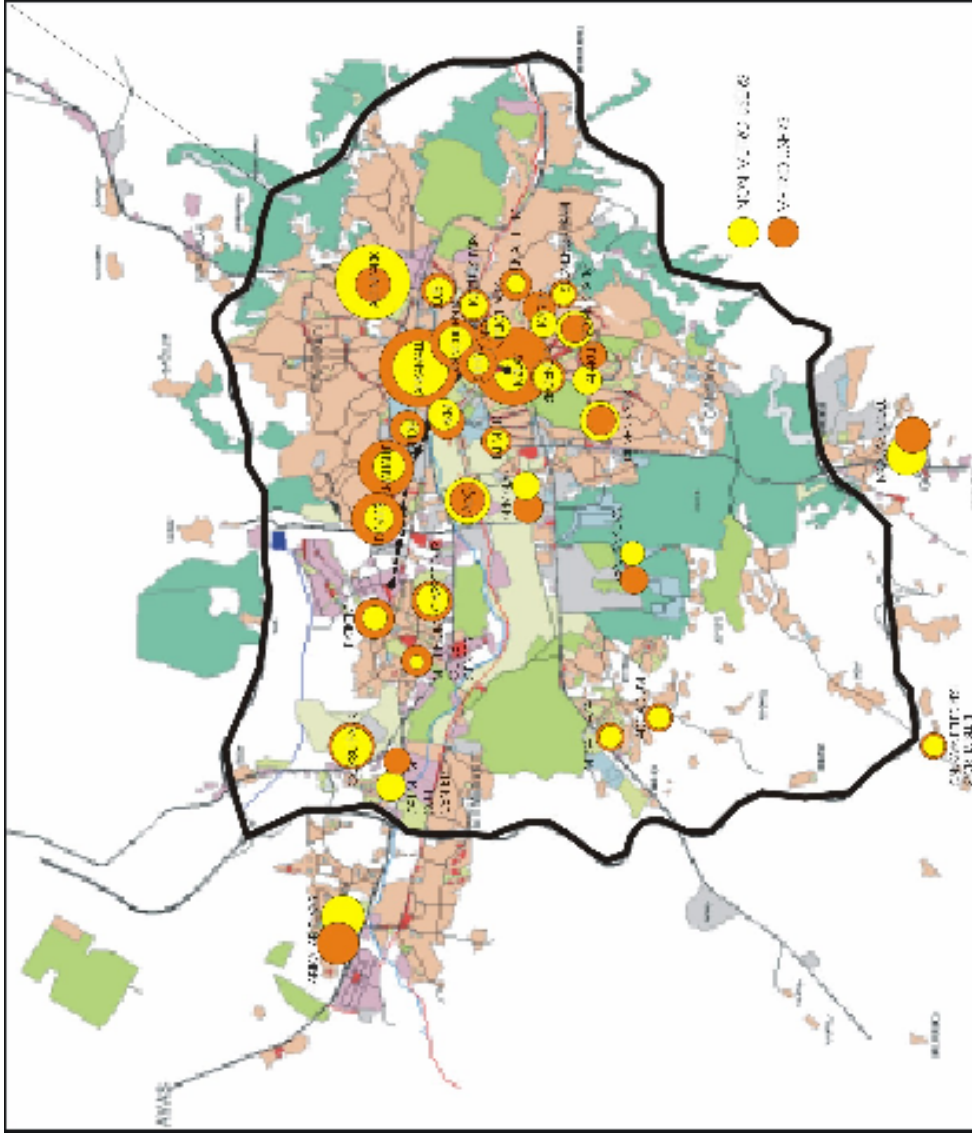


Figure 5.56: Leisure geography of women who don't work: metro users and non-metro users

Age is another important personal factor affecting mobility as mentioned in previous chapters and above in this chapter. Therefore we need to analyze their leisure trips and geography, too. Figure 5.57 shows that nearly all age groups travel with metro for leisure trips, but the youngest women use metro with the highest ratio, which is very important for their leisure mobility and geography.

Firstly, we need to mention that there are 49, 62, 78, 63 and 42 women in “younger than 26”, “26-35”, “36-45”, “46-55” and “older than 55” age groups. Their preferred leisure places are 180, 293, 481, 303 and 283 in number respectively. This means that woman from the above mentioned age groups travel to 3.7, 4.7, 6.2, 4.8 and 6.7 leisure places, again respectively. Younger women seem to be the least vulnerable group in terms of general mobility, as mentioned previously. However, like shopping trips, here we see that the youngest women seems to be the most vulnerable group from the point of view of leisure trips. When we examine different age groups leisure geography (Figure 5.58) it can be said that the narrowest leisure geography is the youngest group’s.

To examine the metro effect in the leisure geography of the youngest women is very important in this sense. As mentioned in the shopping trips section there are 49 women aged 25 or younger, 37 of which are metro users, 12 of which are non users. When we examine their leisure trips and places, it can be seen that while non metro users marked 52 leisure places, metro users marked 150 leisure places where they go. That is to say women who are younger and use metro travel to 4,05 places on average; however, younger women who do not use metro travel to 4,33 places for leisure reasons. Therefore when proportioned with the number of women, the number of places that non-metro users travel do not appear lower. However, when geographies are compared, the outcome is different:

Figures 5.59 and 5.60 show that metro user younger women have significantly wider leisure geography. Non-metro users are going with same ratios to leisure places but they have a narrower and a limited geography. Therefore we can see that while leisure needs related activity amounts of relatively younger women do not change much, their geography are very different, which is caused by metro. As a result it can be said that usage of metro as a transportation mode (mode choice) does not change

their urban activity participation rates but affects their geography, widens their leisure geography.

The younger women who do not use the metro seem to travel to more limited locations than metro users. Most of the places which are experienced by metro users are not preferred by non-metro users: Demetevler, Yenimahalle, İvedik, Batıkent, Mesa Plaza, Arcadium-Çayyolu, Begendik, Abdi İpekçi Park, Kurtuluş Park, Ulus and Sıhhiye. AOÇ, Ankamall, Göksu Park-Eryaman, and Botanik park seem to be their leading destination points when leisure trips are considered. Young metro users also go to these places, but Kızılay, the city center, and Ankamall appear to be the most important leisure destination for them. Metro users' leisure destinations are more varied than non-users. It is also interesting to see that young metro users travel more to the leisure areas of the more affluent southern parts of the city, namely Tunalı Hilmi, Armada, Mesa Plaza, Arcadium-Çayyolu, Real-Ankuva. These places in the south are not served by a metro system; however, it is still an important finding that metro users travel more to those affluent leisure areas, while most of the non-metro users do not even go to these places. It may again be argued that using the metro helps expand the urban geographies of women, and as a result of this increased mobility they tend to travel to additional and new places that may not even be served by the metro.

The comparison of the shopping geography and leisure geography of women who are younger also show that the difference between metro users and non-users are more explicit when leisure trips are considered. That is to say women who are younger and do not use metro are more vulnerable about leisure activities than shopping activities. In other words women who are younger and who use metro travel much more than non-metro users; however the difference is not as much in shopping trips. In this context leisure trips are important for women in terms of urban life participation and metro seems to be important in increasing urban life participation rates. But still in either cases (shopping and leisure) younger women who do not use metro seem to be the most vulnerable women group among all other groups.

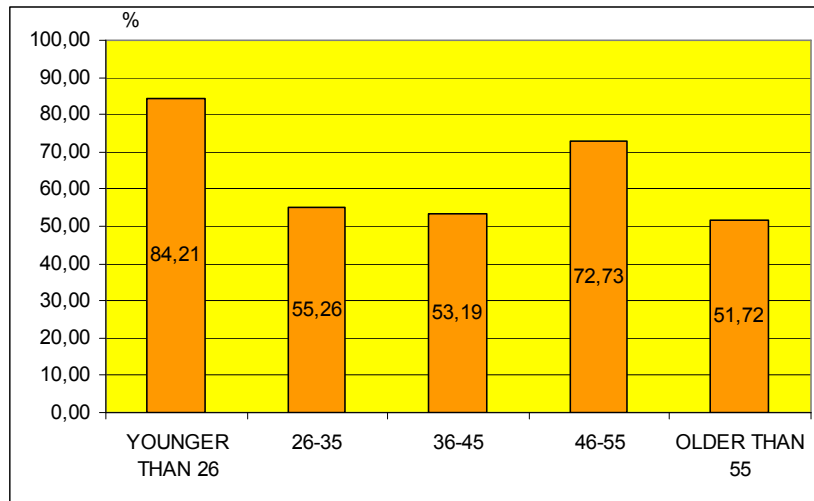


Figure 5.57: Metro usage rates for leisure trips: age groups

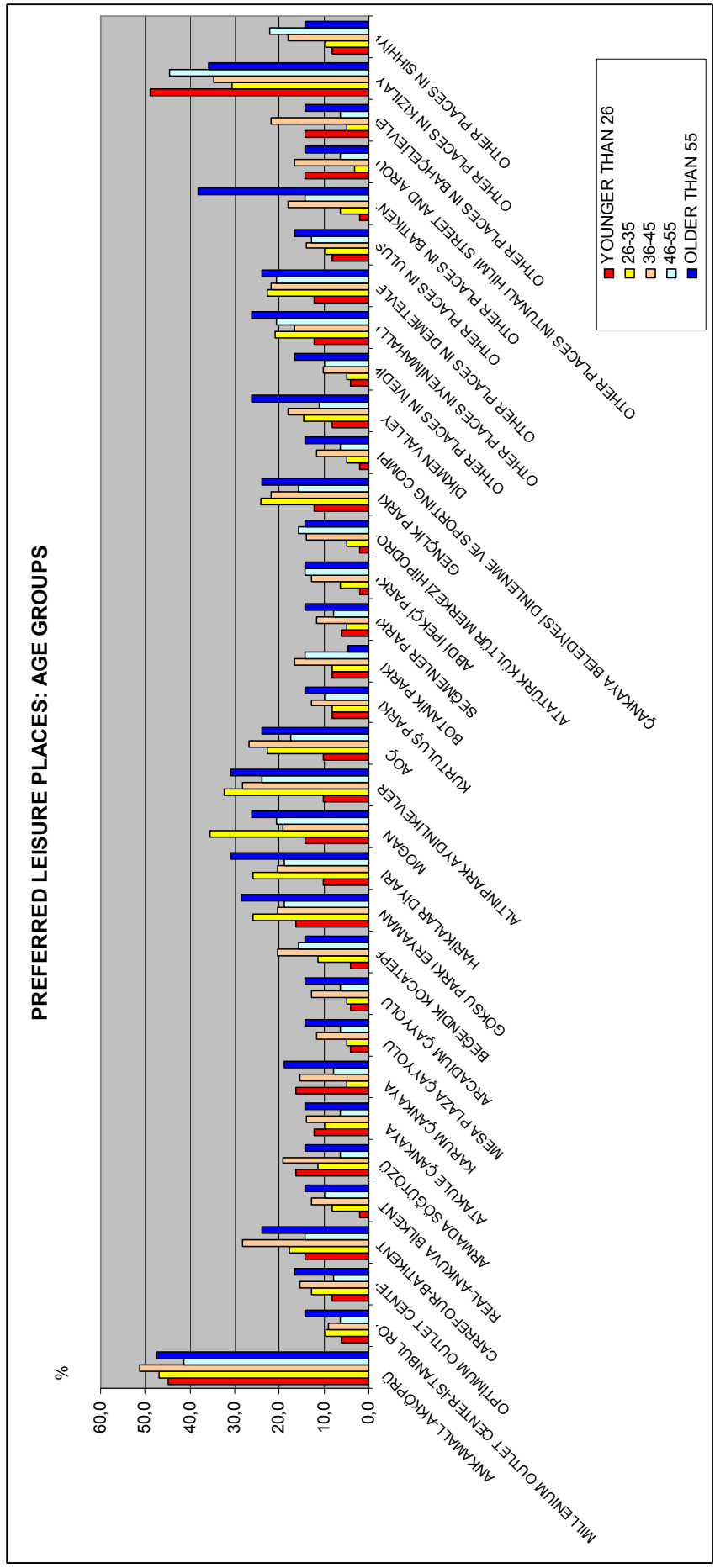


Figure 5.58: Preferred leisure places: age groups

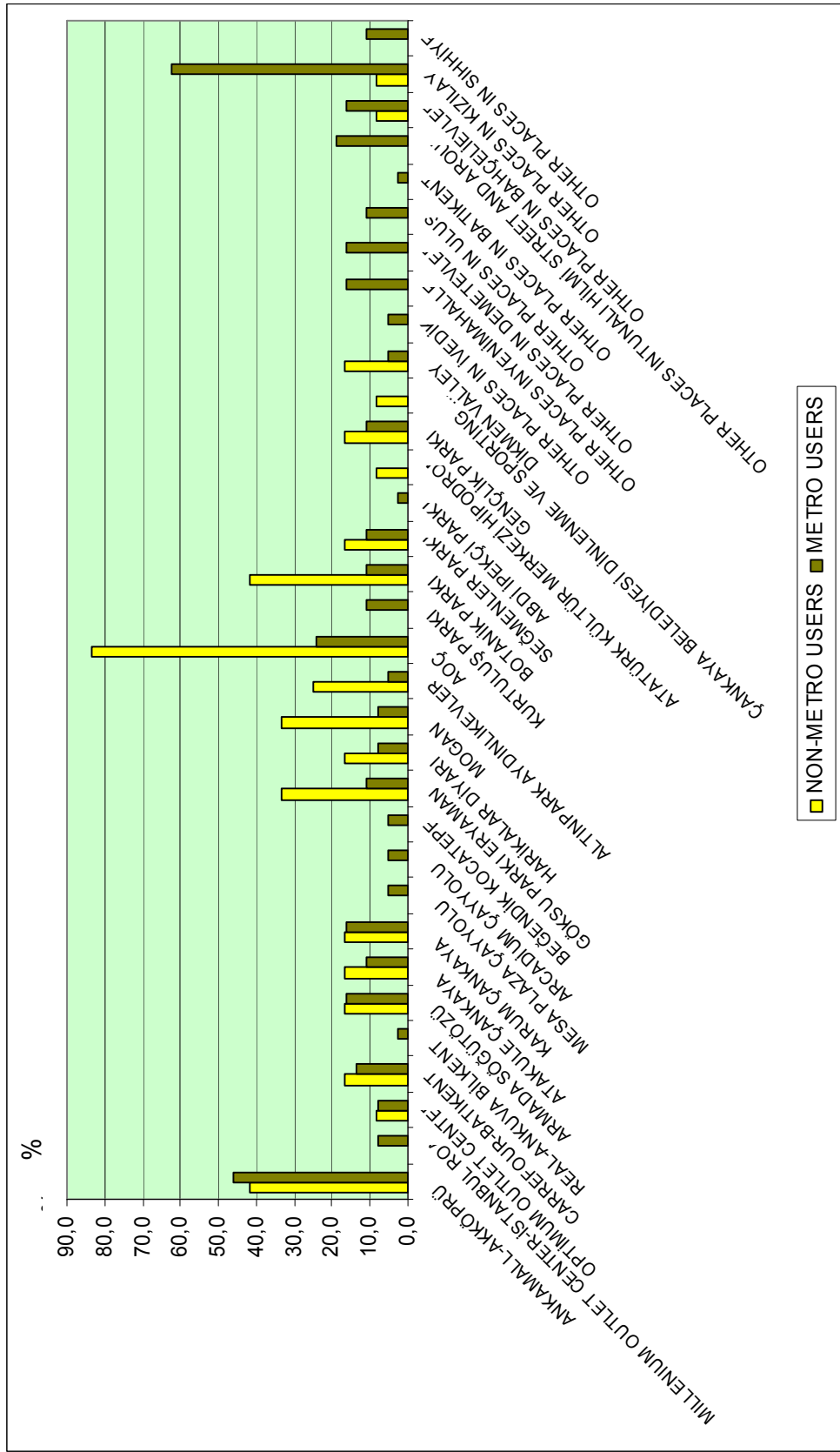


Figure 5.59: Preferred leisure places of women who are younger than 26: metro users and non-users

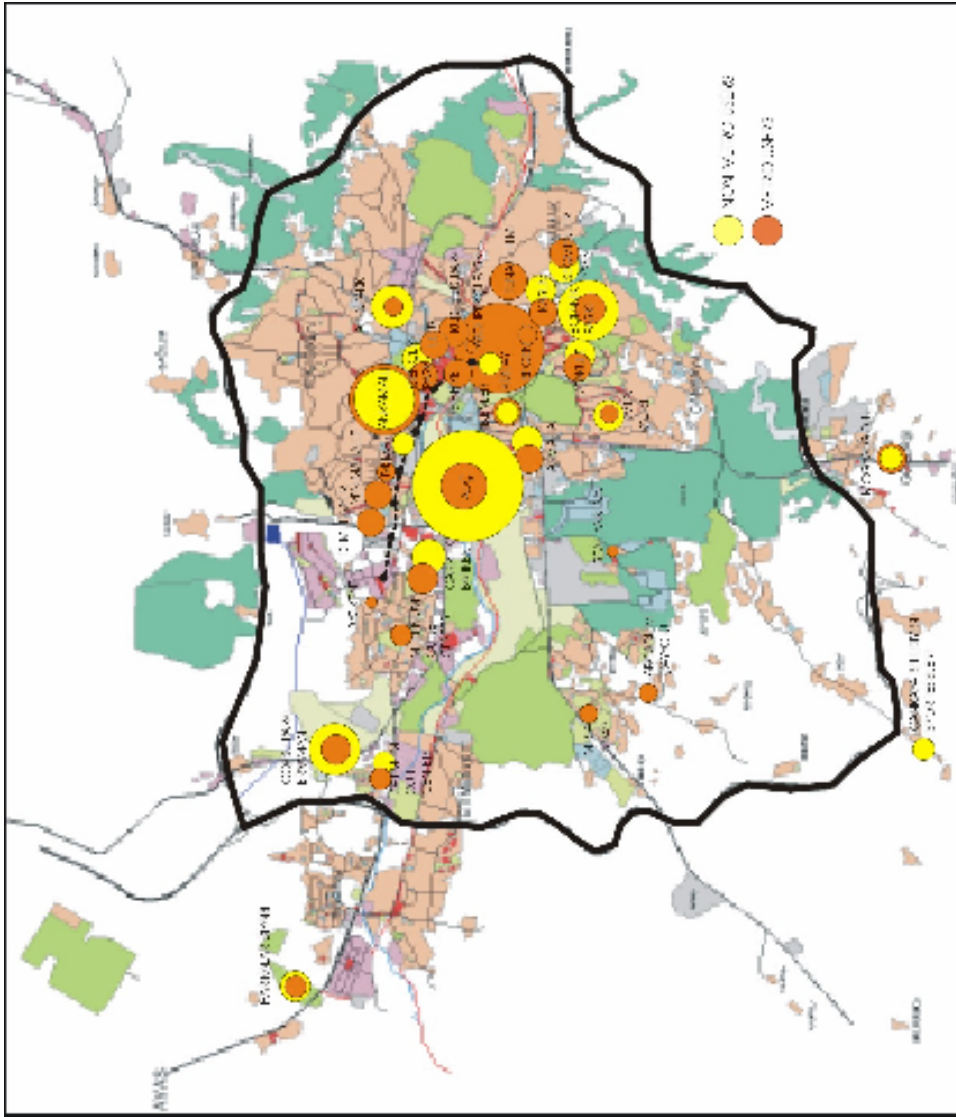


Figure 5.60: Preferred leisure places of women who are younger than 26: metro users and non-users

There are 42 women who are aged 56 or more, 26 of which use the metro, 16 of which do not. While 26 metro user women marked 229 leisure places, 16 non-metro user women marked only 61 places. Again when we proportion metro users to non-metro users and their preferred leisure places within themselves, we can see that there is a big difference between their ratios. While metro user elderly woman travels to 14.31 leisure places, non-metro user elderly woman travels to only 3,81 places for leisure reasons. Here the result is different from younger age group analyzed above, whose activity participation rates do not change from the point of view of metro users and non-metro users but geographies are very different. Here we can say that non-metro user elderly women (at least some of them) may be going to the same places as metro users, but their participation rates are much lower than metro users (Figures 5.61 and 5.62). Furthermore, non-metro user elderly women's leading leisure destinations are limited (Ankamall, Dikmen Valley, Botanik Park and Altınpark), metro user elderly have more leading destinations for leisure activities (Kızılay, Batıkent, Yenimahalle, Demetevler, Altınpark, Göksu Park, Harikalar Diyarı, Dikmen Valley, etc.)

When we compare the shopping and leisure geography of elderly we can again say that metro is more crucial for leisure activities. Because the experienced urban geography difference is much more for leisure trips between metro users and non-metro users among elderly group.

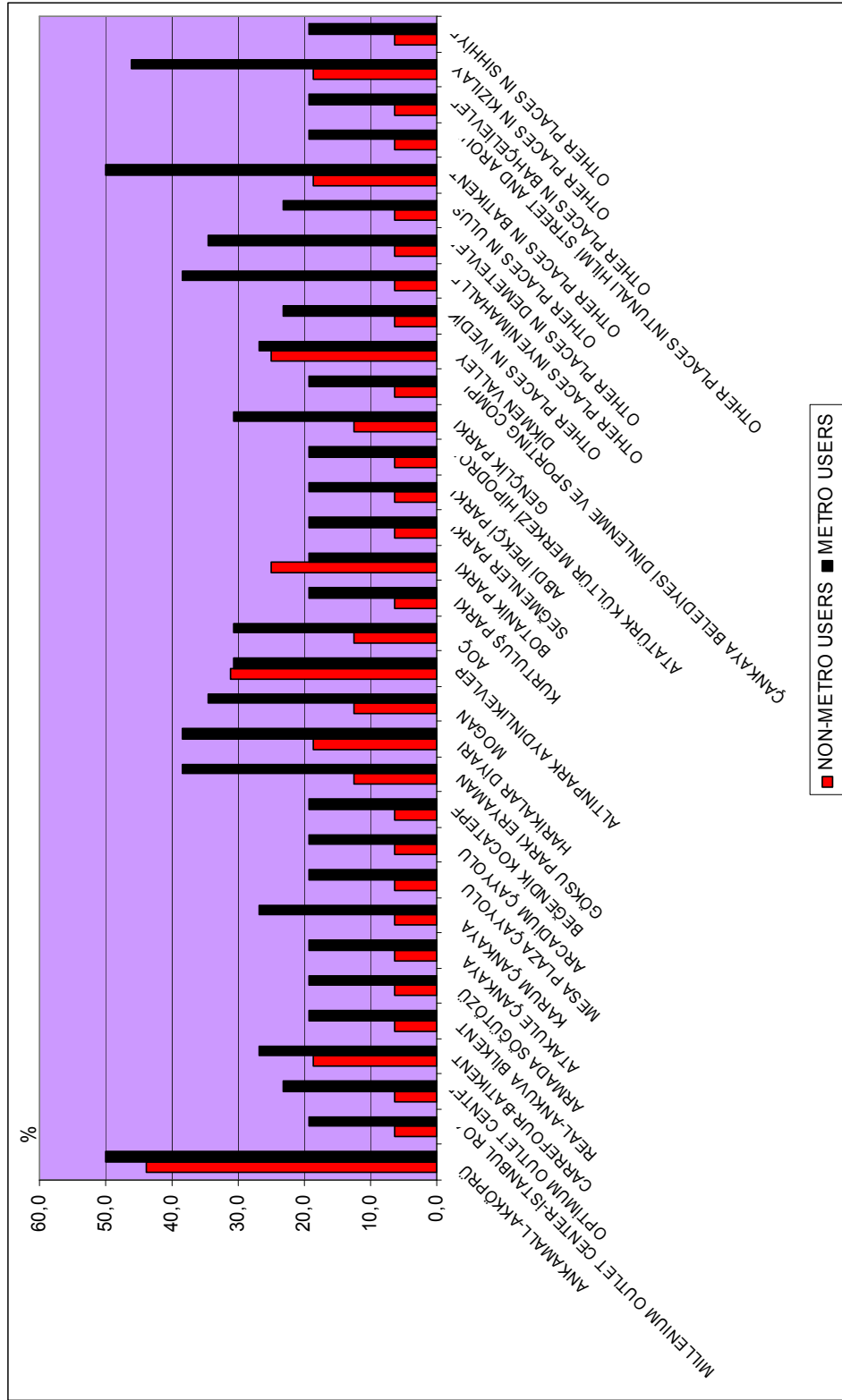


Figure 5.61: Preferred leisure places of women who are aged 56 or more: metro users and non-users

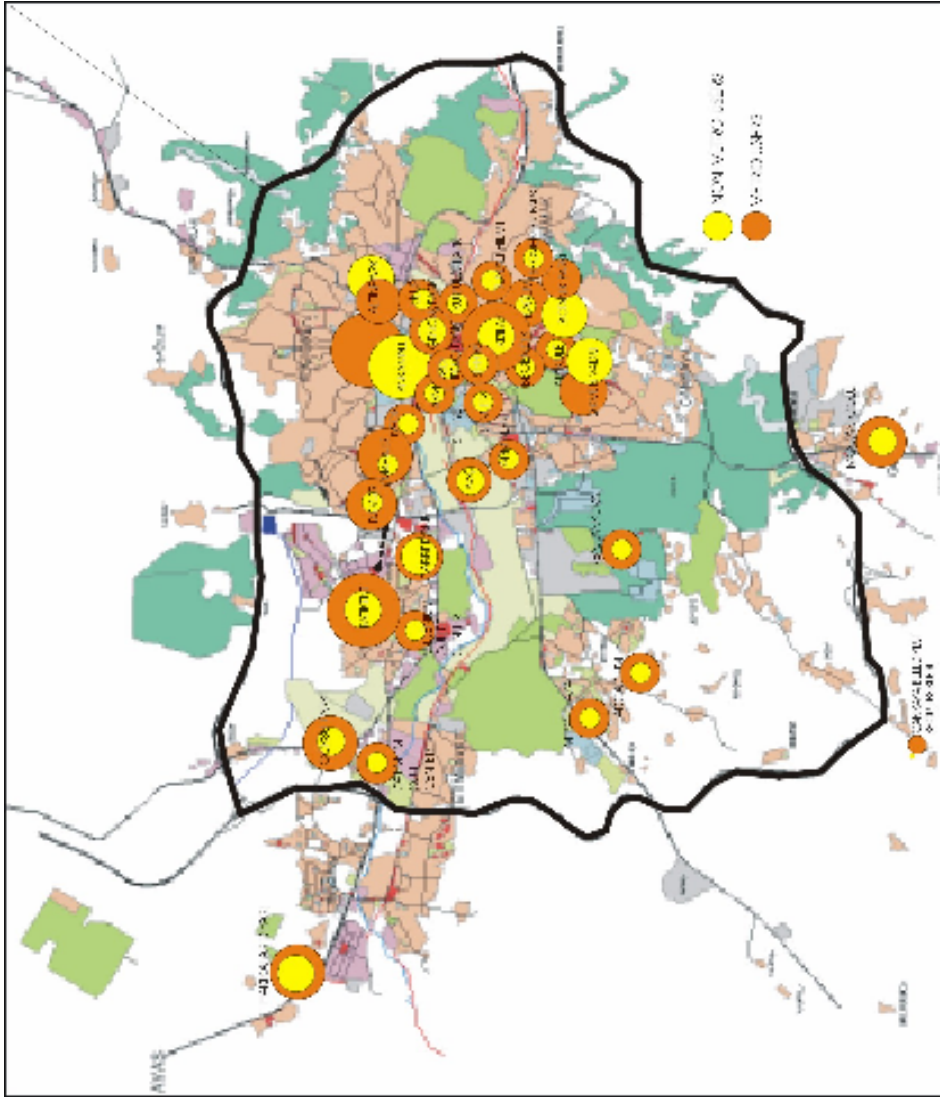


Figure 5.62: Preferred leisure places of women aged 56 or more: metro users and non-users

Income is another factor affecting mobility and experienced urban geography. Previously it was shown that women with low income are less mobile in general. Figure 5.63 also showed that metro usage rates of women with low income for leisure reasons seem to be lower than the others. Therefore low income women might be more vulnerable also from the point of view of leisure mobility and geography.

There are 146, 80, 39 and 35 women in 0-999 YTL, 1000-1499 YTL, 1500-1999 YTL and 2000 YTL and more income groups. They prefer to go 784, 420, 175 and 230 places for leisure respectively. This means that women from each income group travel to 5.4, 5.3, 4.5, and 6.6 destinations for leisure. We can see from these figures that women who have low and middle income groups travel less for leisure than the highest income group. Figure 5.64 also shows that the highest income group has the largest urban leisure geography. Therefore we need to assess the metro effect on the leisure geography of low income group.

0-999 YTL income group consists of 272 women, 87 of which use the metro, 59 of which do not. While the 87 metro user women declared 533 places for leisure, 59 non-users declared 249 leisure places that they go (Figure 5.65). Again if we proportion metro users to non-metro users of low income women group and their preferred leisure places within themselves (while metro user low income woman travels to 6,13 leisure places on average, non-metro user women who have low income only travels to 4,22 leisure places), we can see that there is a difference between their ratios, showing that metro users experience a larger variety of leisure places in the city. Non-metro users among low income women also go to similar leisure places as metro users go, however, in lower rates. This indicates that a higher ratio of metro-user low-income women experience wider urban geographies when compared to non-metro users.

Non-metro users mostly seem to prefer Altınpark (probably mostly Keçiören women prefer), Ankamall (where probably there is a company service) mostly. Other than those places they travel less. However metro users travel with higher ratios within a

larger urban geography, not only along the metro route but also in other parts of the city (Figure 5.66).

When we compare the shopping and leisure geography of women with low income we can again say that metro is more crucial for leisure activities. That is because the experienced urban geography difference is much more for leisure trips between metro users and non-metro users among women with low income.

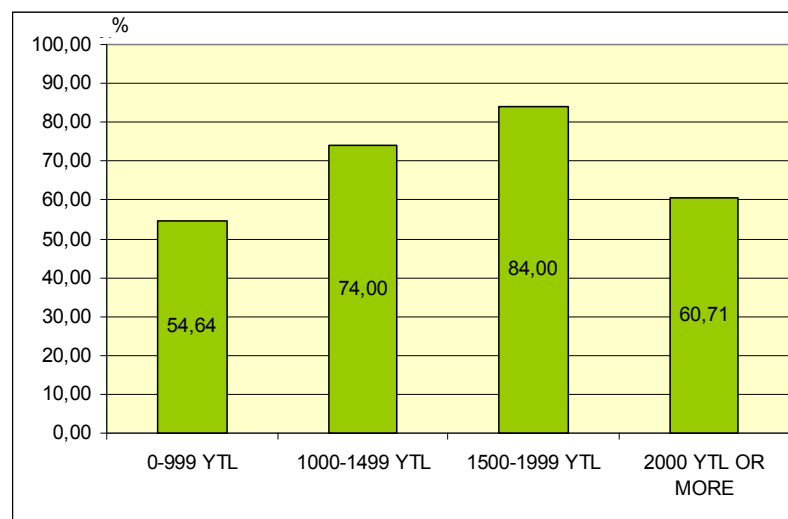


Figure 5.63: Metro usage rates for leisure trips: income groups

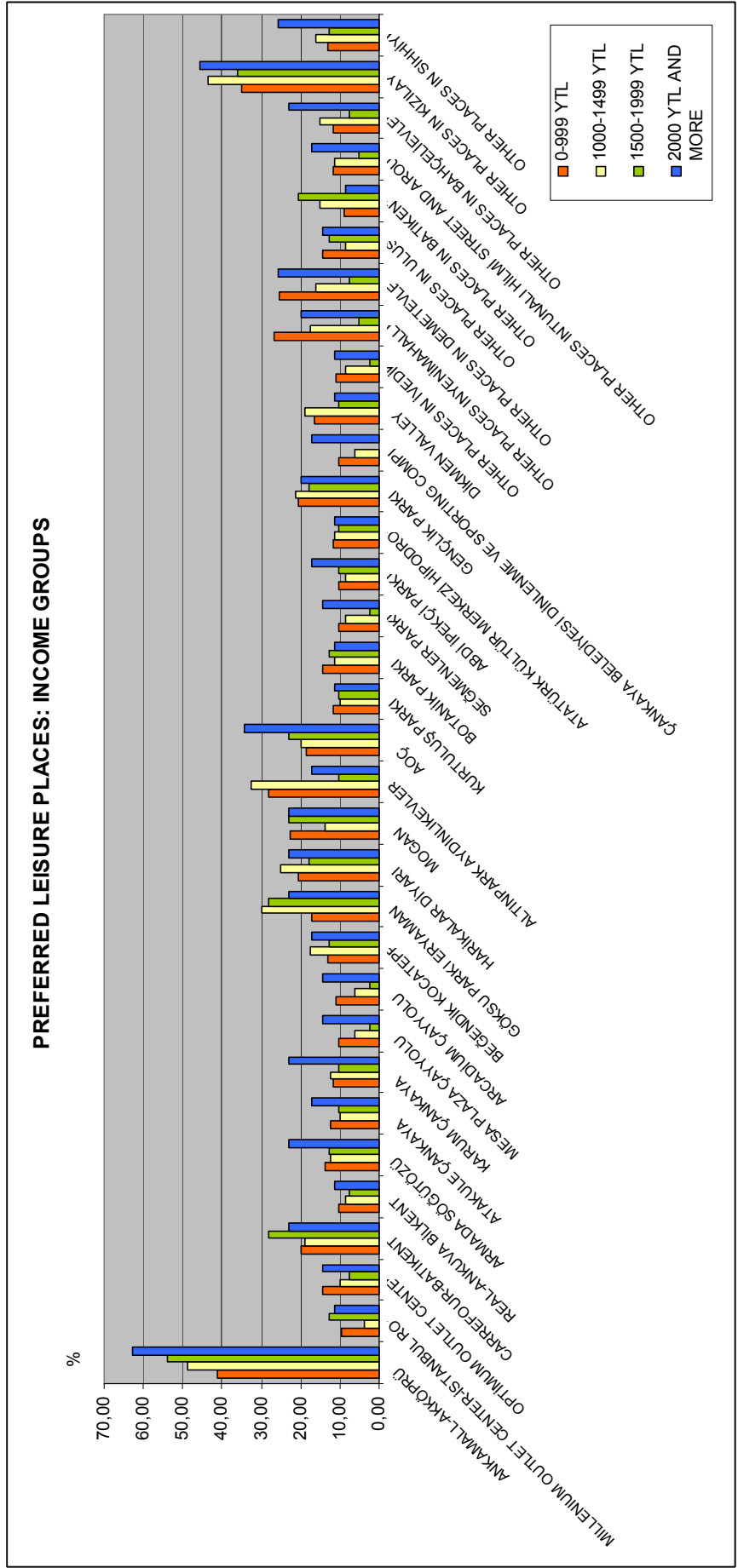


Figure 5.64: Preferred leisure places: income groups

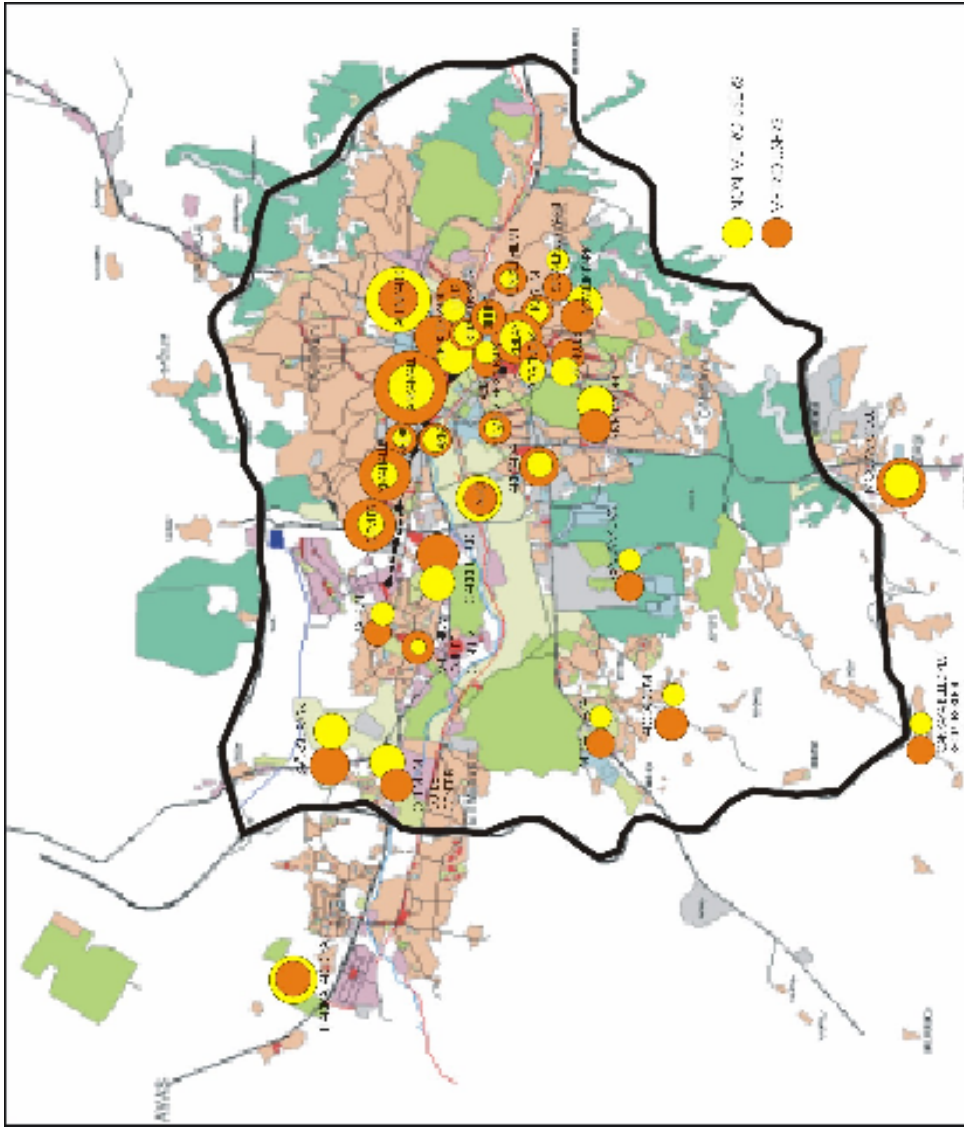


Figure 5.66: Preferred leisure places of women with 0-999 YTL income: metro users and non-users

As previously mentioned having children might be an important constraint from the point of view of mobility. However in the previous section of this chapter it was mentioned that women who have children make more shopping trips than women without children. Here we will analyze their leisure mobility and geography. Firstly Figure 5.67 shows that women with children use metro less for leisure trips. This means that it might not be very convenient to travel with children for leisure purposes. However when we analyze the figures of places traveled by woman we see an interesting result. There are 65 women who do not have children and 235 women who have children. 65 women without children marked 294 leisure places; however 235 women with children marked 1325 places for leisure. This means that while woman without children travels to 4.5 places for leisure on average, woman with children travels to 5.6 leisure places. Therefore having children does not seem to be a barrier for women from the point of view of leisure mobility. When we examine their leisure geographies we can say that women with children also have wider geographies (Figure 5.68).

But since having children can still be considered as vulnerability, because of having more domestic responsibility, we need to analyze the metro effect on their mobility levels. 235 of the interviewed women have children, and 137 of them use metro while 98 of them do not. Metro users marked 822 leisure places and non-metro users marked 483 leisure places of preference (while non-metro user woman who have children travels to 4,93 leisure places, metro user woman who use metro travels to 6 places for leisure reasons). Figures 5.69 and 5.70 again show that metro usage does not make a difference among women who have children from the point of view of their geography: leisure places that women with children travel to (regardless of their metro usage), appear similar. Nevertheless, the ratios of visiting these leisure places appear much higher for metro users, as also revealed by the average ratios given above. Women with children who use the metro travel more for leisure reasons, and a higher proportion of these (compared to non-metro users) have wide urban geographies.

Previously it was mentioned that non-metro user women with children also travel more for shopping, but here we see that non-metro user women with children is

much less mobile and experience a much narrower geography than metro user women with children. Therefore when we compare the shopping and leisure geography of women with children we can once again say that metro is more crucial for leisure activities. Because the experienced urban geography difference is much more for leisure trips between metro users and non-metro users among women with children.

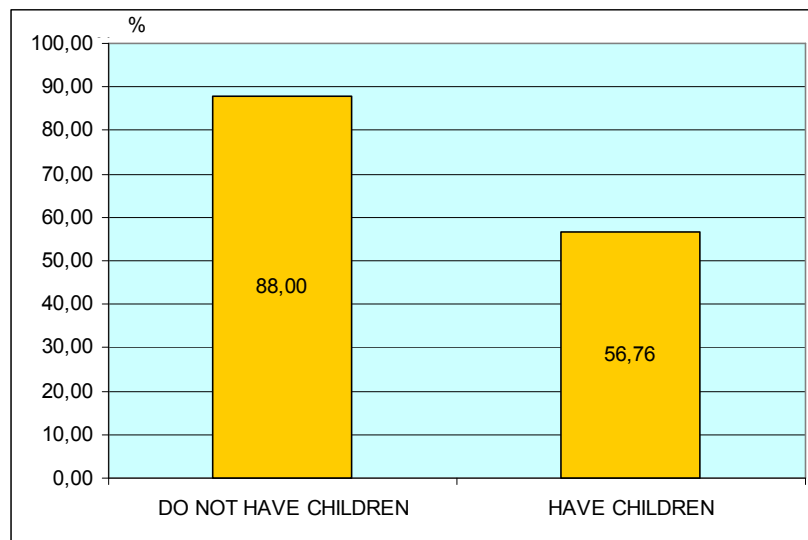


Figure5.67: Metro usage rates for leisure trips: have or do not have children

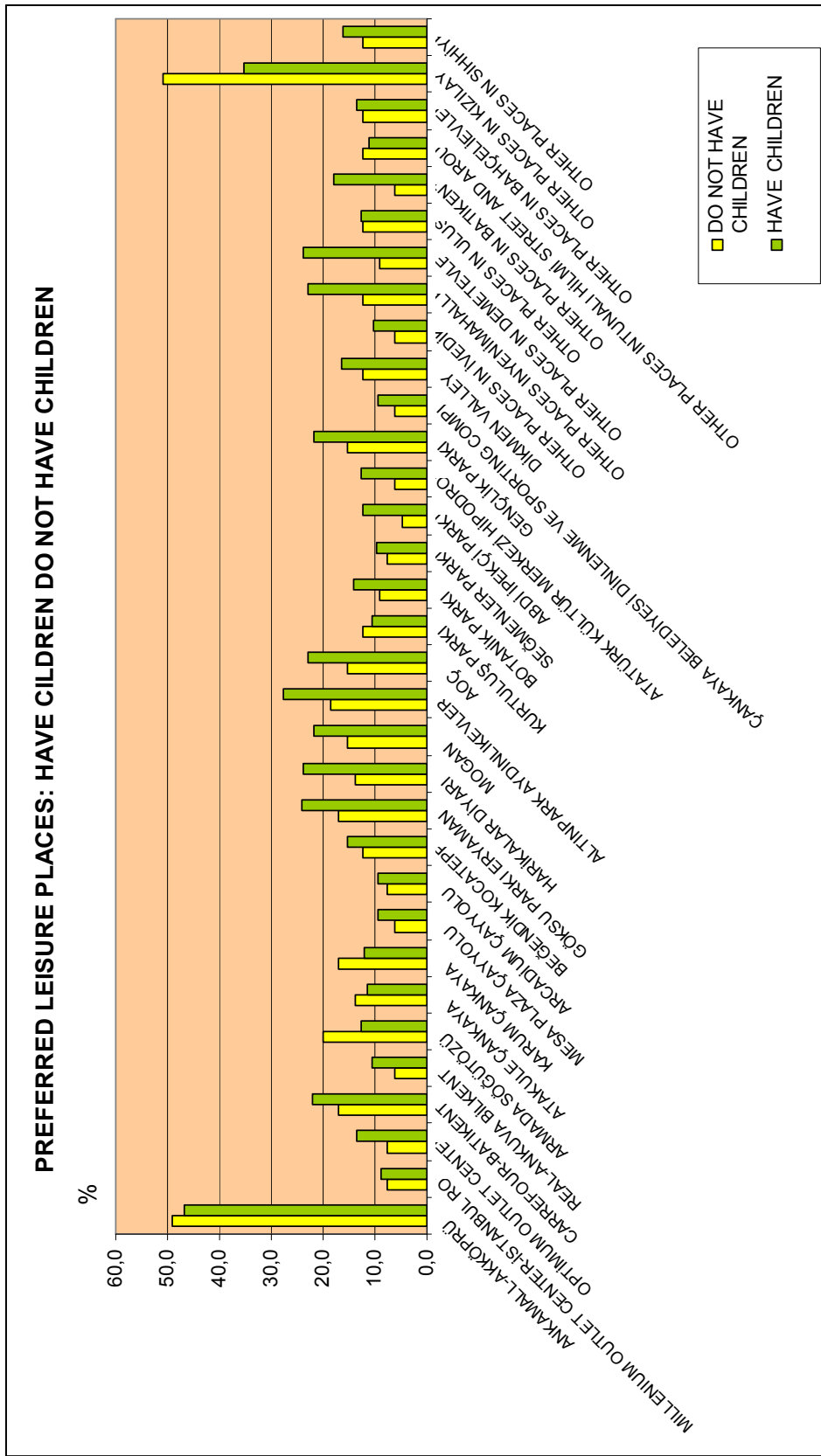


Figure 5.68: Preferred leisure places: have children and do not have children

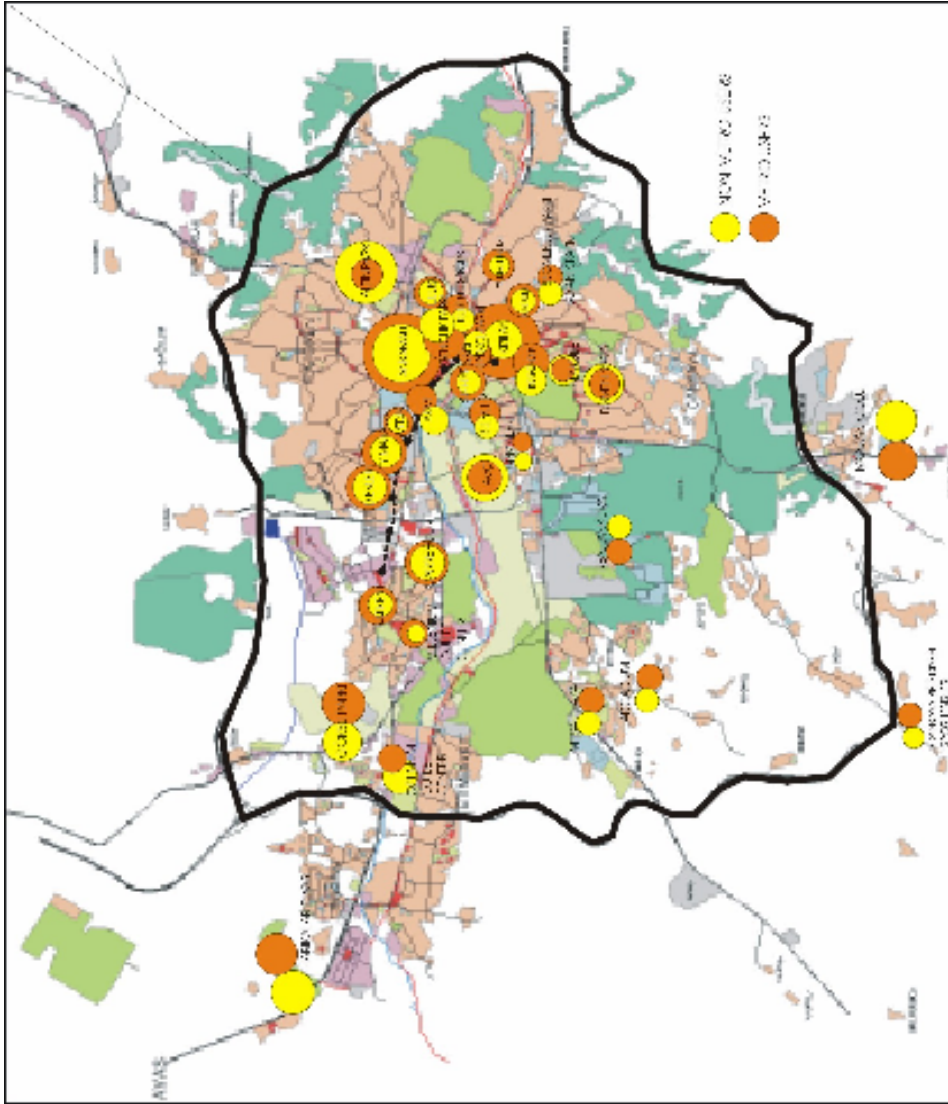


Figure 5.70: Leisure geography of women who have children: metro users and non-metro users

Education level is the final factor we examine from the point of view of women’s mobility. Figure 5.71 shows that less educated women’s metro usage rates for leisure trips are lower than others.

There are 152, 85 and 63 women in “elementary education or below”, “high school education” and “university education” levels respectively. They prefer 895, 348 and 376 leisure places respectively. This means that woman travels to 5.9, 4.1, and 6.0 places for leisure again respectively. In fact it is expected that less educated women travel less for leisure; but, there is not a significant difference between their trip ratios. However less educated women seem to have narrower leisure geography than university graduates (Figure 5.72).

Figures 5.73 and 5.74 give the preferred leisure places of less educated women and their leisure geographies. There are 152 less educated women, while 63 of which do not use metro, 89 of those use metro. The 63 non-metro user women marked 313 places for leisure, the 89 metro users marked 585 leisure places. That is to say while less educated non-metro user woman travels to 4.97 leisure places, less educated metro user woman travels to 6,57 leisure places. That is to say less educated metro user women experience larger parts of the city for leisure reasons.

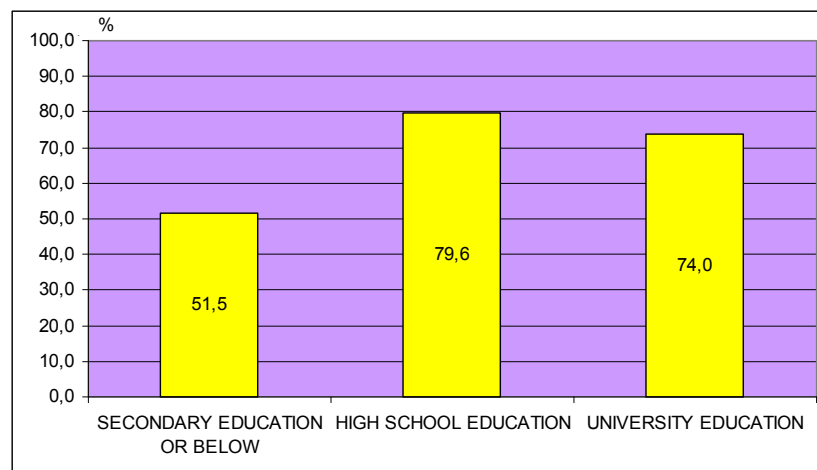


Figure 5.71: Metro usage rates for leisure trips: education levels

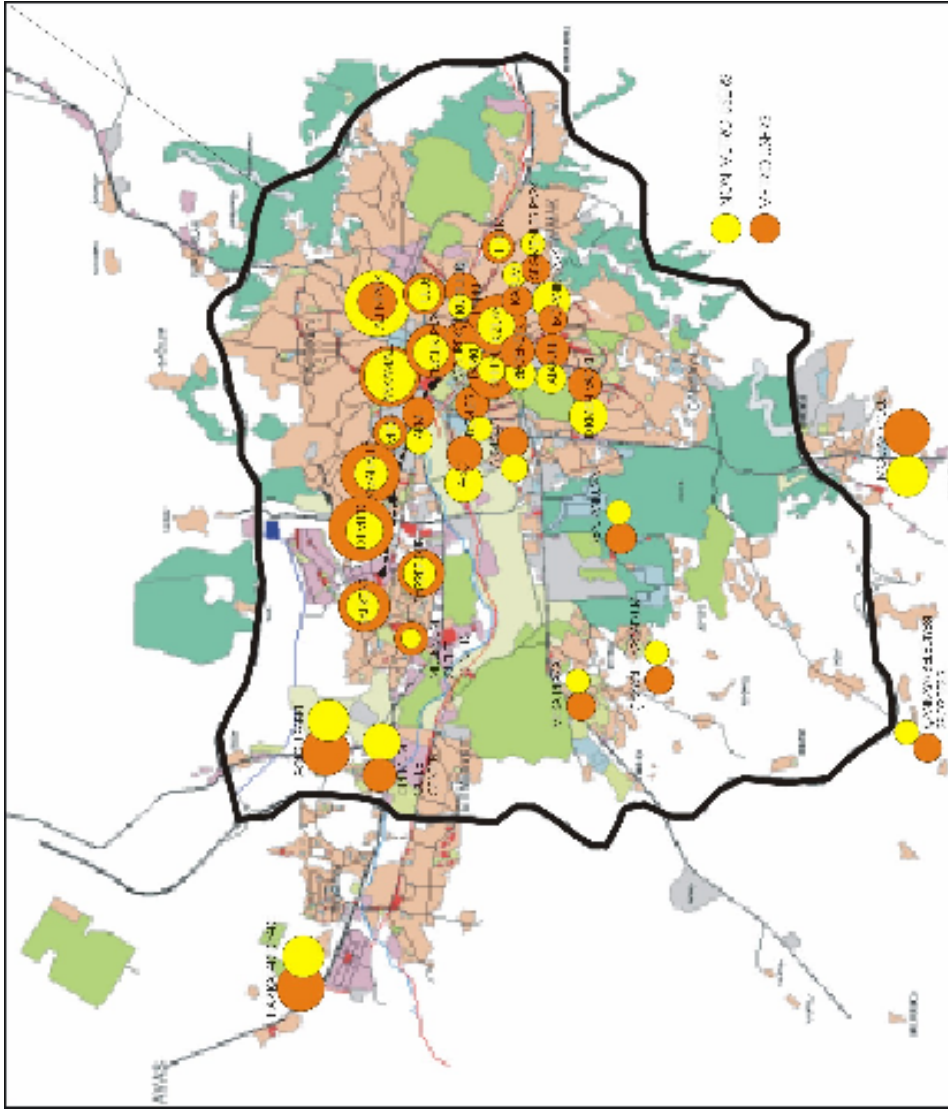


Figure 5.74: Leisure geography of women who are less educated: metro users and non-metro users

Generally when we compare the shopping and leisure geography of less educated women we can again say that metro is more crucial for leisure activities. Because the experienced urban geography difference is much more for leisure trips between metro users and non-metro users among less educated women.

One of the questions regarding leisure trips was about visiting friends. It was considered that visiting friends can be another indicator of urban life participation. Sample women were asked about whether they go for friend visits or not, and if they do they were asked where these trips would be made to and by which transport mode.

Figure 5.75 shows that majority of women go for friend visits (85%). More than half of them go to places in their current neighborhood, that is to say they do not make motorized trips, and only travel by walking. 28% of the interviewed women seem to go neighborhoods that are remote from their own neighborhood, with a vehicle.

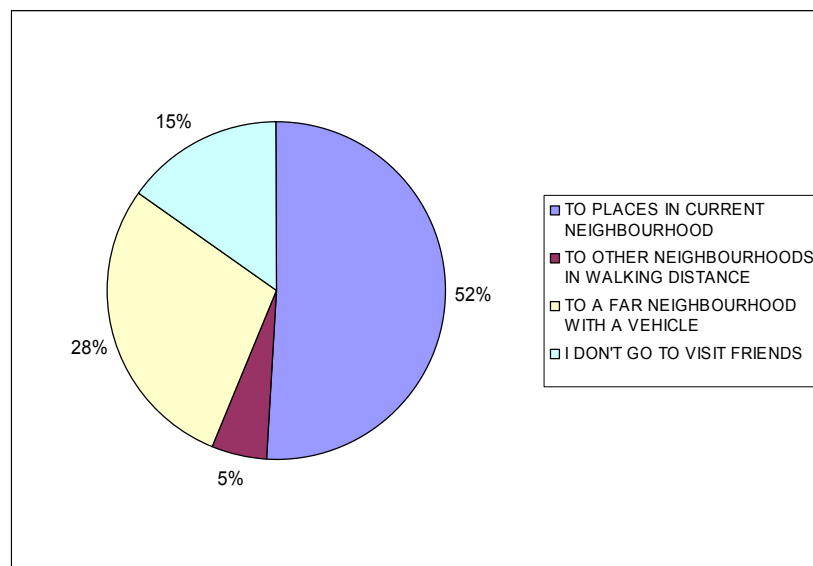


Figure 5.75: Friend visit types in general

Firstly we will explain where women go for friend visits from the point of view of metro users and non users in order to understand metro's effect on Batikent corridor, due to the existing metro infrastructure (Figure 5.76). Women who visit friends mostly go to places in current neighborhood. Women who do not use metro visit friends less, and metro users go to distant neighborhoods more. In order to assess whether this is due to metro accessibility, we have to look at the metro usage rates among women who go to friend visits in neighborhoods that are remote from their own.

In Figure 5.77 we see that 92% of women use the metro for friend visits in more distant neighborhoods. This is important in determining the mobility effect of metro for women, because the figure shows that metro widens women's leisure geography in terms of friend visits.

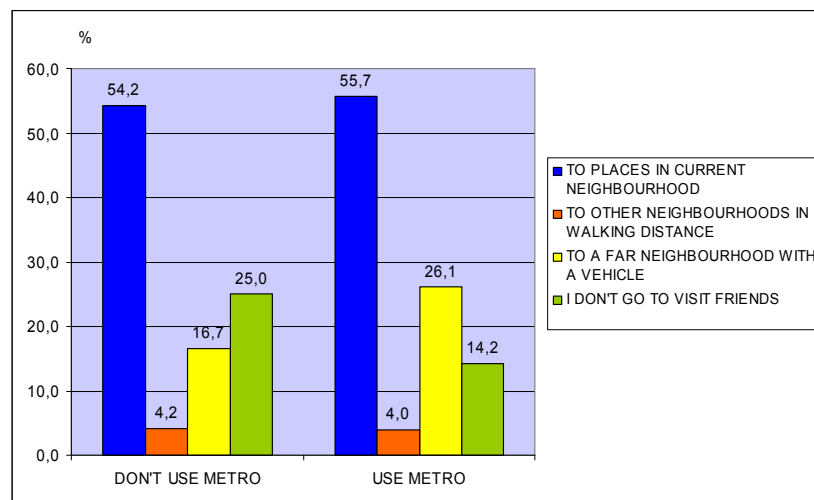


Figure 5.76: Friend visits: metro users and non-users on Batikent corridor

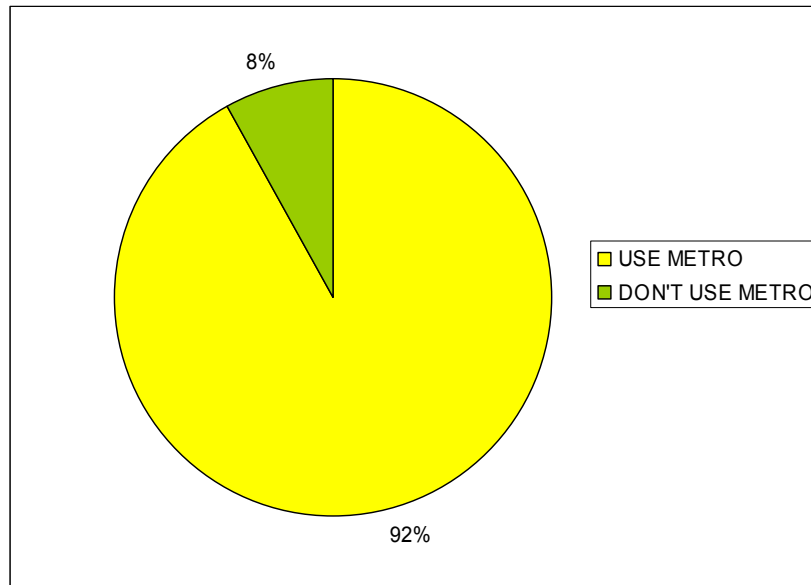


Figure 5.77: Women who go to far neighborhoods for friend visit: metro users and non-metro users

When we examine the vulnerable groups' friend visits, we can see that metro user vulnerable groups travel more for friend visits (Figure 5,78). It is important to assess whether metro users go to far neighborhoods more or not, to understand the metro effect on this type of trips. From the point of view of non-workers, low income, relatively younger and elderly, and women with children; it is very clear that metro users of these groups travel to non-local neighborhoods more for friend visits (Figures 5.79, 5.80, 5.81, 5.82). This is particularly significant for the youngest and the elderly age groups. It can be concluded that metro can help widen the urban geography of women from vulnerable groups in terms of their friend visits as well as other leisure trips.

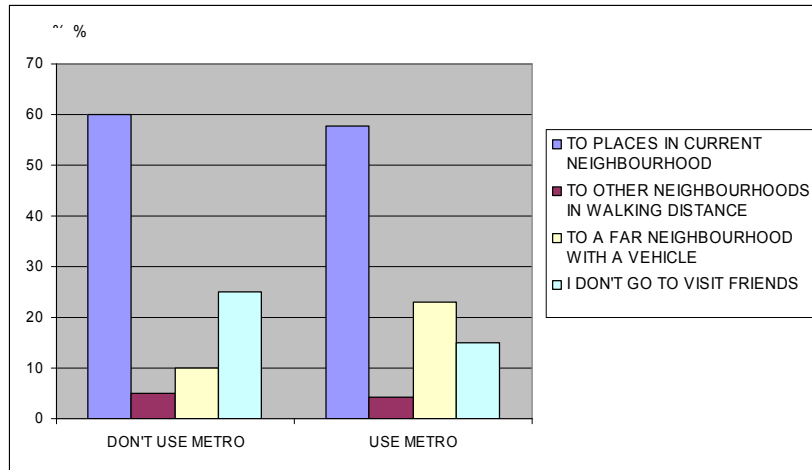


Figure 5.78: Friend visits of women who don't work

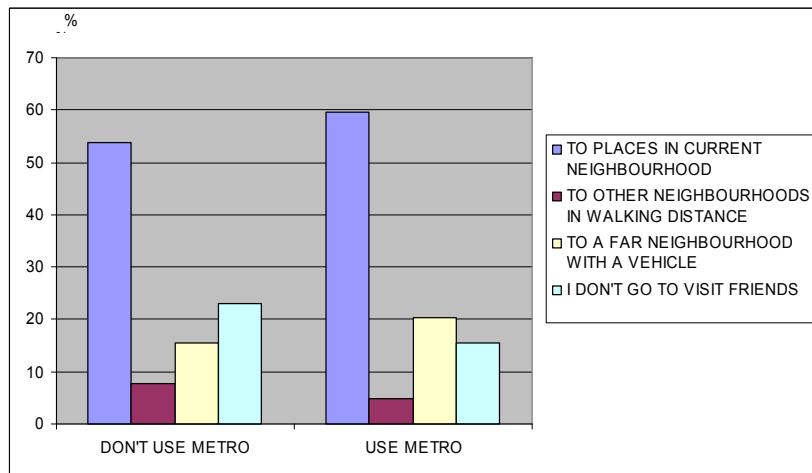


Figure 5.79: Friend visits of women of low income

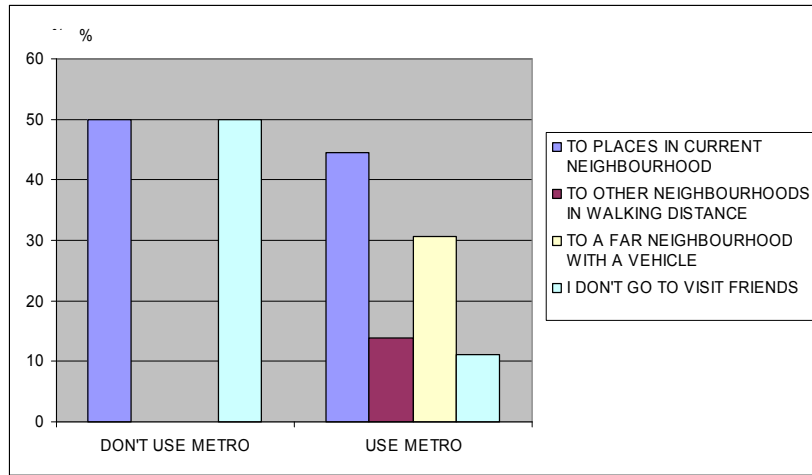


Figure 5.80: Friend visits of relatively younger women

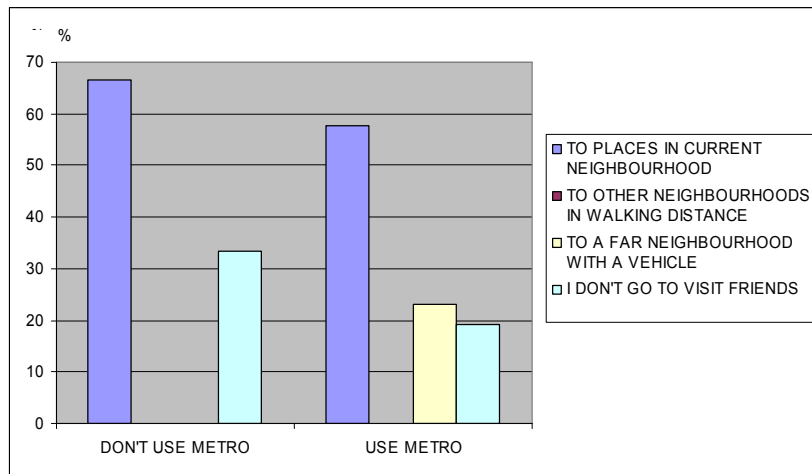


Figure 5.81: Friend visits of relatively older women

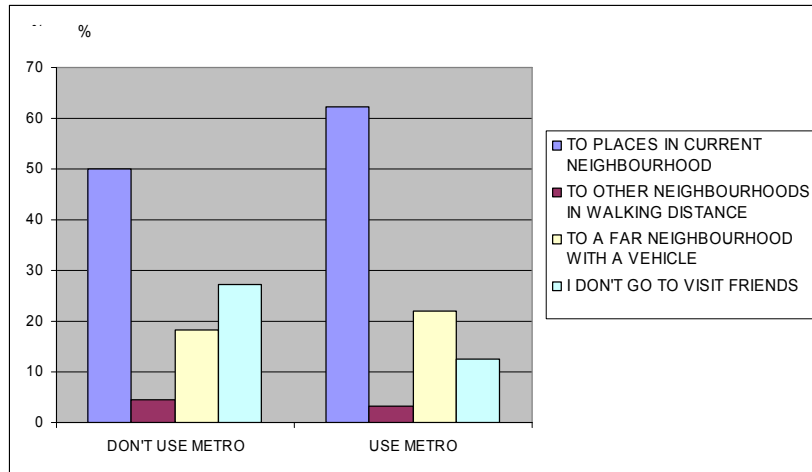


Figure 5.82: Friend visits of women who have children

5.5. SUMMARY OF FINDINGS

This chapter studied women's mobility levels and the urban geography they experience for different activities. The aim was to see whether metro played an important role in increasing the mobility and widening urban geography they experience when traveling for different activities, subsistence-maintenance-leisure activities. Shortly, in this chapter we analyzed mobility levels and the extend of experienced urban geography of women for those who use the metro and those who do not.

In the previous chapter different women groups' mobility were studied, and it was understood that, although in general women are considered more vulnerable than men in terms of mobility; some groups among women are more vulnerable than other women. Therefore in this chapter we focused on activity geographies and metro usage effect on vulnerable women's activity based trips.

Field study has shown that three activity types have different temporal context; while subsistence and maintenance needs are mostly fulfilled in weekdays, leisure needs are mostly fulfilled in weekends, although from personal contexts, that is to say different women groups like workers and non-workers, low income and high income, etc., there may be some differences. Their spatial contexts are also different, because different women's activity geographies are also different.

When we analysed working trips and geographies of women living on Batikent corridor and Keçiören corridor, we saw that working geography of women living on Batikent corridor was larger than that of women on Keçiören corridor. Furthermore when we study vehicle types used for work trips, we saw that women mostly used metro for work trips on Batikent corridor. Therefore we can suggest that women intend to choose work places where there is a metro connection. When we analyzed the women who do not use metro for work trips, we saw that nearly half of them worked in places within walking distance, and nearly half of remaining used company services. When we analyze the characteristics of trip and characteristics of mode (mode choice) while purpose is working, travel time is specified due to

specified working times and direction and location is also specified. Therefore choosing a mode which is reliable and taking less time like metro is convenient. Metro also has direct connections with other modes in some certain nodes like Kızılay, Sıhhiye and Ulus. Therefore women who work in Mamak, for example, can also use metro for her work trips, or women can work in Mamak due to direct metro connection.

From the point of view of vulnerable women, analysis showed that metro usage rates among vulnerable women for work trips is higher than other women. Furthermore metro user vulnerable women (e.g. low income) have a rather larger working geography than non-metro users. When we consider working geography of women living on Keçiören route, we see that they mostly work in their own neighborhoods, perhaps mostly within walking distance. That is to say their working geography is narrower than women living on Batıkent corridor.

From the point of view of shopping trips (maintenance activity) we see that vulnerable women mostly travel with metro for shopping trips. When we assess preferred shopping places of women who use and do not use the metro, we see that metro users go to more places for shopping, while non-metro users' shopping geography is much narrower. When we deal with vulnerable groups as non-workers, the youngest, the elderly and low income level, women with children and less educated women; in all cases it was seen that metro-users from these more vulnerable groups travel to more places in the city, experience a larger variety of destinations (shopping places) in their urban area, and therefore a higher proportion of metro-users among these groups have a large urban geography when compared to non-metro users.

Leisure trips are related with leisure needs, as mentioned above. Leisure trip analysis of vulnerable women groups gave similar result with shopping trips analysis. Most of the sample women declared that they used metro for leisure trips. When we assess preferred leisure places of women comparing metro users and non-users, we see that metro users go to significantly more places for leisure, while non-metro users' leisure geography is narrower. When we deal with the same vulnerable groups analyzed in

shopping geography, in all cases we can see that women who use metro experience more parts of the city, and hence have a wider geography. However, this is particularly the case for the youngest women.

Another important finding of this chapter is that: metro is more crucial for leisure trips; because difference in the covered geography between metro users and non-users among vulnerable women is the most in trips made for leisure activity. Thus we can say that by the help of metro, vulnerable women groups travel more for leisure and so their urban activity participation rates increase.

From the point of view of women who do not work and women with children, this chapter revealed interesting results. Although in Chapter 4 we see that women who work and women without children are much more mobile in trip-frequency terms, from the point of view of shopping and leisure women who do not work and have children are much more mobile in the sense that they have larger geographies. From the point of view of workers, this means that working and other domestic responsibilities decreases the motorized trip frequency for shopping and leisure, and furthermore they have narrower geographies due to time limitations. From the point of view of women who have children it was expected that they have lower trip frequency rates and narrower geographies. However, the higher trip frequency and larger geography for shopping and leisure are probably due to the positive effect of metro on their mobility. Because as mentioned above women who have children also have higher metro usage rates and when we examine the mobility levels and geography of women who have children with comparing metro users and non users we can see that, the mobility levels are quite higher and geographies are quite larger.

When we consider women with children, there is another important finding. In the literature chapter, it was mentioned that having children might be a constraint (cognitive constraint- time geography) for women to use metro, due to some mode characteristics like being underground, out of sight of driver, etc.; it was shown in this field research that this is not true at least in Ankara metro; because metro usage rates are quite high among women who have children. This chapter also reveals that metro usage rates are quite high for work, shopping and leisure trips.

From the point of view of age, there is another interesting point. In Chapter 4 we saw that with increasing age, mobility levels decrease, and the most mobile group seems to be the youngest group, when general mobility levels are considered. However, this chapter stated that the youngest women group is the most vulnerable age group from the point of view of shopping and leisure trips. Therefore the highest general mobility level of them seems to be due to the education trips or work trips. But it is also important to note that younger women who use the metro, as opposed to those who do not, have higher mobility levels and a much larger geography.

The most important personal incapability seems to be resting with the youngest. That is because in this group among non-metro users there are many places where no one goes to, such as Real, Atakule, Tunalı Hilmi, Ulus and Bahçelievler for shopping and Millenium Outlet Center, Real Ankuva, Mesa Plaza, Arcadium, Beğendik, Kurtuluş Park, Abdi İpekçi Park, Tunalı Sıhhiye, etc. for leisure. these are important and leading destinations in Ankara for shopping and leisure.

Trips for visiting friends are also considered in this study as a type of leisure trip. The analysis showed that the majority of women, who prefer to go to other neighbourhoods remote from their own with a vehicle to visit a friend, prefer to travel with metro for visiting friends. When we assess friend visit trips from the point of view of vulnerable women, analysis revealed that among vulnerable groups mentioned above, metro users travel farther places for friend visits, and again we can say that metro enlarges urban leisure geography of vulnerable women.

The literature chapter revealed that, capability constraints, related with personal sources, physical and biological aspects of a person affect his/her activity geography. Having low income and being relatively younger or elderly and having children can be considered as capability constraints, and activity based travel theory claims that capability constraints narrow their geography. While in general this is valid, Ankara case showed that mode characteristics of metro (mode choice) can help overcome capability constraints, and therefore activity geography of women has been widened by choosing metro.

CHAPTER 6

CASE STUDY QUESTIONNAIRE RESULTS: COGNITIVE FACTOR'S AFFECTING WOMEN'S METRO USAGE

6.1. INTRODUCTION

In the previous chapter, personal capability constraints and activity types related activity geographies were studied and metro's effect in overcoming the personal capability constraints was shown. However, cognitive constraints are also important determinants of mode choice, activity participation (activity based travel theory) and urban geography (time geography theory), as mentioned in the literature chapter. The literature chapter also stated that women have more cognitive constraints than men.

The reasons are as in the followings:

1. Physical vulnerability
2. Psychological vulnerability
3. Social life and traditional role
4. Domestic responsibilities

In this study the following cognitive constraints are studied in detail:

1. Security related issues
2. Knowledge related issues

Therefore in this chapter we will study the cognitive aspects of women about metro. Fears and knowledge levels (particularly related with their education level) will be studied from the point of view of metro users and non users, different income groups, different age groups, different education groups and women who have and do not

have children; because those factors might affect the perception of metro and could easily be turned into cognitive constraints).

Considering the core arguments of this research, the focus of this chapter will be especially on the vulnerable women groups who do not use metro. The aim is to understand why they do not use the metro and whether it is caused by some cognitive constraints, i.e. factors regarding their perception of the metro system.

6.2. METRO PERCEPTION: GENERAL ASSESSMENT

The women who were interviewed were asked questions about how they perceive the metro, with a view to obtain their cognitive barriers. Questions can be categorized as follows: fears regarding the metro, stations and surrounding environment; feelings on the quality and cost of metro; personal constraints and conditions.

When we make an assessment on perception of women about the metro, as Figure 6.1. shows, on one hand women generally have fears about the metro; on the other, they mostly do not have negative thoughts on the quality and cost of metro system. But when we analyze their personal capabilities and conditions, we can see that women have some incapability caused by their traditional role and domestic responsibilities as mentioned in the literature chapter.

Women's fears on metro are generally caused by the fear of harassment and violence and of terrorist attacks to the metro (53,7 %, 49,7%) (Figure 6.1). Other important fears regarding the metro are declared as having to travel in a metro car alone (41%), the lack of closed circuit television system (CCTV) on metro cars (37%) and getting on metro alone (25,3%). Other explicit fears are related with traveling at night: getting on metro at night, waiting on a metro station at night and reaching to a metro station at night.

When the quality and cost of the system are considered, half of the interviewed women declared that metro is crowded, and this is the only negative thought regarding service quality. When we examine thoughts on the cost of system, it is

seen that only 10,3 % of women declared that metro is expensive, which is a small ratio in general.

Personal capabilities and conditions seem important when we examine Figure 6.1. The most important personal constraint is that women have other destinations to visit, which is not on the metro route. Other constraints and conditions can be said to be as choosing final destination point in walking distance and the convenience of other transportation modes to her route. Although “unwilling to get on the metro with shopping bags” and “with children” have as much weight as some other factors (22%, 12,3% respectively), they can still be considered as constraints of women caused by their traditional role and domestic responsibilities.

After this general evaluation, it is necessary to study the perceptions from the point of view of metro users and non-users. This is because not using the metro can be an underlying factor causing an increase in the amount of fears about metro. Also as metro users have more information about metro, they may have different fears about the metro. Therefore here we need to analyze perceptions on metro from the point of view of metro users and non-users.

Among interviewed women there are 188 women who use metro and 112 women who do not. As Figure 6.2 shows, the most important evaluation marked by non metro users is the convenience of other modes to her route (51,8% of non-metro users). This is an important finding, because it shows that the most important reason of not using the metro is its route inconveniency and this might be the answer of women who live on Keçiören corridor mostly (Batıkent-Keçiören comparison will be given in Figure 6.3.).

When we study the fears on metro, it is interesting to notice that women who use the metro generally have fears regarding terrorist attacks and harassment and violence. In addition, although women who use the metro, they feel unsafe using the system in the night. Safety seems to be as important an issue for metro users as for the non-users.

Non-users have mostly fears on being alone in a metro car and the lack of closed circuit television system in metro cars. Non-users' personal constraints caused by having children, having other destinations and choosing destination point within walking distance are more than metro users. But when the quality and cost of the metro system is considered, we can say that non-users have positive perceptions in general.

While women have positive thought on the system quality of metro, over half of metro users think that metro is a crowded transportation mode. Also among non-metro users the ratio of women who think that metro is crowded is not low (39%).

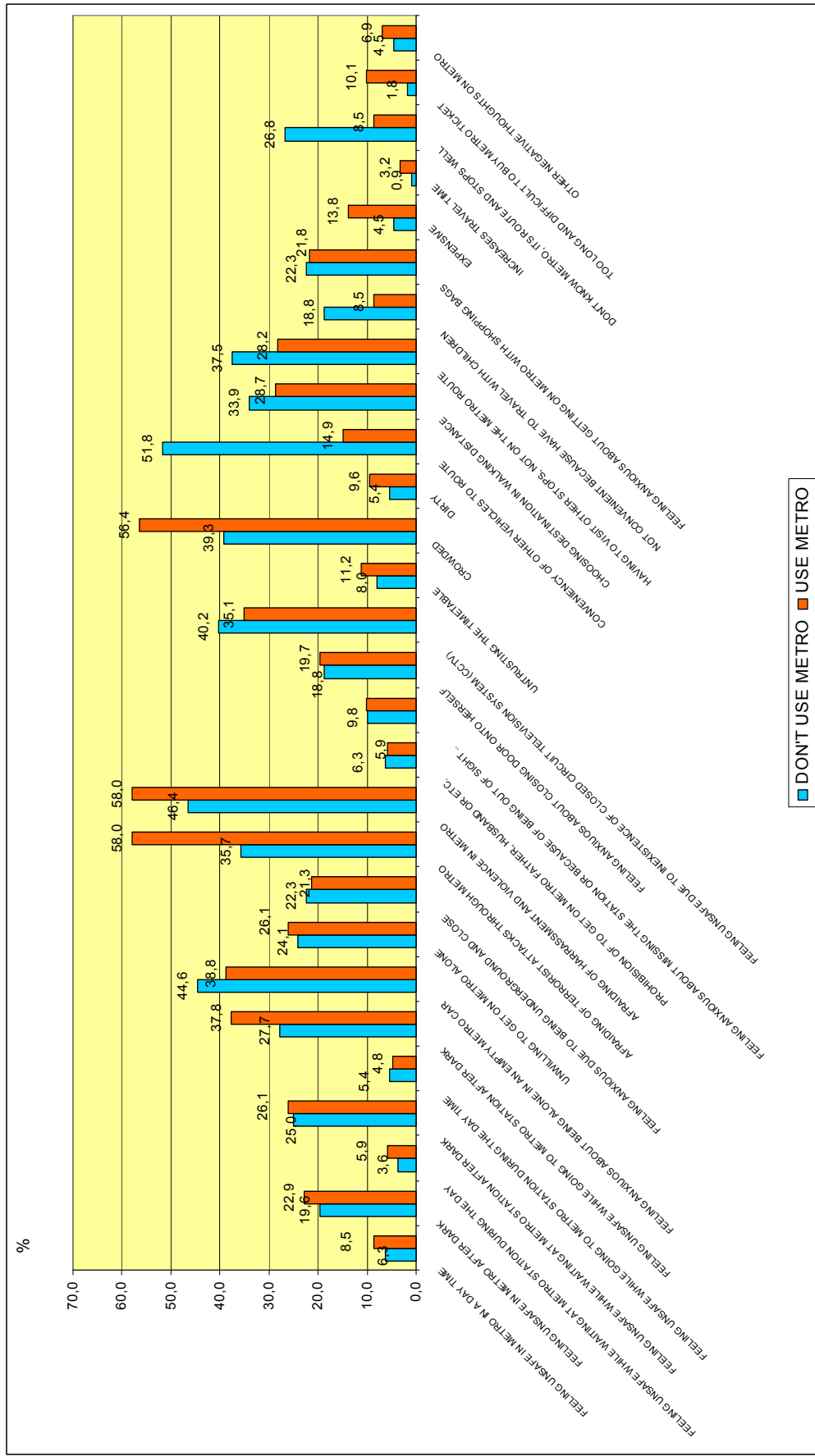


Figure 6.2: Metro evaluation: metro users and non metro users

Batıkent-Keçiören comparison gives similar results with Figure 6.3, because on Keçiören there is no metro yet, and therefore most women there do not use metro. Again here we can see that women on Batıkent corridor have safety concerns although they may be metro users. A large ratio of women on Keçiören corridor declared that, metro was not convenient to their route. That is to say the most important reason for their not using the metro seems to be the inconvenience of metro's route to their route.

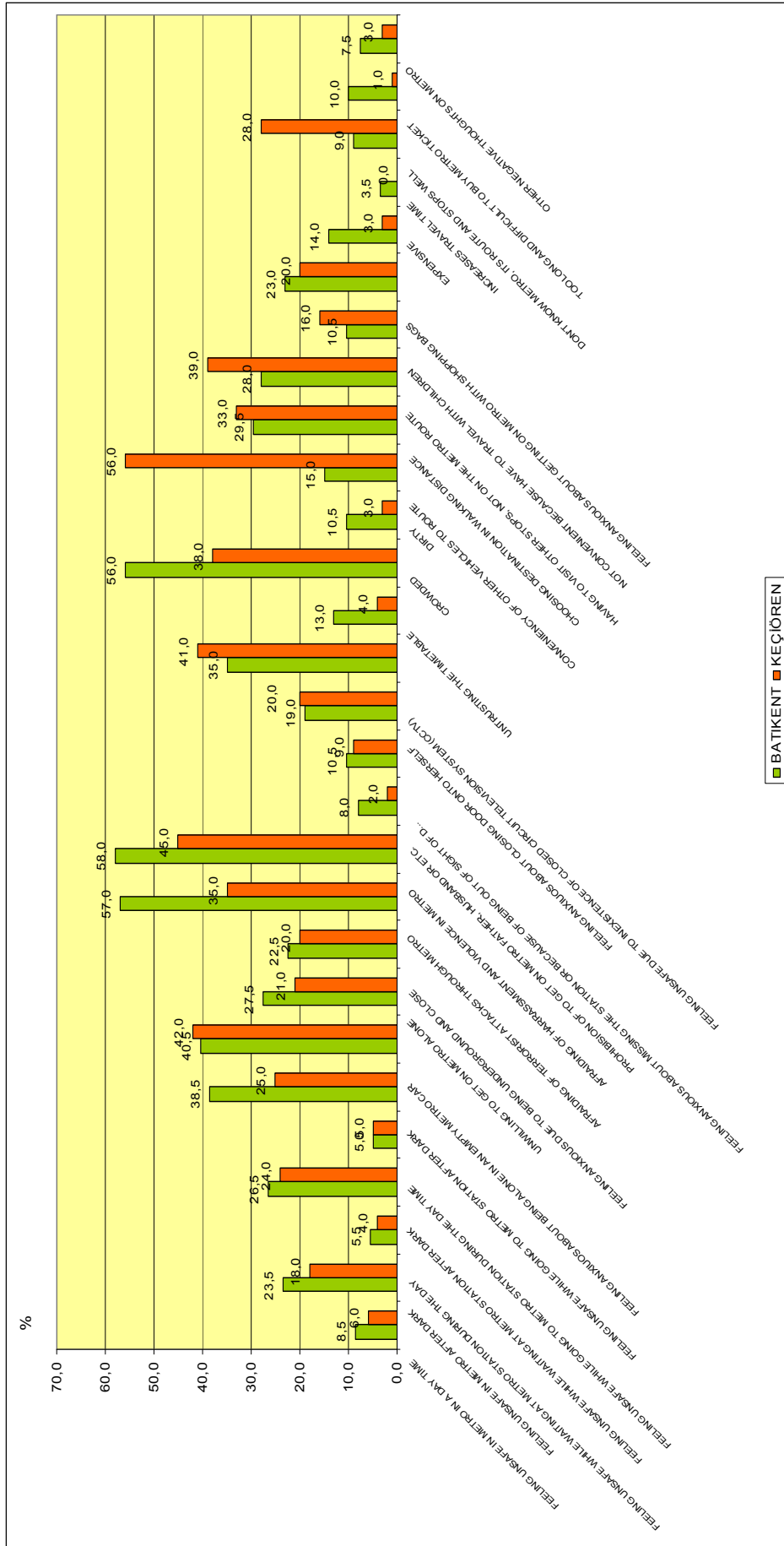


Figure 6.3: Evaluation on metro: Batikent-Keçiören comparison

Working is another variable that may affect perceptions about the metro (Figure 6.4). When we consider fears about metro, we can see that women who do not work generally have more fears than workers. On the other hand when we examine their personal constraints and conditions, it is seen that women who do not work have more destinations to visit outside the metro route; they have more constraints about traveling with children and more women out of work choose their destination point within walking distance than women in work. Women who do not work have less knowledge on the metro, its routes, and its ticket purchasing procedure. While no women in work declared that they did not use the metro because their husband, father, etc does not let them to, 7% of women who do not work declared that this was the case. The analysis showed that women who do not work have more constraints and fears regarding metro which affects their mobility as well as urban geography.

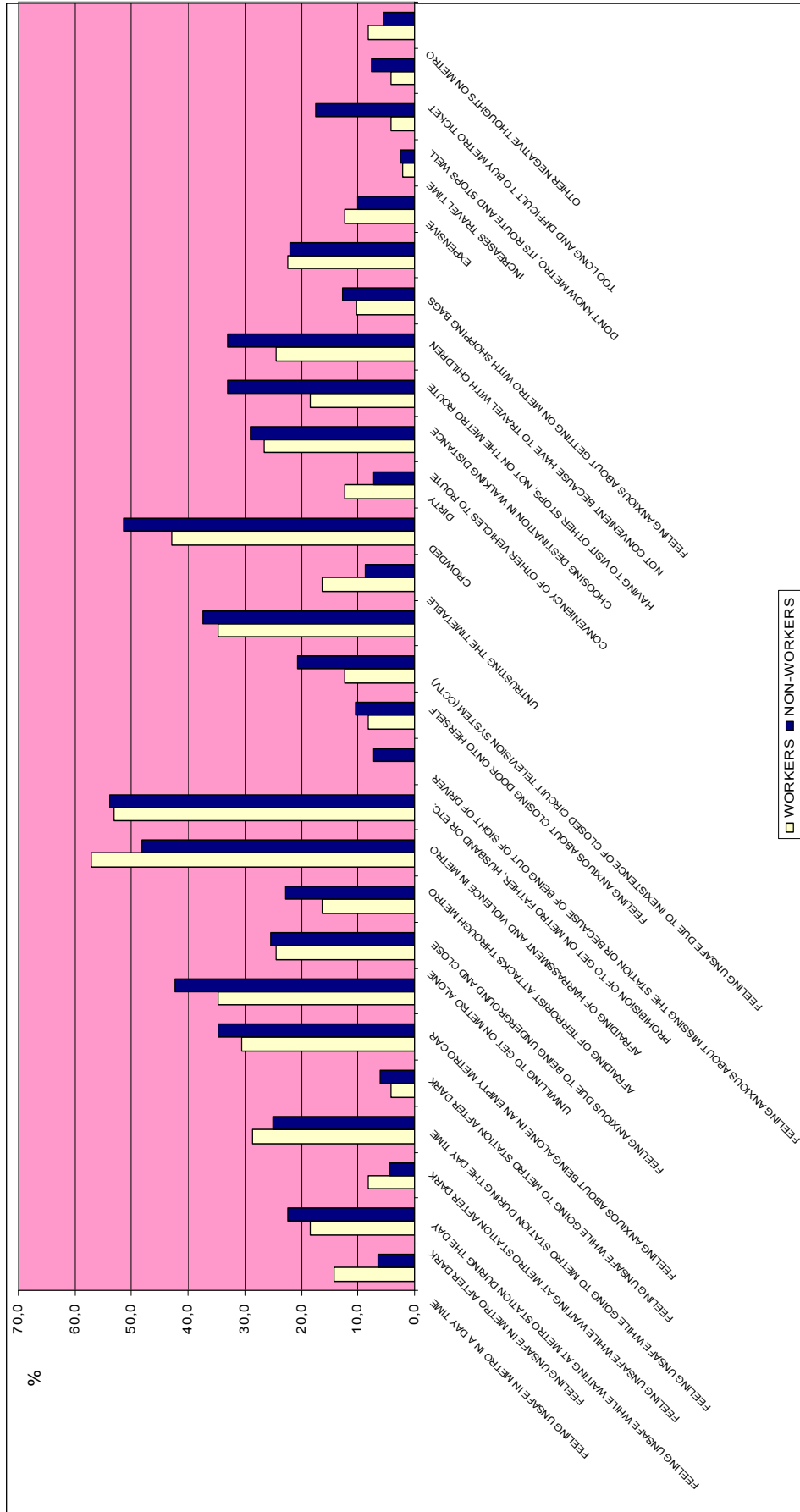


Figure 6.4: Metro evaluation: workers and non workers

Income may be another factor affecting perceptions regarding the metro. Figures 6.5 shows that there are no significant differences in women's perceptions in terms of their income levels, but that women from the lowest income group (below 999 YTL) have more fears regarding the safety issues while using or accessing to metro.

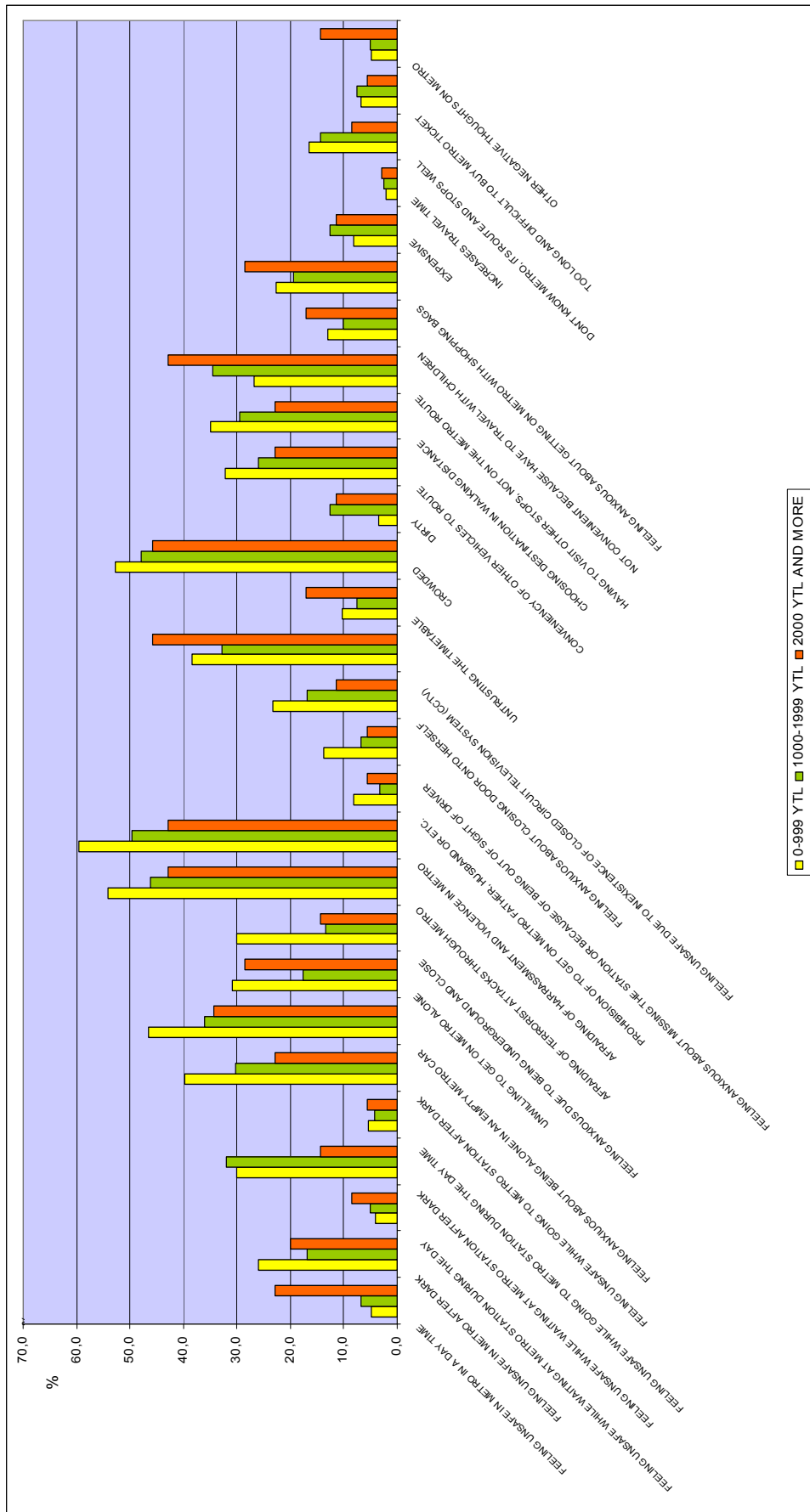


Figure 6.5: Evaluation on metro: income groups

It was stated in the literature chapter that, the most important element affecting metro perception is the education level. Figure 6.6 reveals that, fears on metro are indeed directly related with education level. Women's concerns regarding safety issues mostly decrease as education levels increase. There is one exception: while university graduates stated safety concerns less than other education groups, the fear of terrorist attacks to the metro was one area that is stated by a majority of these educated groups.

When we consider conditions and constraints of women with low education level in comparison to higher education level women, we can say that less educated women's families are more likely to prohibit them to use the metro, but university graduate women have no such constraints. Furthermore women with low education level choose destination points within walking distance with higher ratios. That is to say their urban geographies are narrower. Knowledge on metro is also directly correlated with education level. As the education level increases, knowledge on metro also increases. Therefore we can say that education level is a major factor affecting perceptions regarding the metro.

In Figure 6.7 metro perception of different age groups is shown. In this analysis, age groups are categorized as the younger group (25 and younger), economically active group (26-55) and the elderly group (56 and older). Age is an important variable, because as mentioned in Chapter 4 and Chapter 5, younger groups and older groups can be more vulnerable than the economically active group. The figure shows that those aged 56 and more have noted more fears than younger group in most of the variables. On the other hand, the youngest group seems to have more safety concerns about using the system in the night.

In general, it is seen that the youngest and the elderly are more sensitive to safety and personal constraints about metro usage. Economically active group is more sensitive about route convenience.

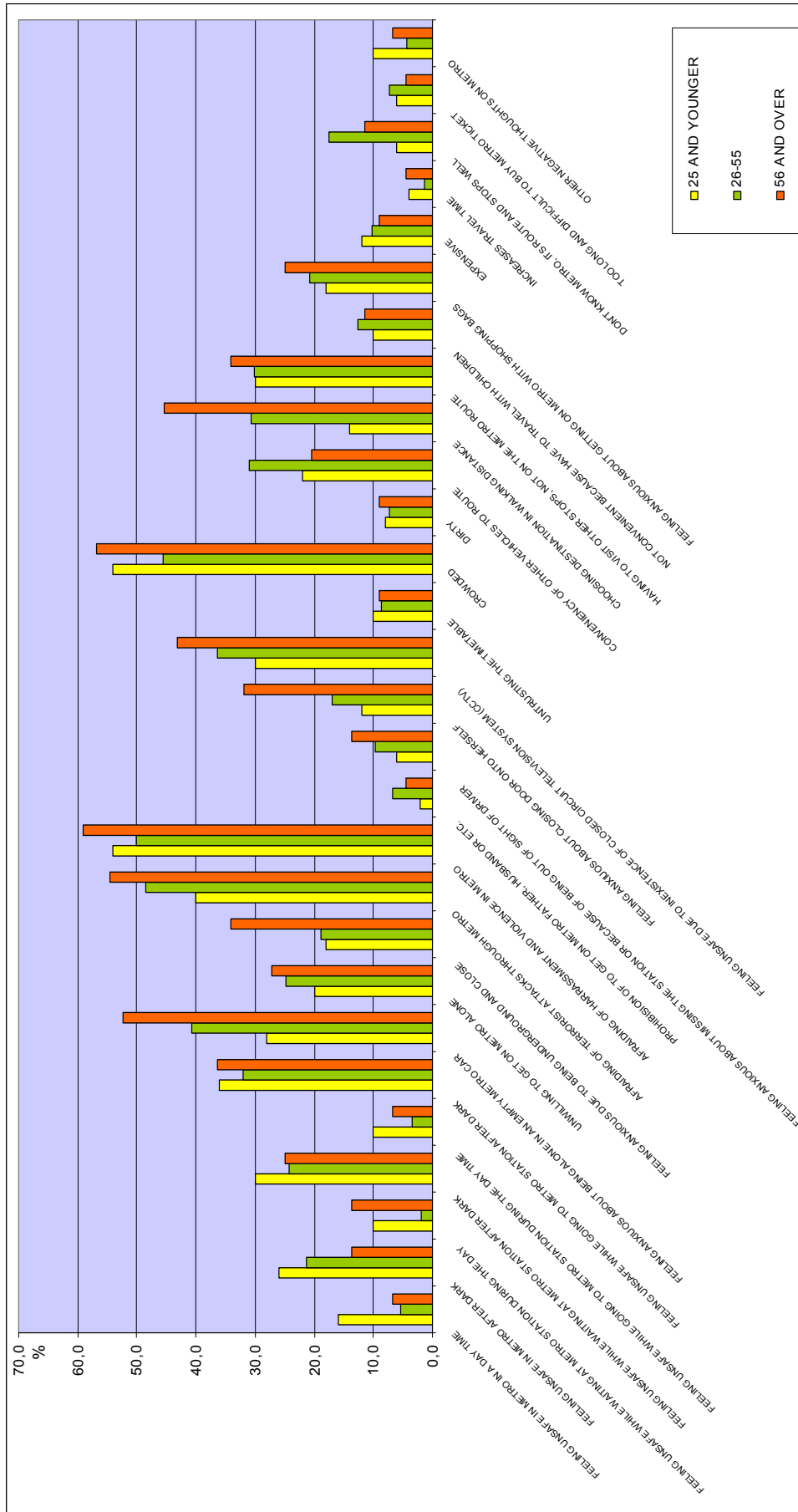


Figure 6.7: Evaluation of metro: age groups

Having children, as mentioned in literature survey chapter, might bring women more constraints. As shown in Figure 6.8. the most significant finding is that, except for the perceptions of women during night travels, women with children have more fears than women who do not have children. Women who have children feel more insecure being alone in an empty car, getting on metro alone, missing the station point, terrorist attacks through metro and the technical system characteristics of metro (automatic doors, being out of sight of driver, inexistence of CCTV), all of which are probably the results of having a child nearby while traveling.

Personal constraints are also more for women who have children, such as having to choose destination points within walking distance, inconvenience of traveling with children and lack of knowledge on metro.

6.3 METRO PERCEPTION: MOBILITY OF COGNITIVE VULNERABLE

Previous sections revealed important results: women mostly declared that they feel anxious because metro is an underground and closed system; they are afraid of terrorist attacks as well as harassment and violence; and they feel anxious because there is no CCTV in metro cars; and they are afraid of being alone in an empty metro car.

In general we see that women are mostly afraid of terrorist attacks, harassment and violence, and being alone in an empty metro car. But a more important point is that whether those fears affect women's mobility or not. Therefore in this section we will analyze whether those fears are effective on women's mode choice and therefore mobility.

Among 300 interviewed women 65 declared that they were afraid of the underground aspect of the metro (Figure 6.9). Although the amount of women who have this concern was not high, when we examine the mobility levels of them with a comparison with women who do not have such a fear, we can see that their mobility levels are different. Women who have such a fear have low mobility levels both in weekday and weekend (Figures 6.10 and 6.11).

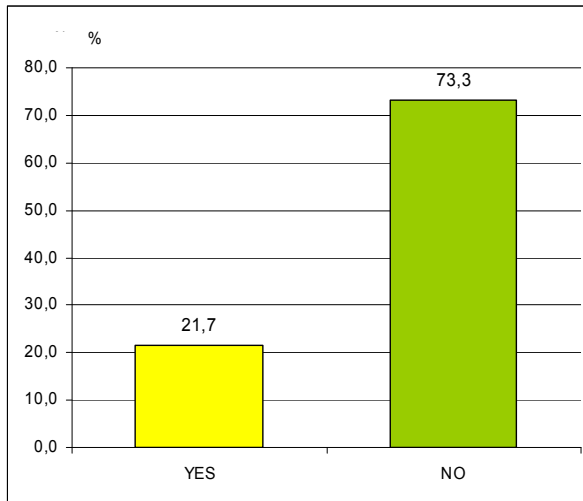


Figure 6.9: Feeling anxious due to the underground aspects of metro

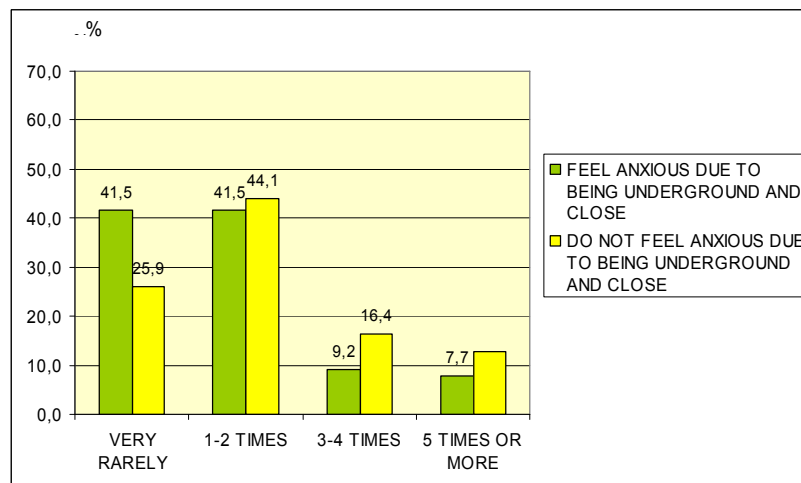


Figure 6.10: Weekday mobility: security perception

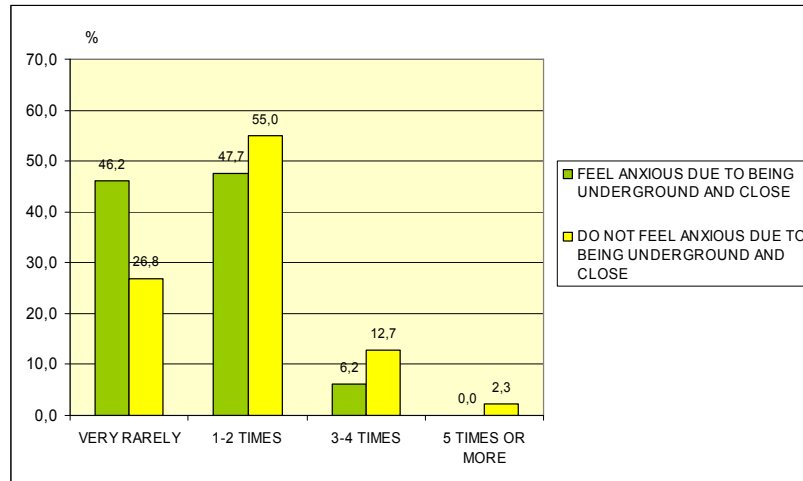


Figure 6.11: Weekend mobility: security perception

Terrorist attack to the metro is a more dominant fear affecting women. Approximately half of the women declared that they were afraid of terrorist attacks (Figure 6.12). On the other hand when we look at the mobility levels, this issue does not seem to affect women's mobility (Figures 6.13, 614).

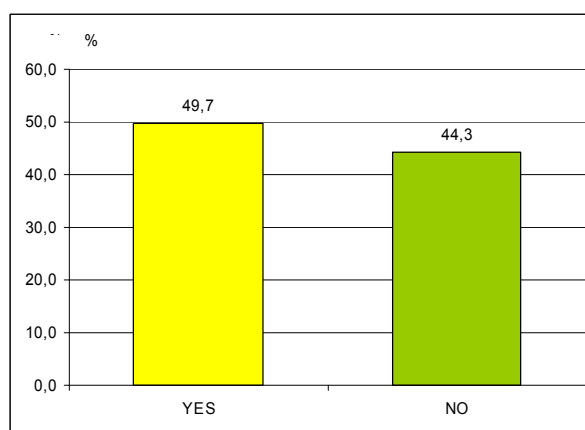


Figure 6.12: The ratio of women who afraid of terrorist attacks through metro

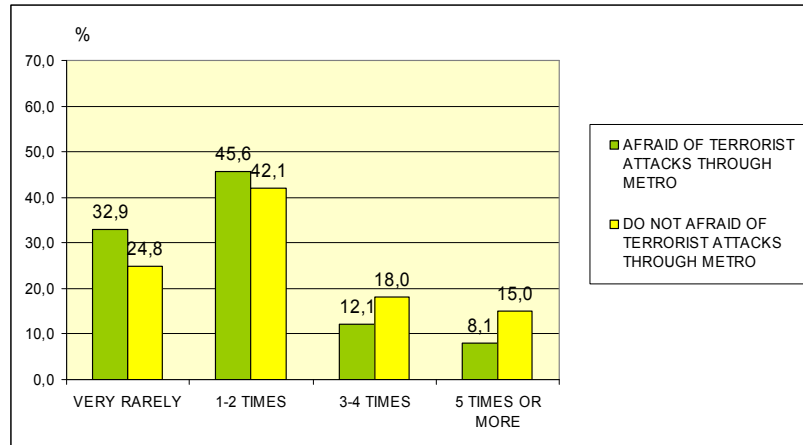


Figure 6.13: Weekday mobility of women who afraid of terrorist attacks through metro

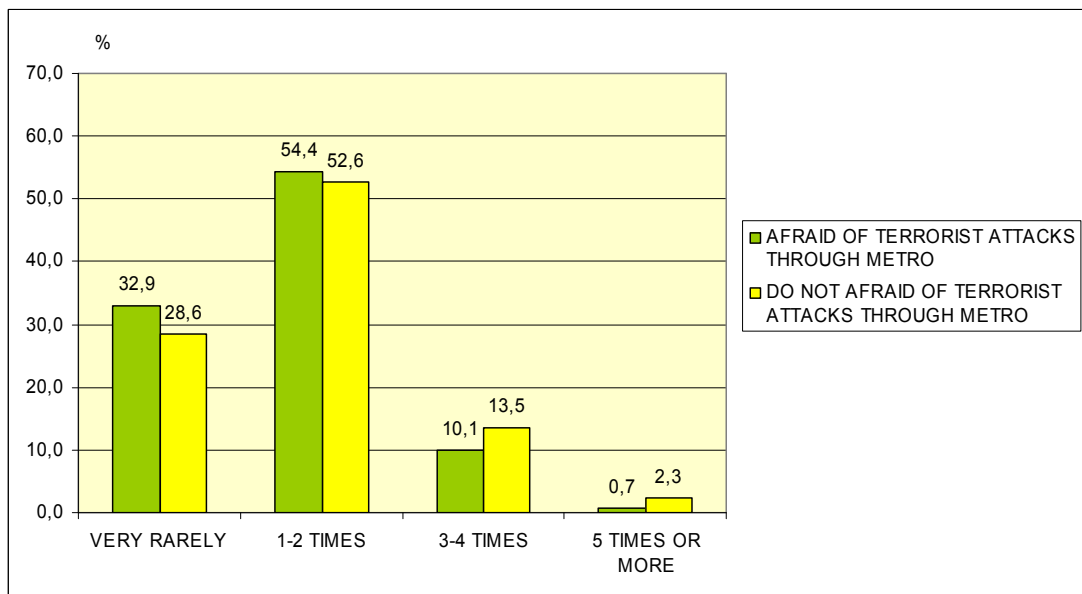


Figure 6.14: Weekday mobility of women who afraid of terrorist attacks through metro

Harassment and violence is the most common issue stated by women. Over half of the women interviewed are concerned about this issue. This fear seems to be a more determinant factor on the mobility of women. It seems that women who have such fears are less mobile both in weekdays and weekends than those who do not have such a fear (Figures 6.15, 6.16 and 6.17).

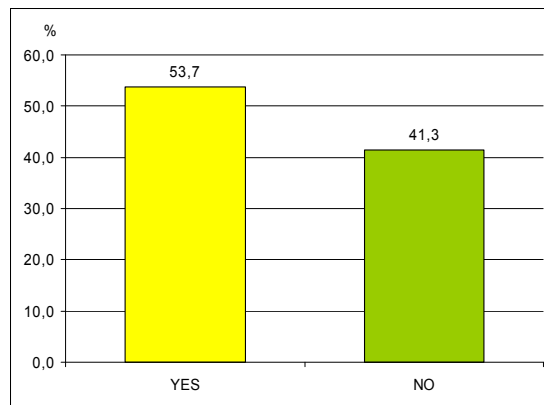


Figure 6.15: The ratio of women who afraid of harassment and violence in metro

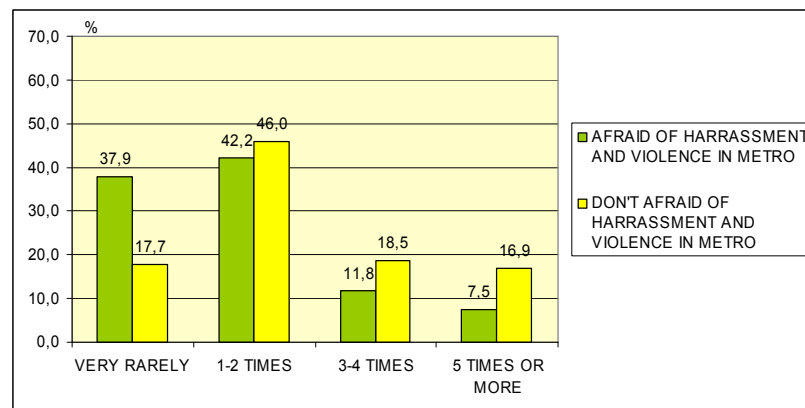


Figure 6.16: Weekday mobility of women who afraid of harassment and violence in metro

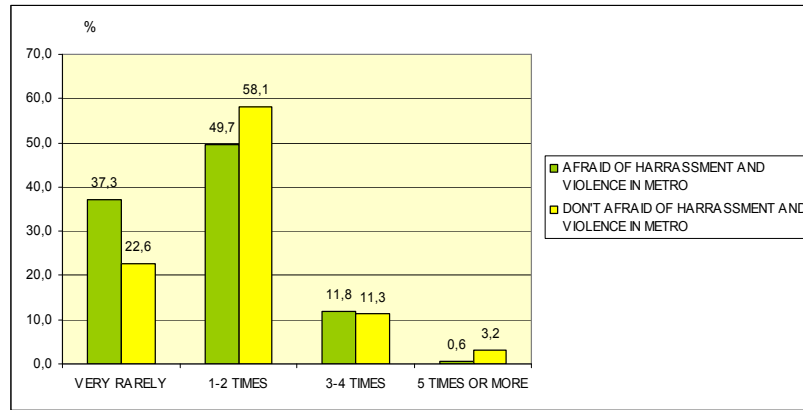


Figure 6.17: Weekend mobility of women who afraid of harassment and violence in metro

The lack of CCTV in metro cars is another common issue stated by women (58%). However, it seems to affect people's mobility less (Figures 6.18, 6.19 and 6.20).

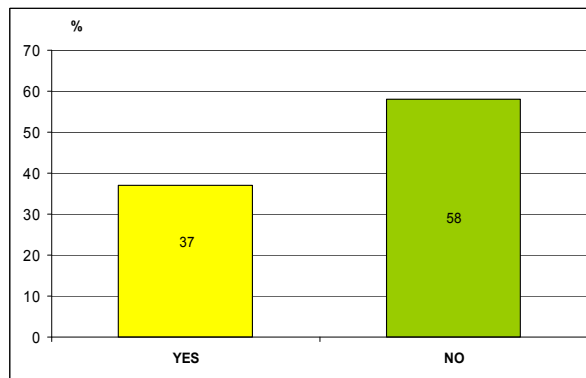


Figure 6.18: The ratio of women who feel unsafe due to inexistence of CCTV

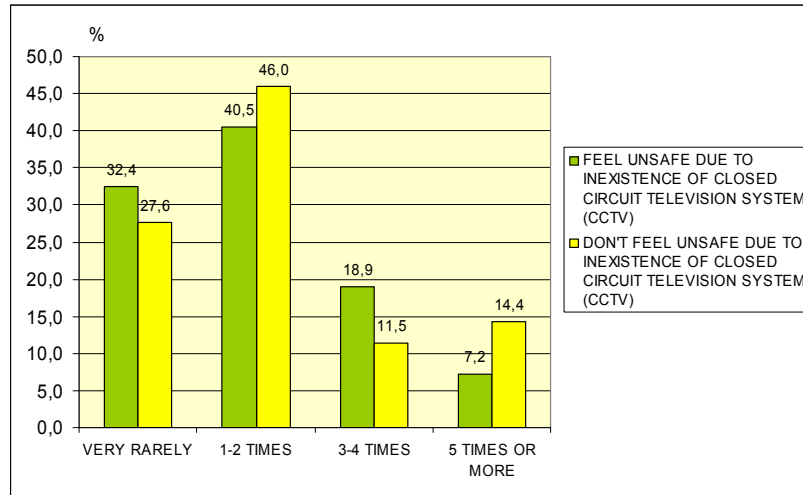


Figure 6.19: Weekday mobility of women who feel unsafe due to the lack of CCTV

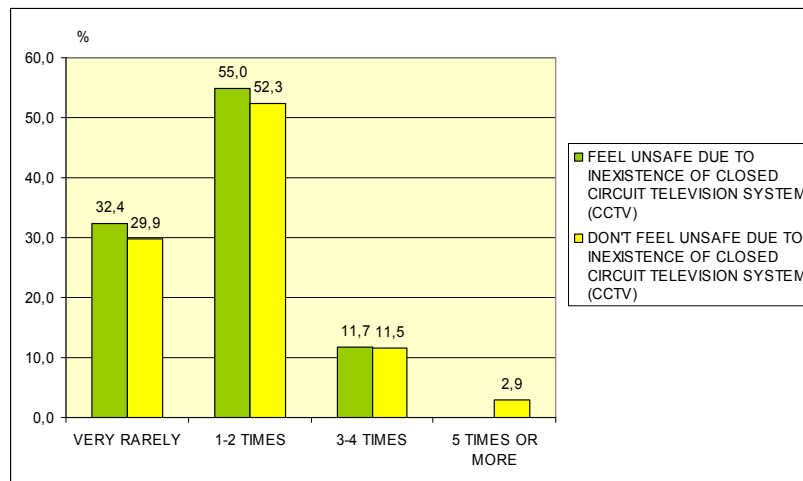


Figure 6.20: Weekend mobility of women who feel unsafe due to the lack of CCTV

Fear of being alone in an empty metro car is also another factor that seems to affect women's mobility indirectly (Figures 6.21, 6.22 and 6.20)

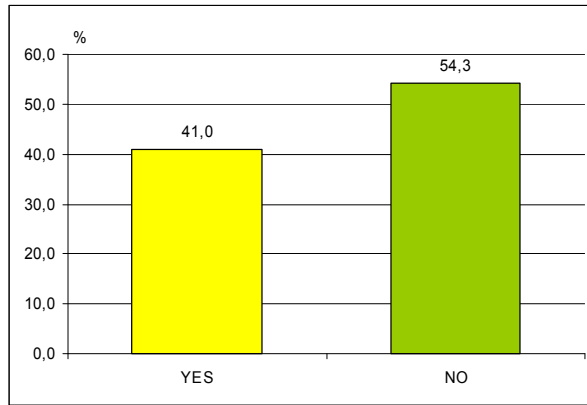


Figure 6.21: The ratio of women who feel anxious about being alone in an empty metro car

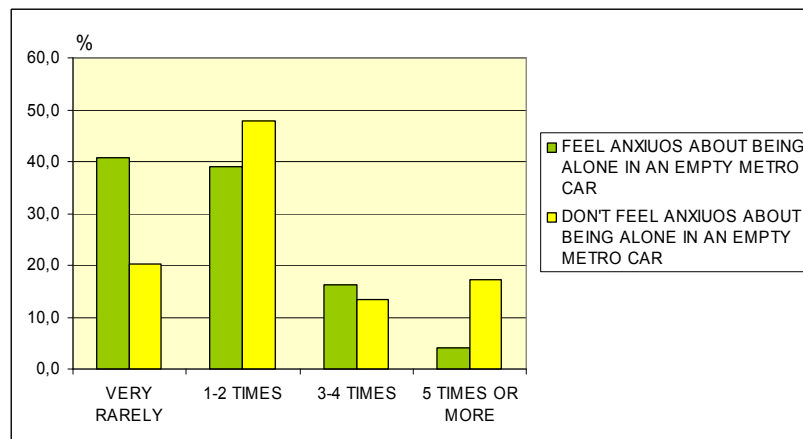


Figure 6.22: Weekday mobility of women feel anxious about being alone in an empty metro car

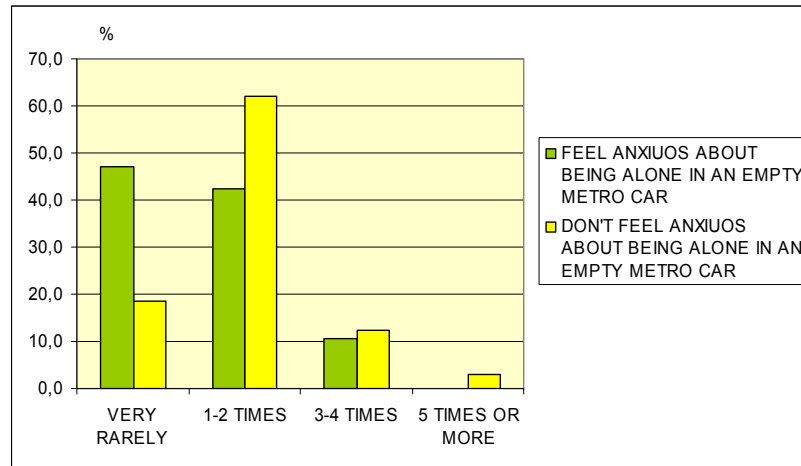


Figure 6.23: Weekend mobility of women feel anxious about being alone in an empty metro car

In Figure 24, metro usage levels of women who have different fears are analyzed. In general we can see that although more women are afraid of terrorist attacks and harassment and violence, these do not have significant effects on the metro usage levels of women. In this Figure, the concern that affects metro usage levels most seems to be feeling anxious about being alone in an empty metro car. Secondly feeling anxious due to the lack of CCTV in metro cars and feeling unsafe while going to metro station, seem to be other factors affecting the metro usage.

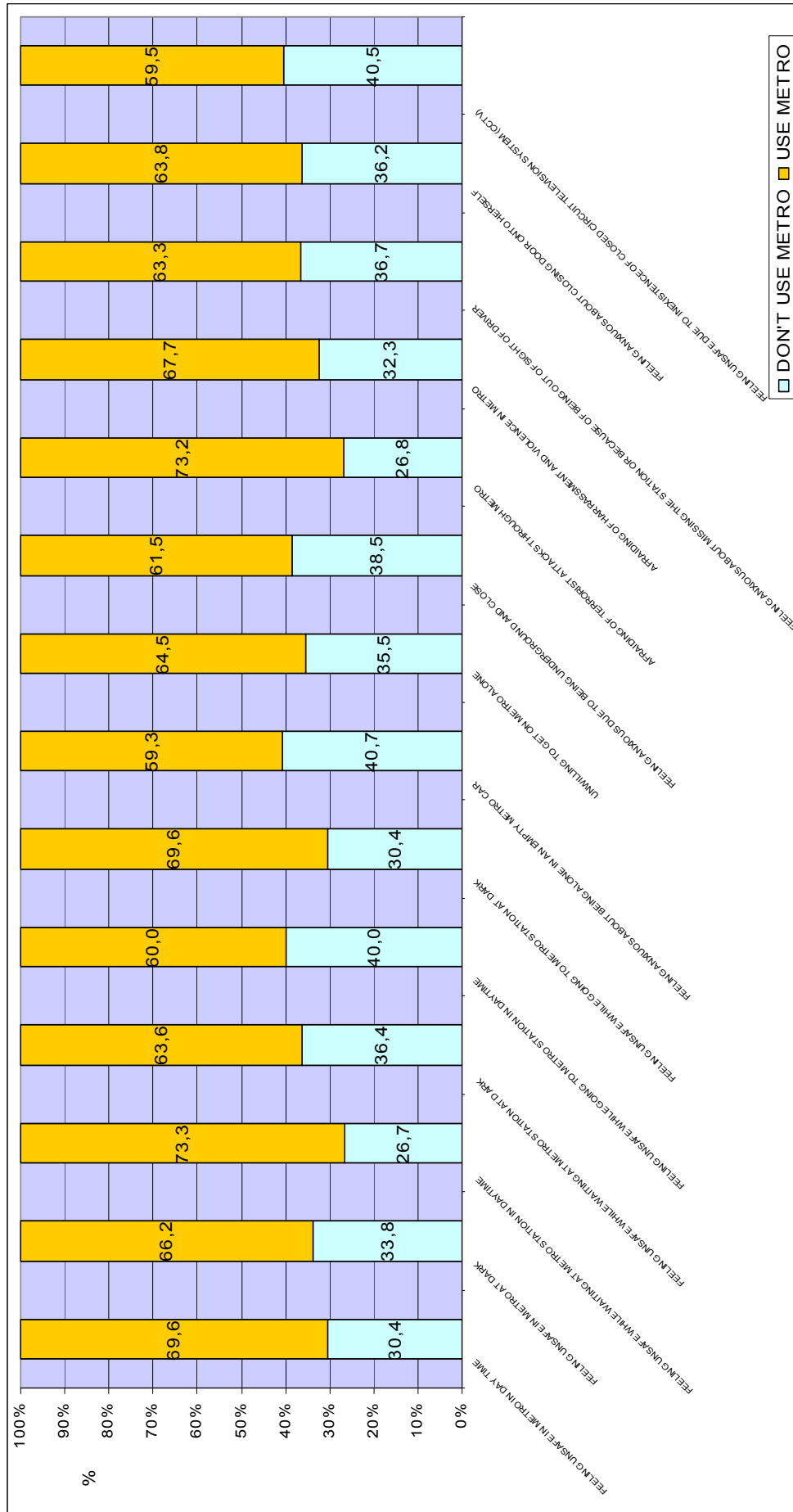


Figure 6.24: Metro usage levels of women who have fears on metro

When we compare the mobility levels by the metro perceptions of vulnerable groups we see interesting results (Figures 6.25, 6.26, 6.27, 6.28, 6.29, 6.30). Fears on metro seem to affect mostly the mobility of less educated women. Secondly they affect the mobility of elderly. Then the mobility levels of women with children, women with low income and women who do not work, seem to be affected, but not significantly. In this analysis the mobility of youngest women group seems to be least effected by fears about metro. Therefore we can say that less educated women and elderly women are the most mobility vulnerable women groups due to their metro perceptions.

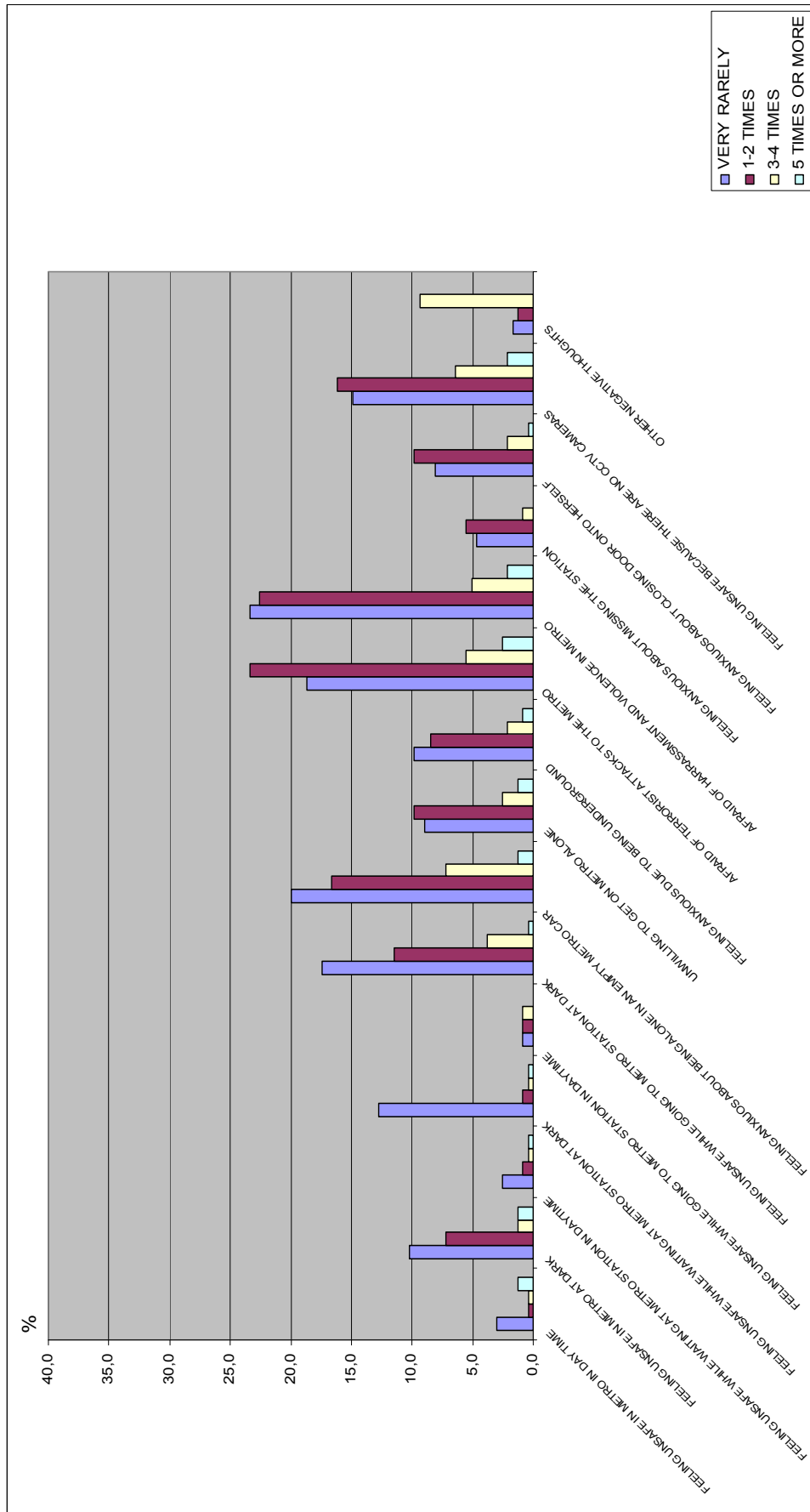


Figure 6.25: Mobility levels of women who have children by metro perception

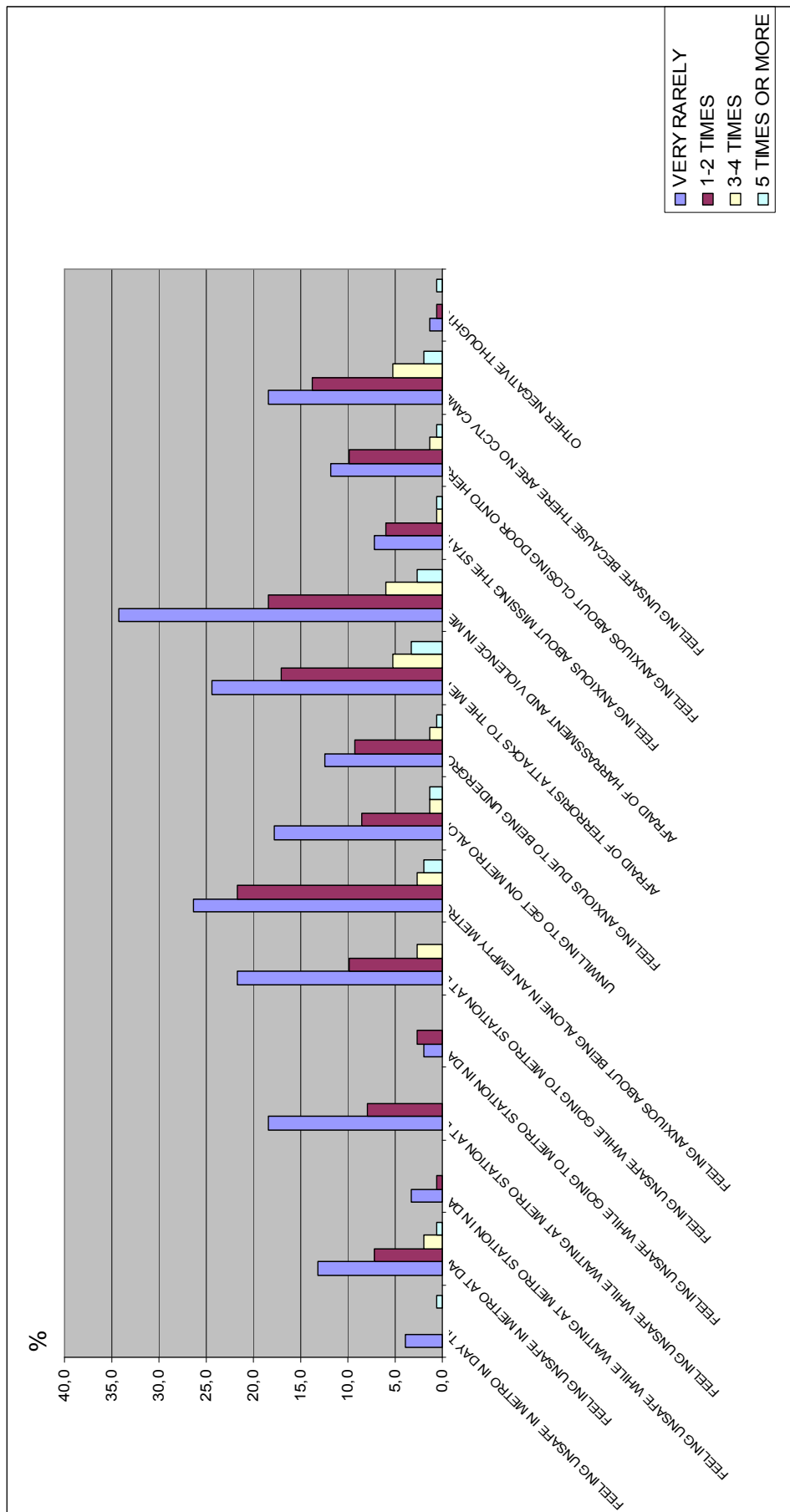


Figure 6.26: Mobility levels of less educated women by metro perception

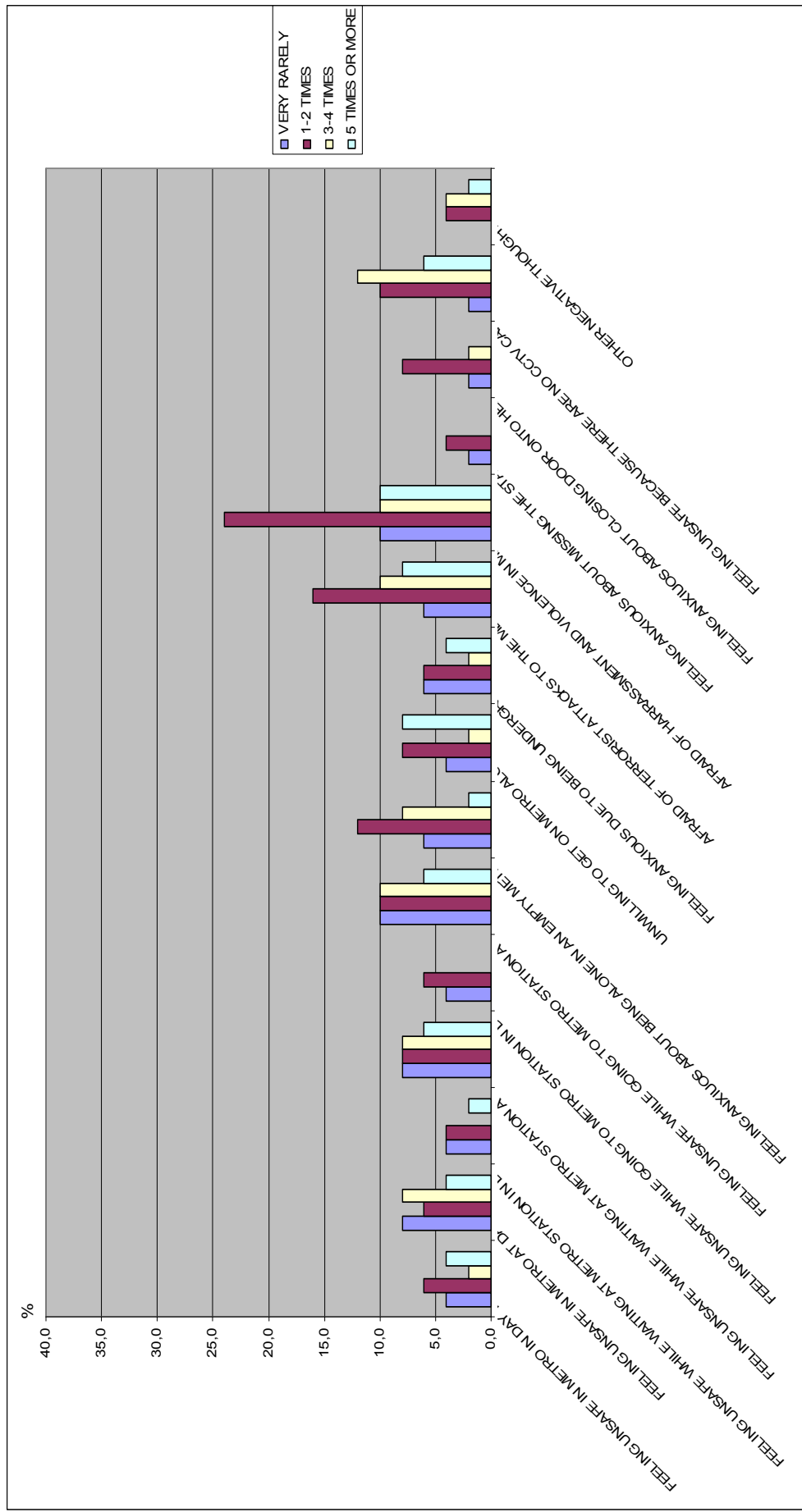


Figure 6.27: Mobility levels of younger women by metro perception

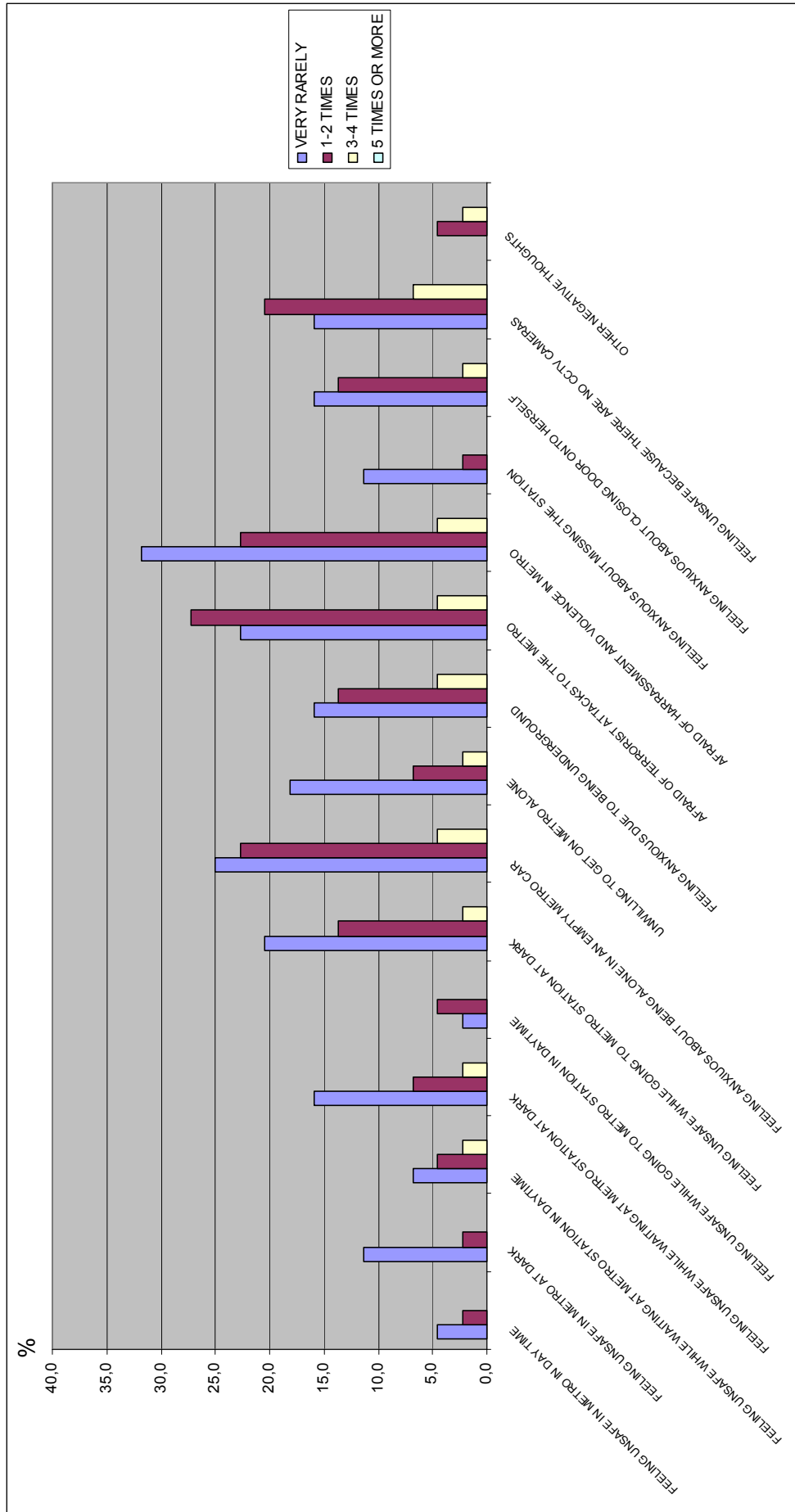


Figure 6.28: Mobility levels of elderly women by metro perception

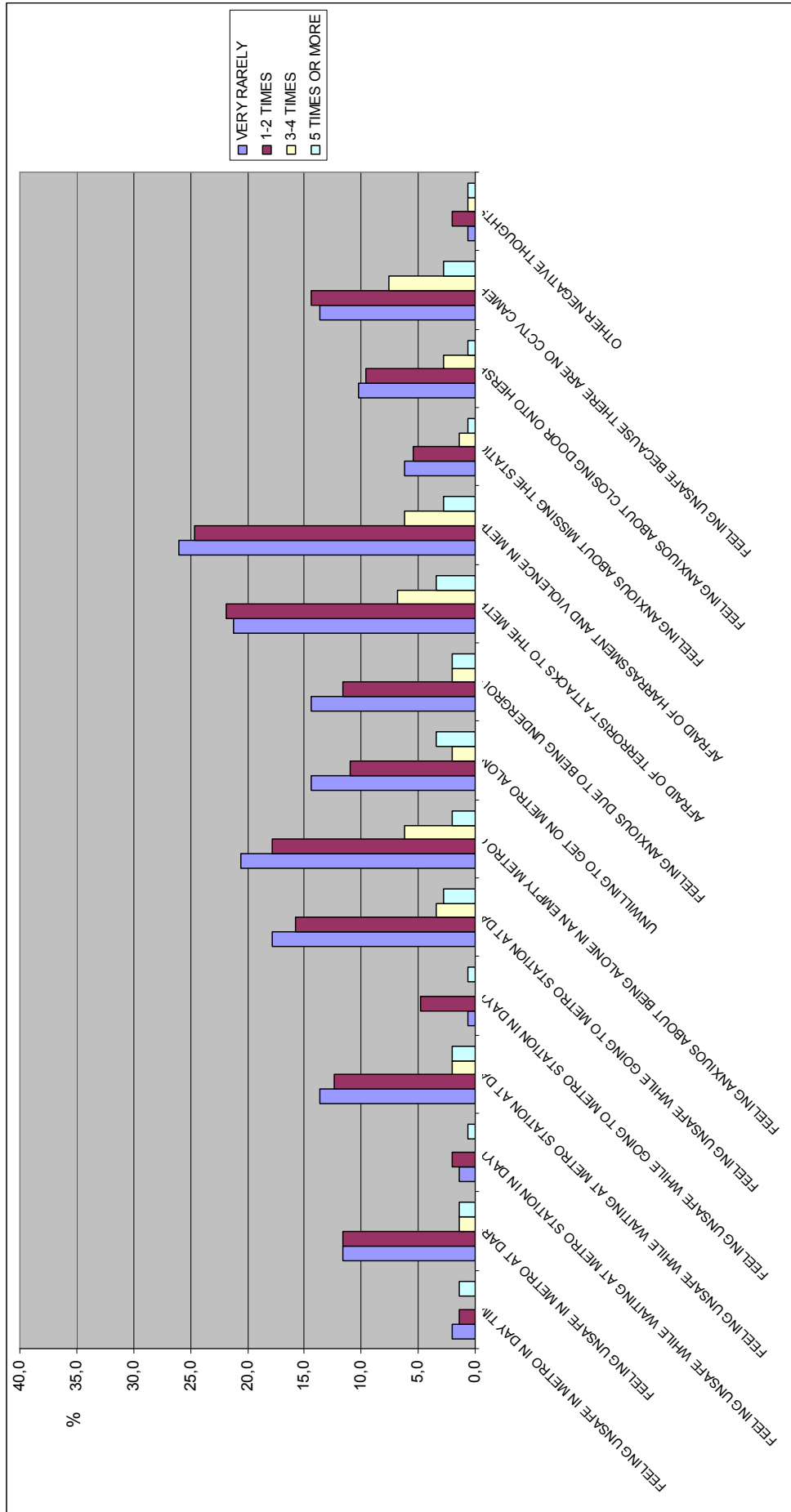


Figure 6.29: Mobility levels of low income women by metro perception

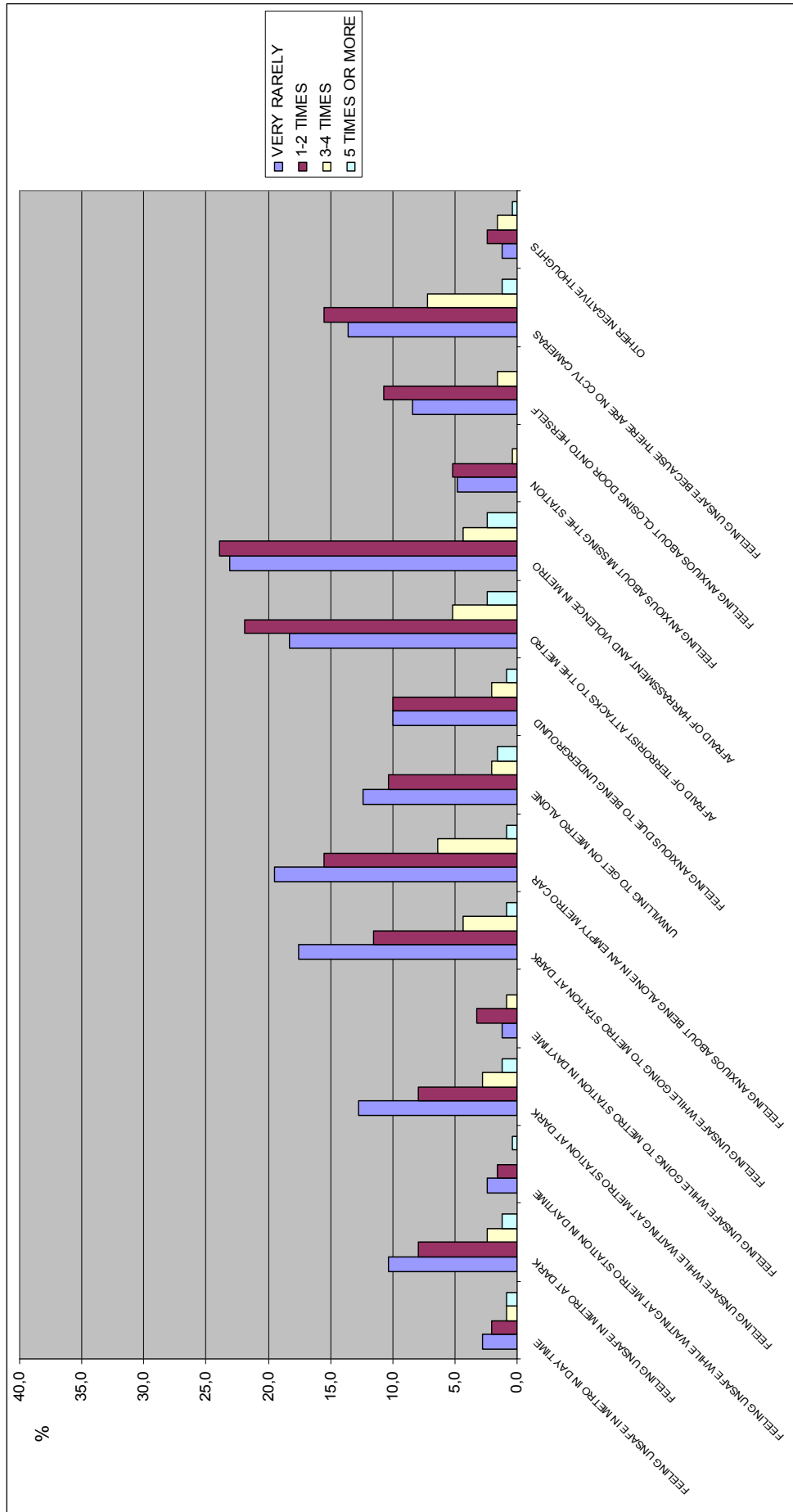


Figure 6.30: Mobility levels of women who do not work by metro perception

6.4. METRO PRECEPTION: REASONS FOR USING AND NOT USING THE METRO

Up to now metro perception of different women groups in general has been analyzed. In field research women were also asked about why they prefer or do not prefer metro for working, shopping and leisure trips.

When we analyze metro usage reasons for work, shopping and leisure trips; the most important two are that metro is fast and metro stations are close to the destinations (work place, shopping area or leisure place) (Figures 6.31, 6.32, and 6.33). This means that time cost and route convenience are very important factors for all types of trips.

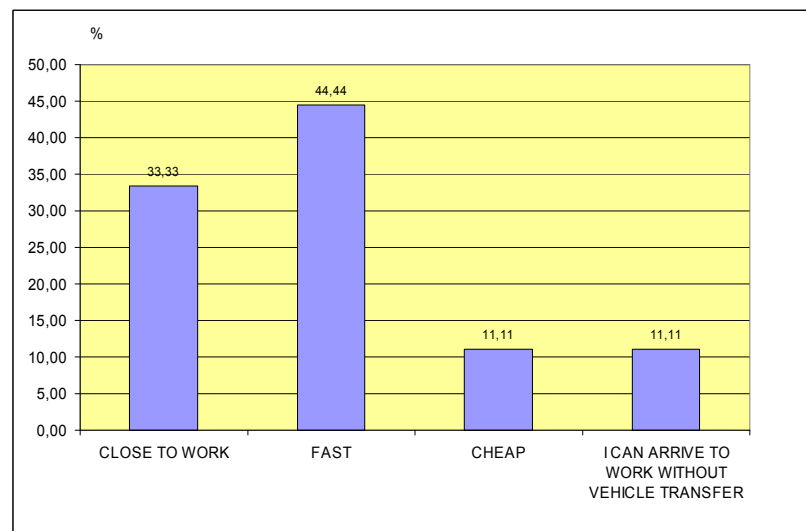


Figure 6.31: Reasons for using metro for working trips

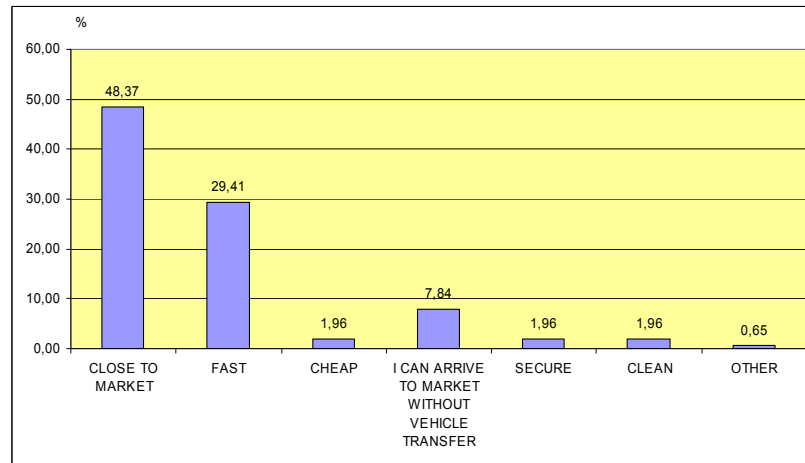


Figure 6.32: Reasons for using metro for shopping trips

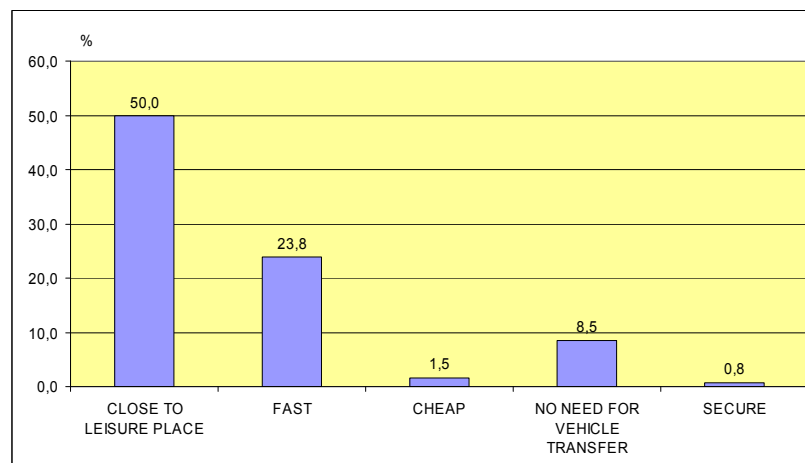


Figure 6.33: Reasons for using metro for leisure trips

Figures 6.34, 6.35 and 6.36 show that women who do not use the metro for different types of trips do so because they mostly fulfill their activities within walking distance. Furthermore women who work and do not use metro for working trips do so because they use company/institution service which provides a door-to door

service that is very convenient for work trips. When we examine leisure trips, we can also see the metro's being crowded as a factor.

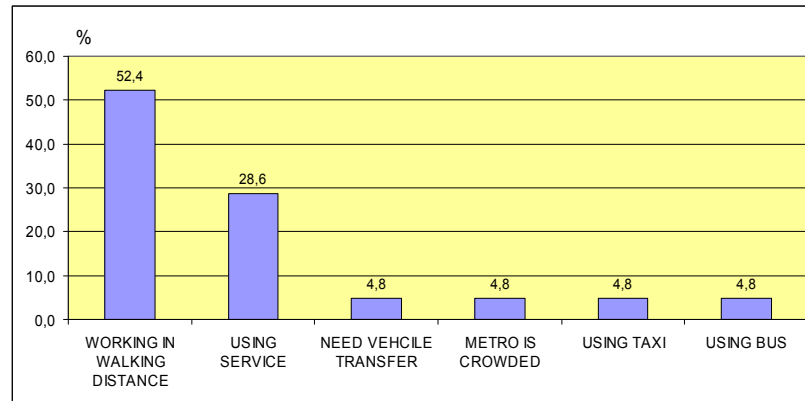


Figure 6.34: Reasons for not preferring metro for work trips

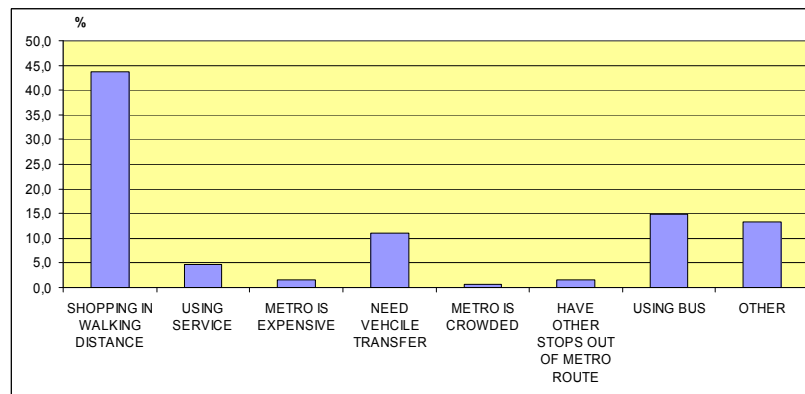


Figure 6.35: Reasons for not preferring metro for shopping trips

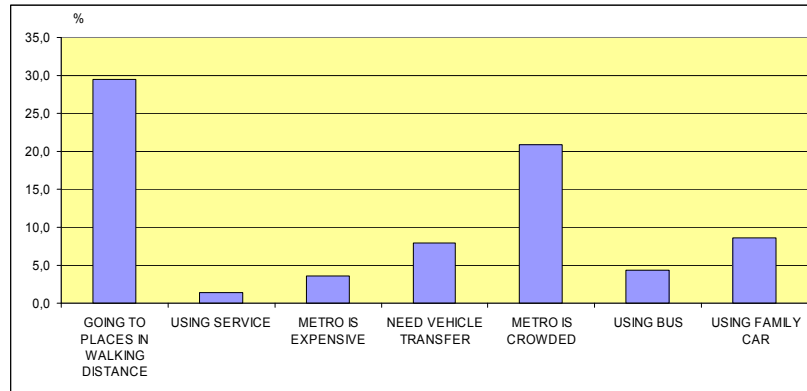


Figure 6.36: Reasons for not preferring metro for leisure trips

As mentioned for working trips, proximity to a metro station is an important factor. Therefore we also need to analyze for which type of trips women walk and for how many minutes. Figure 6.37 shows that women, who are within 10 minutes walking distance to a metro station, is likely to use metro for working trips. This means that walking more than 10 minutes requires getting a vehicle to travel and those who are not living within 10 minutes walk to the metro station choose transport modes other than the metro. This is a similar result to the analysis of Keçiören, where none of the interviewed women said that they used metro for work trips. We can say that it has a deterrent effect to use metro for work trips when one cannot reach the metro by walking.

On the other hand women are willing to walk more to reach a metro station when they travel for shopping or leisure reasons (6.38, 6.39). The most important difference from work trips is time limitation. Since work times are determined and it is important to be on time, travel time becomes very crucial. Being in the walking distance seems to be important from the point of view of working women. However, shopping and leisure trips are more flexible activities than work trips. Therefore women are more willing to walk more to reach the metro. Nevertheless, their likelihood of using the metro slightly decreases as their distance to a metro station increases.

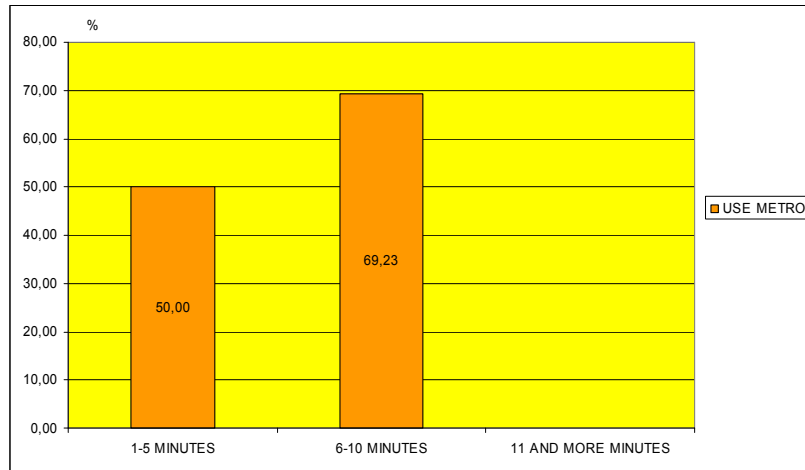


Figure 6.37: Proximity to metro by metro usage for work trips

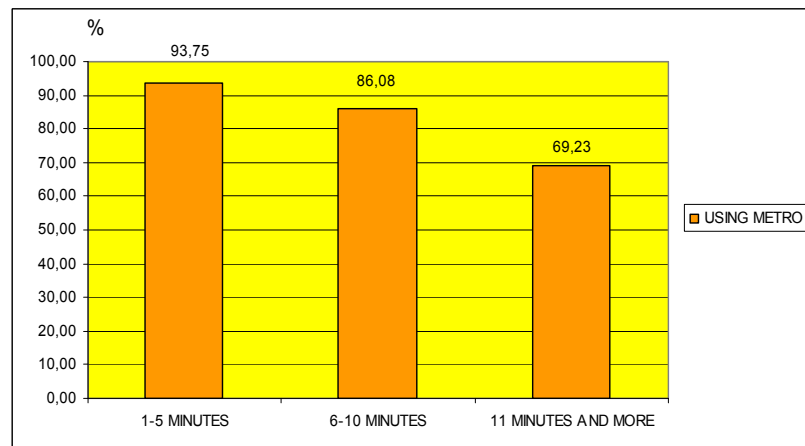


Figure 6.38: Metro preference for clothing shopping by walking time to metro station

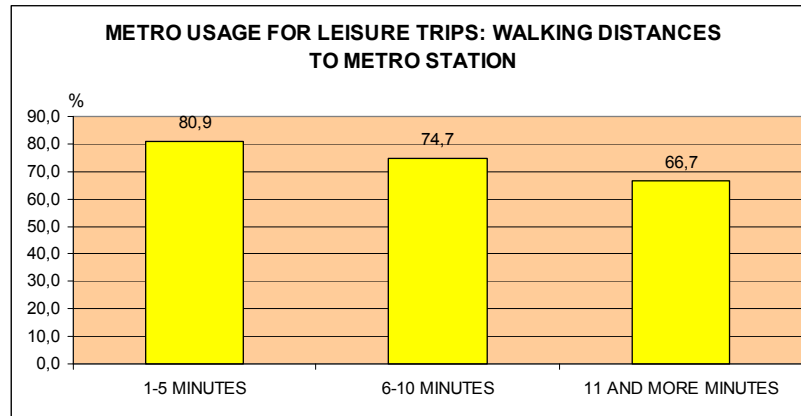


Figure 6.39: Metro usage for leisure trips: walking distances to metro station

Women, were also asked about the security of different vehicles. Figure 6.40, reveals an interesting result: even women who do not use the metro think that metro is the most secure mode than all the other modes, including the car.

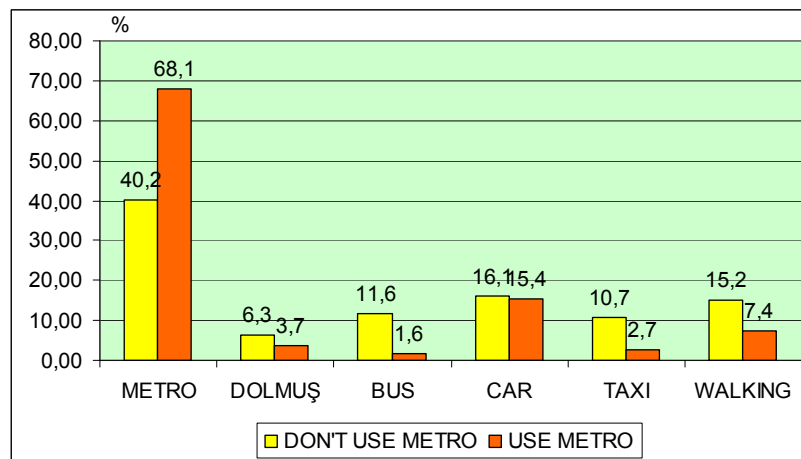


Figure 6.40: Security perception about different vehicles of metro users and non-users

6.5. SUMMARY OF THE FINDINGS:

This thesis study's hypothesis has been based on urban rail system's quality and its effect in decreasing the cognitive constraints of women. Therefore this chapter examined metro perception and their effects on the mobility of different women groups.

It was discussed in the literature chapter that mobility constraints are not only related with roles and responsibilities that women have in a household. Women are psychologically and physically more sensitive than men and therefore women's mobility and activity participation are affected dramatically. Mode choice theory states that time and money cost of the mode are the most important factors in travel demand analysis. However; in literature survey it was claimed that from the point of view of women, time and money may be less important when compared with some other factors, like security and customary and legal constraints in mode choice. The analysis made here included all these possible constraints and concerns regarding safety as well capability constraints such as traveling with a child; however reasons for mode choice appear to be closely related to the time cost of the metro system, as literature survey stated, as well as its convenience in terms of being close to a destination. Women who choose to use the metro do so because they see the metro as the fastest mode and because it provides access to the selected destination points. Therefore we can say that the claim in literature survey that says time is the most important factor in mode choice is also relevant for Ankara.

Women who do not use the metro, on the other hand, mostly go to places within walking distance. In this respect choosing final destination points within walking distance can be considered as an indicator of low mobility and limited geography. Therefore, the analysis of various other cognitive factors; i.e. women's perceptions regarding the metro, regarding mode choice is very important in terms of analyzing vulnerable women's activity geography.

This chapter put forward women's fears, constraints and feelings about the quality of metro. Women in general do not have negative perceptions regarding the system

quality and cost, like cleanness, speed, time schedule, cost, etc. However, when we deal with different women's constraints about metro, like inconvenience of traveling with children, with shopping bags, choosing destination point within walking distance, especially groups we accepted as vulnerable (low income, non-workers, elderly, etc.) seems to have these concerns. Among various issues, the most effective ones seem to be the fears and concerns regarding the security of the metro.

It was revealed that women mostly fear harassment and violence, terrorist attacks, being alone in empty metro car, going to a metro station at night, lack of CCTV in wagons, and the fact that metro is an underground system.

Those fears have been analyzed from the point of view of vulnerable groups, and we can say that the groups that have been mostly affected by fears in terms of metro usage are the less educated and elderly women. Their fears seem to affect metro usage and therefore mobility levels.

As mentioned in the literature survey chapter; Root et.al. (2000) stressed that security has to often be the central issue when compared with time and cost variables for women, although for men this is not the case. The physical vulnerability of women to violent attacks or sexual abuse may cause them not to take public transport (Williams, 2005; Hamilton, 2002; Peters, 1999). As stated in a report by the UK Department for Transport (<http://www.dft.gov.uk>, 03.08.2006) as well as by Buck (2005), Hamilton (2002) and Bianco et.al. (1996); fear of harassment and threat of violence affect women's travel behavior; hence mode choice could easily be affected from insecure occasions, and insomuch that they could forgo from traveling all together. In this study, it was seen that such concerns regarding safety on metro also exists for women in Ankara. On the other hand, even the women who use the metro have these concerns, but they still continue to use the metro (perhaps only limiting their usage to the day time in order to avoid traveling in the night time, a significant concern that this study revealed).

Therefore, it appears that although they have various safety concerns regarding the metro, these do not become barriers for the women in Ankara in their choice of using

the metro. As a result, these cognitive issues, although important, do not determine mode choice. Time cost and convenience in terms of accessing the final destination point appear to be the major factors.

Therefore although time-geography theory mostly put emphasis on capability, coupling and authority constraints as affecting time geography of women, cognitive constraints seem to be very important for women. But when metro is considered, due to the system quality, women mostly prefer to travel with metro. Therefore we can say that when women have to go out of walking distance, although they seem to have many fears about metro and personal constraints to travel with metro, most of them prefer it, if possible, therefore we can say that metro decreases cognitive constraints of women and helps to increase the mobility levels and enlarge activity geographies.

CHAPTER 7

CONCLUSION

7.1. SUMMARY OF THE RESEARCH

This study has aimed to develop a conceptual framework for the mobility and activity geography of women and the factors affecting it. The problem definition and the research question of the study have been oriented by the increasing interest in the urban rail systems in the world as well as in Turkish cities. In recent years increasing urban rail investments taking place in cities like İstanbul, Ankara, İzmir, Eskişehir, Adana and Kayseri, make it extremely relevant and important to study and improve our understanding of the effects of these systems on mobility.

The main hypothesis of this study has been that “*urban rail systems may increase the mobility, expand urban geographies due to system quality, and removing the effects of cognitive constraints*”. Within the framework of this hypothesis, it was intended to improve our understanding of the role that urban rail systems play on the mobility of women (those who are captive public transport riders), and consequently the effect of rail systems on their mobility and urban geography. The main aim is to understand whether mobility levels and urban geographies differ when considering women who use and who do not use urban rail system, to what extent their mobility and activity rates, their urban experiences differ considering the same comparison (metro users and non users), and whether the urban rail systems play a role in those differences. In this respect, the study analyses whether the Ankara metro has positive effects or not on the mobility levels of women living nearby metro stations, women who use the metro and have limited or no access to private cars. In cases where those expected impacts have not been realized, understanding the factors that lie under

these situations is also important from the point of view of the theoretical framework of this study, and to contribute to the theoretical discussions. Therefore comparisons among women groups (such as different women groups with different ages, marital status, children, education levels, occupations, household responsibilities and perceptions on different transportation modes etc.) and the effects of those differences on their transportation mode choices and mobility levels have also been important research areas in the study.

The literature review showed that there are valuable studies on mode choice, activity based travel, time-geography and women. Mode choice theory states that although there are many factors in mode choice, money cost and the time cost of the mode are the most important factors. Activity based travel theory introduces two important points: one is that travel is a derived action caused by people's activity needs, which are three types: subsistence, maintenance and leisure needs. The other point is that people's mobility are limited by time and space, which is also the establishing claim of time-geography theory. Time geography theory, on the other hand, introduces another important point: there are some constraints in the mobility of people: capability, coupling and authority constraints, and according to some other researchers cognitive constraints mainly relating to the lack of information and knowledge about modes. When we analyze women studies, we see private space-public space debate, and emerging traditional role and domestic responsibility on one hand and psychological and physical vulnerability causing fears on the other.

However, there are also gaps in the literature, in this area:

- ✚ Although there are many studies on mode choice, activity based travel theory, time geography theory and gender; four study areas are not brought together to examine different women groups' mobility problems (to the best knowledge of the author)
- ✚ There is a tendency to overstate money cost and time cost of the transportation system in mode choice of people. But from the point of women

there might be other factors affecting mobility: domestic responsibility, traditional role and cognitive constraints

- ✚ Although women and transportation problems have been studied by many researchers, there is not an exact study on “metro choice based **activity geography** of vulnerable women groups”.
- ✚ Time geography theory is constructed on 3 main constraints: capability, coupling and authority. But on the other hand some researchers suggested cognitive constraints as another category and they mentioned mostly the lack of information as the cognitive constraint. But security matters and related fears can be as important cognitive constraints for women from the point of view of metro; and studies are limited on this subject.

Based on the findings of the literature review, which is summarized above, this thesis focused on women’s mobility and mode choice effect on their urban activity geography. In detail, it has focused on vulnerable women groups’ mobility levels based on metro choice, and it has critically evaluated the metro perception and cognitive constraints affecting mobility and activity geography of vulnerable women groups.

7.2. MAIN FINDINGS OF THE STUDY

7.2.1. The results of the analysis

Considering the above arguments, the main research question was formulated as follows:

- Does the existence and usage of an urban rail system have a significant effect on women’s mobility levels and the urban geography that they experience (i.e. Do women living nearby or using an urban rail system make more trips, that are higher in frequency and longer in distance, resulting in a higher number of destinations in the city visited by them?)

Secondary questions were as follows:

1. What are the vulnerable women groups in terms of mobility levels, considering their socioeconomic and demographic factors and capability constraints? Does the metro usage affect the mobility levels of those vulnerable women groups?
2. What are the activity geographies of those vulnerable groups? Does the metro usage increase the urban geography that they experience?
3. What are the effects of fears and knowledge level of the vulnerable women on metro usage and mobility levels? Does metro prevent those fears transforming into cognitive constraints?

In this context two questionnaires were held on two different areas in Ankara. The first questionnaire was held in housing areas along the Batıkent Metro corridor (Batıkent, Yenimahalle, Demetevler, etc.) and the second one was held on Keçiören-Etlük areas where a metro system is under construction. A total of 300 women were interviewed. Results are analyzed below from the point of view of the three questions mentioned above:

- 1- In terms of mobility levels, particularly frequency of trip-making, the study revealed the following:

Without considering metro usage/non-usage, it is not possible to suggest with certainty that on a corridor with metro, the mobility levels of women will be high compared to other corridors without metro. Because women living on Batıkent corridor (which has a metro) are less mobile than those living at the Keçiören corridor (where metro does not operate yet).

Although in literature survey it was stated that money cost and the time cost of a mode are the most important factors, Ankara case showed that the most important factor is travel time, but money cost is not an important factor in mode choice. Besides the travel time factor, socioeconomic and demographic factors also affect mobility levels of women.

Of socioeconomic and demographic factors, age, income levels and education levels seem to be the most significant. Those who are elderly, with lower income and lower education level indicated that they very rarely made motorized trips due to having some mobility constraints (capability and cognitive constraints mostly).

When socioeconomic and demographic factors are considered, Ankara Case showed that women with children, married women, women who do not work and women with low income are less mobile than women without children, single women, women who work and women with high income respectively. The reasons might be the increased maintenance stops in trip-making and therefore more complex trips caused by trip chaining so forgoing motorized travel and fulfilling much of the maintenance activities within the walking distance for women who have children, and are married. On the other hand women who work have regular working trips and women with high income have the advantage of income for being more mobile than others. As a summary, we can say that in the literature survey chapter (Chapter 2) it was stated that domestic responsibilities might increase the mobility levels of women, but field research in Ankara shows that increased domestic responsibilities, due to being married and/or having children, etc. causes a decrease in motorized mobility levels, possible because increased responsibilities limit women to perform these activities within walking distance. Therefore mobility vulnerable women groups can be defined as in the followings:

- a. low income women,
- b. married women,
- c. elderly women,
- d. women with children
- e. less educated women.

Using the metro affects the mobility levels of women. Although the trip frequency between metro users and non-metro users do not change as significantly as might be expected, metro users are more mobile than non metro users. That is to say metro users and non-users both make motorized journeys and have a certain level of mobility; however, in metro user group the ratio of women who “very rarely” travel is lower. Furthermore at weekends the difference between metro users and non-users is more, that is to say women who use the metro are more mobile for leisure reasons. This supports the arguments in Chapter 2 that urban rail access can increase mobility; and increased mobility can enable a “better life” with more leisure activities.

When we focus on different women groups we see that among vulnerable women, metro effect on mobility is very significant. The most positively affected groups from the existence of metro seem to be the elderly and women with low income.

In addition, it was found that nearly half of the women interviewed would not be as mobile as now if there was no metro system. This ratio is much higher among the vulnerable. This means that metro positively affects the mobility of more sensitive and therefore less mobile women. Mode choice theories showed that, in the literature survey chapter, although conventional modeling techniques mostly take travel time and travel cost as determinant factors, in recent years socioeconomic and demographic factors have been added in mode choice models. However, the measurement and calculation problems caused the widely usage of time and cost still as main determinant. The Ankara case study revealed in this respect that metro is a very important mode from the point of view of women with different constraints, both capability and cognitive. That is to say taking into account of different socioeconomic and demographic factors are very important in mode choice studies and transportation investments when women are considered. Because Ankara case study showed that women with low income, elderly and younger women, women who do not work, less educated women and women who

have children are more vulnerable groups, who have less mobility levels when compared with others. The analysis explicitly showed that metro positively affects the mobility levels of these vulnerable groups.

- 2- In terms of vulnerable women's activity geographies and the effect of metro on them, the study revealed the following:

When we analyzed working trips and geographies of women living on Batıkent corridor and Keçiören corridor, we saw that working geography of women living on Batıkent corridor was larger than that of women on Keçiören corridor. Furthermore when we study vehicle types used for work trips, we saw that women mostly used metro for work trips on Batıkent corridor. Therefore we can suggest that women intend to choose work places where there is a metro connection. When we analyzed the women who do not use metro for work trips, we saw that nearly half of them worked in places within walking distance, and nearly half of remaining used company services.

From the point of view of vulnerable women, the analysis showed that metro usage rates among vulnerable women for work trips are higher. Furthermore metro user vulnerable women (e.g. low income) have a rather larger working geography than non-metro users. When we consider working geography of women living on Keçiören route, we see that they mostly work in their own neighborhoods, perhaps mostly within walking distance. That is to say their working geography is narrower than women living on Batıkent corridor, which has a metro.

From the point of view of shopping trips (maintenance activity) we found that vulnerable women mostly travel with metro for shopping trips. When we assess preferred shopping places of women who use and do not use the metro, we see that metro users go to more places for shopping (which means that they have rather larger shopping geographies), while non-metro users' shopping geography is much narrower. When we deal with vulnerable groups, in all cases it was seen that metro-users travel to more places in the

city, experience a larger variety of destinations (shopping places) in their urban area, and therefore a higher proportion of metro-users among these groups have a large urban geography when compared to non-metro users.

Leisure trip analysis of vulnerable women groups gave similar result with shopping trips analysis. When we assessed preferred leisure places of women comparing metro users and non-users, we found that metro users go to significantly more places for leisure, while non-metro users' leisure geography is narrower. When we deal with the same vulnerable groups analyzed in shopping geography, in all cases we can see that women who use the metro experience more parts of the city, and hence have a wider geography. However, this is particularly the case for the youngest women.

Another important finding of the study was that: metro is particularly important as an “enabling” mode for leisure trips; because difference in the covered geography between metro users and non-users among vulnerable women is the most in trips made for leisure activity. Thus we can say that by the help of metro, vulnerable women groups travel more for leisure and so their urban activity participation rates increase.

Trips for visiting friends were also considered in this study as a type of leisure trip. The analysis showed that the majority of women, who preferred to go to other neighborhoods remote from their own with a vehicle to visit a friend, preferred to travel with metro for visiting friends. When we assessed friend visit trips from the point of view of vulnerable women, analysis revealed that among vulnerable groups, metro users traveled farther places for friend visits, and again we can say that the usage of metro enlarges urban leisure geography of vulnerable women.

The literature chapter revealed that, capability constraints, related with personal sources, physical and biological aspects of a person affect his/her activity geography. Having low income and being relatively younger or elderly and having children can be considered as capability constraints, and

activity based travel theory claims that capability constraints narrow their geography. While in general this is valid, the Ankara case showed that mode characteristics of metro (mode choice) can help overcome capability constraints, since the activity geography of women in Ankara has been widened when they choose to use the metro.

- 3- In terms of perceptions and cognitive constraints, the study revealed the following:

It was discussed in the literature chapter that mobility constraints are not only related with roles and responsibilities that women have in a household. Women are psychologically and physically more sensitive than men and therefore women's mobility and activity participation are affected dramatically. Mode choice theory states that time and money cost of the mode are the most important factors in travel demand analysis. However; in literature survey it was claimed that from the point of view of women, time and money may be less important when compared with some other factors, like security and customary and legal constraints in mode choice. The analysis made in this study also included all these possible constraints and concerns regarding safety as well capability constraints such as travelling with a child; however reasons for mode choice appear to be closely related to the time cost of the metro system, as literature survey stated, as well as its convenience in terms of being close to a destination. Women who choose to use the metro do so because they see the metro as the fastest mode and because it provides access to the selected destination points. Therefore we can say that the claim in literature survey that says time is the most important factor in mode choice is also relevant for Ankara.

The analysis in Chapter 6, which focused on women's fears, constraints and feelings about the quality of metro showed that women in general do not have negative perceptions regarding the system quality and cost, like cleanness, speed, time schedule, cost, etc. However, when we deal with different women's constraints about metro, like inconvenience of traveling with

children, with shopping bags, choosing destination point within walking distance, especially groups we accepted as vulnerable (low income, non-workers, elderly, etc.) seems have these concerns. Among various issues, the most effective ones seem to be the fears and concerns regarding the security of the metro.

It was revealed that women are mostly fear harassment and violence, terrorist attacks, being alone in empty metro car, going to a metro station at night, lack of a CCTV in wagons, and the fact that metro is an underground system. Those fears were analyzed from the point of view of vulnerable groups, and we can say that the groups that have been mostly affected by fears in terms of metro usage were the less educated and elderly women. Their fears seem to affect metro usage and therefore mobility levels.

As mentioned in the literature survey chapter Root et.al. (2000) stressed that security has to often be the central issue when compared with time and cost variables for women, although for men this is not the case. The physical vulnerability of women to violent attacks or sexual abuse may cause them not to take public transport (Williams, 2005; Hamilton, 2002; Peters, 1999). The fear of harassment and threat of violence affects women's travel behavior; hence mode choice could easily be affected from insecure occasions, and insomuch that they could forgo from traveling all together (Bianco et.al., 1996; Hamilton, 2002; Buck, 2005; <http://www.dft.gov.uk>, 03.08.2006). In this study, it was seen that such concerns regarding safety on metro also exist for women in Ankara. On the other hand, even the women who use the metro have these concerns, but they still continue to use the metro (perhaps only limiting their usage to the day time in order to avoid travelling in the night time, a significant concern that this study revealed).

Therefore, it appears that although they have various safety concerns regarding the metro, these do not become barriers for the women in Ankara in their choice of using the metro. As a result, these cognitive issues, although important, do not determine mode choice. Time cost and convenience in

terms of accessing the final destination point appear to be the major factors. Therefore we can say that when women have to go out of walking distance, although they seem to have many fears about metro and personal constraints to travel with metro, most of them prefer it, if possible, therefore we can say that metro decreases cognitive constraints of women and helps to increase the mobility levels and enlarge activity geographies.

7.2.2 Understanding Mobility Constraints And Vulnerability

As a summary we can say that this study brings a new view on the analysis of urban activity geography of vulnerable women. **Activity geography vulnerability** has been introduced in the context of narrowed spatial experience for subsistence, maintenance and leisure type of activities and it is a kind of mobility vulnerability caused by cognitive constraints (fears, knowledge) and capability constraints of women (vulnerable women) based on inconvenient mode supply (Figure 7.1).

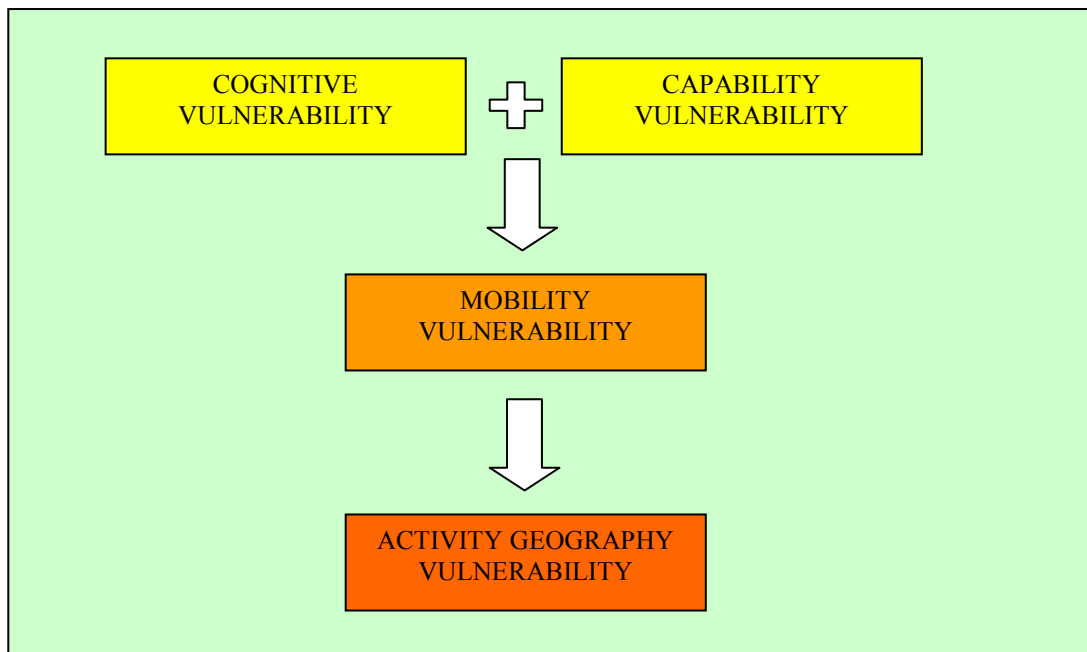


Figure 7.1: The relationship of concepts of the study

With this thesis study, it was stated that vulnerable women who use metro have wider activity geographies (related with activity types) than those who do not use metro. While temporal and spatial dimensions of the activity become uncertain, metro channels those activities into wider geographies.

This study explicitly showed that rather than the money cost, time cost savings offered by the metro are extremely important; and that this time cost saving provided by a transportation mode is sufficient to increase the mobility levels of women. With the field research of this thesis it was seen that women who do not work, who are relatively younger and older, who have low income, who have children, and women who are low educated have narrower activity geographies than other women, therefore they are called as mobility vulnerable women. This vulnerability for mobility is obviously caused by some capability and cognitive constraints of women, having low income, having children, being a young or being elderly, or having a low level of education.

From the point of view of capability vulnerability we can say that women who have low education levels, women who have low income and elderly women are the most vulnerable. From the point of view of cognitive constraints women with low education and income levels and elderly are the women who have the highest vulnerability. When we consider the two vulnerability types, we can see that same groups are affected. But the most important result of this study is that metro enables vulnerable women to be more mobile. We can claim that if there was no metro on Batikent route many women would not go outside and travel with the same frequency and they would have narrower activity geographies than today; and those women are mostly the elderly, those with low income and those with children.

7.2.3. Contributions of the Study to the Existing Literature

The following points display the contributions of the study to the existing literature:

- 1- The concept of activity geography vulnerability has been analyzed from the point of view of four areas: mode choice, activity based travel, time geography and women studies to the transportation literature. The term activity geography vulnerability has been studied with a triangular conceptual framework, cognitive vulnerability, capability vulnerability and mobility vulnerability in Ankara metro context.
- 2- The study showed that urban rail investments can indeed be an important planning tool to increase the mobility of women, and particularly the more vulnerable groups among them. Increasing their mobility can help them experience a larger part of the city that they live in, hence can increase their participation to urban life.
- 3- The analysis of the Batıkent-Metro route in Ankara showed that urban rail systems have the capacity to overcome the capability and cognitive constraints of vulnerable women and therefore have the capacity to expand activity geography even of vulnerable women. The urban geography of vulnerable women has not been analyzed before as a factor of activity, mode and cognitive and capability constraints point of views.
- 4- Vulnerability criteria have not been made explicit from the point of view of women in such a way that they are categorized by activity types.
- 5- The findings of the study supports the claims put by many researchers, (mentioned in the literature survey chapter) that time cost is one of the most important factor in mode choice.
- 6- Finally, the study showed that metro usage increases the mobility levels and enlarges urban geography particularly for leisure activities; and this finding

supports the arguments in mobility studies that improved transportation opportunities lead to increases in mobility, which can prepare and reinforce conditions for a “better life”.

7.3. IMPLICATIONS OF FINDINGS

In Turkey urban rail transport investments will continue both in Ankara and other cities. Therefore in this respect while making an urban investment in a city, it is important to note that expectations regarding a positive impact on the mobility of vulnerable groups are realistic. Claims that urban rail systems can help increase the mobility of people, and especially those who have lower levels of mobility (hence vulnerable) are verified with the outcomes of this study on Ankara. However, it should also be remembered that in the travel demand analysis, money cost and time cost of the system are not the only important factors to take into account. In the estimation of travel demand vulnerable groups must be considered, and in this respect women are more vulnerable. But also there are more vulnerable groups among women. Women who have low income, low education level, elderly and women with children were found as the most vulnerable women groups, whose mode choice tendencies need to be taken into consideration.

Urban rail investments have a strong positive image and it is claimed that women would be more mobile if they have the opportunity to reach a metro station. That is because urban rail systems are faster, higher quality, more comfortable, and easily perceived systems and they can help reduce the fears and insecurity and therefore cognitive constraints of vulnerable women. However, the opposite is also possible: automatic doors, unattended rail cars and underground aspect of the system can create new fears and cognitive constraints.

Therefore, when making a transportation investment, it should be remembered that urban rail systems are important since they expand urban geography of even the most vulnerable women. However, women have still some cognitive constraints and capability constraints when using metro. Therefore with some precautions and

making some simple changes in the system the usage levels of metro can be seriously increased. Study findings can be handled theoretically and practically as follows:

- 1- The theoretical discussions of the study can be tested in the travel demand analysis and other urban rail transportation investments to see whether the results of the proposed conceptual framework are relevant or not.
- 2- This study strongly recommends making a survey of the city when estimating the travel demand of people to see the socio economic profile of people and to design the system in such a way that more women can reach the station points and feel secure in doing so as well as in using the system.
- 3- Metro system information, stations, and timetables should be distributed to people both in walking distance and out of walking distance area of the station points, in order to eliminate lack of information as a cognitive barrier.
- 4- Transportation mode possibilities should be increased at the interchange points and intermediate transportation opportunities should be put in service to transport people to station points, like services. This can address the trip-chaining tendency of women with domestic responsibilities.
- 5- Ankara metro conditions should be reviewed to decrease the physical and psychological vulnerability levels of women and therefore to increase their usage levels and expand their activity geographies since metro has the capacity to do so. Keçiören metro line and other future lines can also be planned and designed in the same way. In this respect security precautions must be taken both in the stations, the surrounding areas of the metro stations, and metro wagons, such as increased lighting, presence of security personnel, security cameras, etc.
- 6- Some other precautions must be taken to increase the usage levels of women who have children, such as special divided space for children while standing up in a metro wagon, or special holders designed for children if they stand up during the trip.
- 7- The mechanical system of metro should be designed in such a way that elderly and disabled people can easily use the system without any fear.

7.4. LIMITATIONS OF THE STUDY

The research faced its most important limitation during the field survey. The study had aimed to implement and analyze travel diaries in addition to the questionnaire in order to get the time geography of different women groups, especially the vulnerable ones. But efforts showed that it was a very difficult process to have the travel diaries correctly and completely filled in, and then returned. The travel diaries require a significantly larger amount of time to be committed when compared to a questionnaire; and they also require a certain level of knowledge and awareness regarding transport modes, trip destinations, durations, etc. These requirements seem to largely affect the successful application of this data collection method. Due to a very low level of return of these forms, this method had to be abandoned and instead the content of the questionnaire was increased to help collect a wide set of data.

7.5. RECOMMENDATIONS FOR FUTURE WORK

In this study activity geography of vulnerable women concept has been analyzed in accordance with three other concepts: capability vulnerability, cognitive vulnerability and mobility vulnerability. Geography dimension has been put forward by the study, but time dimension had to be overlooked. But with a further study, in which the filling in of travel diaries can be made time dimension can be included and time geography of vulnerable women can be studied.

The findings of the study regarding mobility and various vulnerability issues and constraints can be tested further by focusing on different groups. This study had its main focus on women; however a comparison of genders was not included. Studies on only low income groups, or only elderly groups, and analyzing the different travel patterns, mobility levels, and geographies of men and women in these vulnerable groups can also contribute to the arguments and findings of this study.

As a further study, women living on Keçiören corridor can be analyzed with a view to conduct a before and after study; that is before and after the metro system opens.

The before study can also build on the findings of this current research, because an analysis has been made here for Keçiören metro corridor, and women's mobility levels, urban geographies and their perceptions on metro have been determined. Therefore such a study, undertaken also after the operation of metro, can give the opportunity to assess the metro effect both on capability and cognitive constraints related mobility levels and urban geography of vulnerable women with a “before and after metro” study.

REFERENCES

BOOKS AND ARTICLES

1. ADLER, T., BEN-AKIVA, M.; 1979, “ A Theoretical and Empirical Model of Trip Chaining Behaviour”, *Transportation Research 13B*, Transportation Research Board, Washington, D.C., 243-257.
2. ALPIZAR, Francisco; CARLSSON, Fredrik; September 2001, “Policy Implications and Analysis of the Determinants of Travel Mode Choice: An Application of Choice Experiments to Metropolitan Costa Rica”, *Working Papers in Economics no:56*, Department of Economics, Göteborg University
3. ALZER, M.; 1990, “The Communitarian Critique of Liberalism”, *Political Theory*, Vol. 18, No:1, pp. 6-23, Sage Publications
4. ARENTZE, T., TIMMERMANS, H.J.P., 2000, “The Albatross System’ Albatros: A Learning-Based transportation Oriented Simulation System”, Vol. 3. *European Institute of Retailing and Services Studies (EIRASS)*, Eindhoven, pp. 71–80.
5. ARENTZE, T., DIJST, M., DUGUNDJI, E., JOH, C.-H., KAPOEN, L., KRYGSMAN, S., MAAT, K., TIMMERMANS, H.J.P., VELDHUISEN, J., 2001, “The AMADEUS Program: Scope and Conceptual Development”, *World Congress of Transportation Research*, Seoul, Korea.

6. ARENTZE, T., TIMMERMANS, H.J.P., 2002, "Modeling the formation of activity agendas using reactive agents". *Environment and Planning B: Planning and Design* 29, 719–728.
7. ASENSIO, Javier; 2002, "Transport Mode Choice by Commuters to Barcelona's CBD", *Urban Studies*, Vol. 39, No.10, 1881-1885
8. BANISTER, David; 2008, "The Sustainable Mobility Paradigm", *Transport Policy*, 15 (2008), pp. 73-80, Elsevier
9. BEIMBORN, Edward; GREENWALD, Michael; JIN Xia, 2003, "Accessibility, Connectivity and Captivity Impacts on Transit Choice", *TRB Paper*, Center For Urban Transportation Studies, University of Wisconsin-Milwaukee <http://www.uwm.edu/People/xiajin/projects/TRBpaper.ppt>, 21.03.2005
10. BHAT, Chandra R., 1998, "Accommodating Variations in Responsiveness to Level-of Service Measures In Travel Mode Choice Modeling", *Transportation Research Part A*, Vol. 32, no:7, pp.495-507
11. BHAT, C., 1999, "An analysis of evening commute stop-making behavior using repeated choice observations from a multi-day survey", *Transportation Research B* 33 (6), 495–510.
12. BHAT, C.R., SINGH, S.K., 2000, "A comprehensive daily activity-travel generation model system for workers", *Transportation Research A* 34 (1), pp.1–22.
13. BIANCO, et al, 1996, Bianco, Martha and Catherine Lawson. (1996). "Trip-Chaining, Childcare, and Personal Safety: Critical Issues in Women's Travel Behavior", *A paper presented at the Second National Conference on Women's Travel Issues in Baltimore, Maryland on October 24 - 26, 1996.*

14. BLACK, Alan; 1995, "Urban Mass Transportation Planning", McGraw-Hill, USA

15. BLACK, R. William; 2003, "Transportation: A Geographical Analysis", The Guilford Press, New York

16. BLAIR, Juliet; 1997; "Private Parts in Public Places: The Case of Actresses" in *Women and Space: Ground Rules and Social Maps*, ed y ARDENER, Shirley, Great Britain

17. CAPPER, Brian J., 1999, "Public Body, Private Women: 'The Ideology of Gender and Space and the Exclusion of Women from Public Leadership in the Late First Century'", *Version of chapter in: Theology and the Body (ed. Robert Hannaford and J'annine Jobling)* Gracewing, Leominster U.K., 1999, pp. 123-151.

18. CARLSSON-KANYAMA, Annika; LINDEN, Anna-Lisa; THELANDER, Asa; 1999, "Gender Differences in Environmental Impacts From Patterns of Transportation- A Case Study From Sweden", *Society and Natural Resources*, Volume 12, p. 355-369

19. CARTER, Miranda; 2005, "Gender Differences in Experience with and Fear of Crime in Relation to Public Transport", in *Research on Women's Issues in Transportation, Report of a Conference*, Volume 2: Technical Papers, November 18–20, Chicago, Illinois

20. CHAKRABORTY, Anup Shekhar; 2008, "Emergence of Women from 'Private' to 'Public': A Narrative of Power Politics from Mizoram", *Journal of International Women's Studies* Vol. 9 #3 May 2008.

21. CHERCHI, Elisabetta; ORTÚZAR, Juan de Dios; August 2003, "Alternative Specific Variables in Non-linear Utilities: Influence of Correlation, Homoscedasticity and Taste Variations", *Conference paper, Session III:*

Development of Theory Moving through nets: The physical and social dimensions of travel 10th International Conference on Travel Behaviour Research, Lucerne, 10-15.

22. COLEMAN, Charlotte, 2000, “Women, Transport and Cities: a Overview and an Agenda for Research”, in *Women and the City: Visibility and voice in urban space*, eds DARK, Jane; LEDWITH, Sue and WOODS, Roberta; p. 83-97
23. COMMISSION OF THE EUROPEAN COMMUNITIES (CEC), 2007, “Green Paper: Towards a New Culture for Urban Mobility” (SEC(2007)1209, Brussels
24. COMMISSION OF THE EUROPEAN COMMUNITIES (CEC), 2007, “Green Paper: Towards a New Culture for Urban Mobility”, SEC 2007, 1209-25.09.2007, COM 2007-551 Final; Brussels
25. ÇUBUK, K., TÜRKMEN, M., ERDEM, M., (2002), “Ankara'da Yapılan Ulaşım Planlaması Çalışmalarının Raylı Sistemler Bazında Değerlendirilmesi”, *Uluslararası Trafik ve Yol Güvenliği Kongresinde Sunulan Bildiri*, Gazi Üniversitesi, Ankara, <http://www.trafik.gov.tr/icerik/bildiriler/B6-45.doc>
26. DAVIDSON, William; DONNELLY, Robert; VOVSHA, Peter; FREEDMAN, Joel; RUEGG, Steve; HICKS, Jim; CASTIGLIONE, Joe; PICADO, Rosella; 2007, “Synthesis of first practices and operational research approaches in activity-based travel demand modeling”, *Transportation Research Part A-41 (2007)*, 464-488
27. DAVIDOV, Eldad; 2003, “Travel Mode Choice As A Rational Choice-Different Aspects”, Doctor Grades Study, Tel-Aviv-Jaffa, Israel

28. DONG, Xiaojing; BEN-AKIVA, Moshe E.; BOWMAN, John L.; WALKER, Joan L.; 2006 “Moving From Trip Based to Activity Based Measures of Accessibility”, *Transportation Research Part A*, 40, 163-180

29. EDGEWORTH, Kathryn; 1999; “Women as Public Intellectuals: The Exclusion of the Private in Public Intellectual Life”, *Paper presented at Women’s Worlds 99: The 7th International Interdisciplinary Congress on Women*, Tromso-Norway, June 20-26, 1999.

30. ELLEGARD, Kajsa; HAGERSTRAND, Torsten; LENNTORP, Bo; “Activity Organization and the Generation of Daily Travel: Two Future Alternatives”, *Economic Geography*, Vol. 53, No.2, April 1977, 126-152

31. FREUDENDAL-PEDERSEN, Malene; 2005, “Structural Stories, Mobility and (Un)freedom”, pg 29-45, in “*Social Perspectives on Mobility*”, eds. Thomsen, Thyra Uth; Nielsen, Lise Drewes and Gudmundsson, Henrik, 2005, England

32. GOLOB, T.F., (1986), “A Non-Linear Canonical Correlation Analysis of Weekly Trip Chaining Behavior”, *Transportation Research Part A*, 20A (5), 385-399

33. GOSSEN, Rachel and PURVIS, Charles L., “Activities, Time, and Travel Changes in Women’s Travel Time Expenditures, 1990–2000”, in *Research on Women’s Issues in Transportation, Report of a Conference, Volume 2: Technical Papers*, November 18–20, Chicago, Illinois, p. 21-29

34. GUDMUNDSSON, Henrik; 2005, “Mobility as a Policy Concept”, pg 107-126, in “*Social Perspectives on Mobility*”, eds. Thomsen, Thyra Uth; Nielsen, Lise Drewes and Gudmundsson, Henrik, 2005, England

35. HAMILTON, Kerry; 2002, “Gender and Transport Developed Countries”, *Background Paper for the Expert Workshop “Gender Perspectives For Earth*

Summit 2002: Energy, Transport, Information for Decision Making”, Berlin, Germany, 10-12 January 2001.

36. HANSON, Susan; SCHWAB, Margo; 1995, “Describing Disaggregate Flows Individual and Household Activity Patterns”, 166-187, *The Geography Of Urban Transportation*, ed. by HANSON, Susan; 1995, Clark University, The Guilford Press
37. HAMED, Mohammad M.; MANNERING, Fred L.; 1993, “Modeling Travelers’ Post Work Activity Involvement: Toward A New Methodology”, *Transportation Science*, Vol. 27 No:4, November.
38. HANSON, Susan; HANSON, Perry; 1980, “Gender and Urban Activity Patterns in Uppsala, Sweden” *Geographical Review*, Volume 70, p 291-299.
39. HINE, Julian and MITCHELL, Fiona; 2003; “Transport Disadvantage and Social Exclusion”
40. HØYER, Karl G, 1999, “Sustainable Mobility- The Concept and its Implications”, *PhD Thesis*, Institute of Environment, Technology and Society, Roskilde University, Denmark; Department of Environmental Research, Western Norway Research Institute, Sogndal, Norway
41. International Association of Public Transport (UITP), May 2005, “Pricing In Regional Public Transport”, Brussels, Belgium
42. International Association of Public Transport (UITP), November 2003, “The Metro: an opportunity for sustainable development in large cities”, FOCUS-A UITP Position Paper, Brussels, Belgium
43. International Association of Public Transport (UITP), July 2002, “Public Transport for Sustainable Mobility”, *FOCUS-A UITP Position Paper*, Brussels, Belgium

44. International Association of Public Transport (UITP), June 2001, "Access to Public Transport", *FOCUS-A UITP Position Paper*, Brussels, Belgium
45. ITS BERKELEY, ITS DAVIS, ITS IRVINE; Winter 2005-2006, "What Women Want: The Guidance and Checklist?", *Los Angeles Subscribe*, Vol. 4, No:1
46. JANG, Tae Youn; 2003, "Causal Relationship Among Travel Mode, Activity, and Travel Patterns", *Journal of Transportation Engineering*, January-February 2003.
47. JEAN CLAUDE, T., ISABELLE, T.; 1987, "Towards Conceptualizing Trip Chaining Behavior: A review", *Geographical Analysis*, 19(1), 1-17
48. JENSEN, Anne; 2005, "The Institutionalization of European Transport Policy from a Mobility Perspective", pg 127-153, in "*Social Perspectives on Mobility*", eds. Thomsen, Thyra Uth; Nielsen, Lise Drewes and Gudmundsson, Henrik, 2005, England
49. JOHANSSON, Maria Vredin; HELDT, Tobias; JOHANSSON, Per; 2005, "Latent Variables in a Travel Mode Choice Model: Attitudinal and Behavioral Indicator Variables", Uppsala University, Department of Economics, Working Paper 2005:5
50. KAUFMANN, Jodi; 2007, "A Construction of Public/Private Space on and through the Transsexual Body/Subject", Georgia State University
51. KITAMURA, R., 1985, "Trip-chaining in a Linear City", *Transportation Research Part A*, 19, 155-167

52. KNOFLACHER, Hermann, 2006, "A new way to organize parking: the key to a successful sustainable transport system for the future", *Environment and Urbanization*, 18, 387
53. KRYGSMAN, Stephan; ARENTZE, Theo; TIMMERMANS, Harry; 2006, "Capturing tour mode and activity choice interdependencies: A co-evolutionary logit modeling approach", *Transportation Research Part A 41*, pg. 913-933
54. LASH, S. and URRY, J., 1994, "Economies of Science and Space" Sage, London
55. LEE, Yuhwa; HICKMAN, Mark; WASHINGTON, Simon; 2007, "Household type and structure, time use pattern and trip-chaining behavior", in *Transportation Research Part A 41*, pp.1004-1020
56. LEVINSON, David; KUMAR Ajay; Autumn 1995, "Activity, Travel and The Allocation of Time", *Journal of the American Planning Association*, Vol. 61, p 458, 13p
57. LI , Hainan; GUENSLER, Randall; OGLE, Jennifer; 2004; "Comparing Women's and Men's Morning Commute Trip Chaining in Atlanta, Georgia, by Using Instrumented Vehicle Activity Data", in *Research on Women's Issues in Transportation, Report of a Conference Volume 2: Technical Papers*, November 18–20, Chicago, Illinois, p. 14-20
58. LU, X.L., PAS, E.I.; 1999, "Socio-demographics, activity participation, and travel behavior"; *Transportation Research A 33 (1)*, 1–18.
59. LYONS, Lenore T.; 2007, "A curious space 'in-between': The public/private divide and gender-based activism in Singapore", *Faculty of Arts-Papers*, University of Wollongong, Australia

60. MANSKI, Charles F., April 27 2005, “Random Utility Models With Bounded Ambiguity”, Department of Economics and Institute for Policy Research Northwestern University
61. MCGUCKIN, N. and MURAKAMI, E., 1998, “Examining Trip-Chaining Behavior: A Comparison of Travel by Men and Women”, Federal Highway Administration, Washington DC.
62. MCGUCKIN, Nancy; NAKAMOTO, Yukiko; “Differences in Trip Chaining by Men and Women”, in *Research on Women’s Issues in Transportation, Report of a Conference Volume 2: Technical Papers*, November 18–20, Chicago, Illinois, www.travelbehavior.us/projects_files/ 18.11.2008
63. MILLER, Harvey; 2004, “Travel Chances and Social Exclusion”, www.geog.utah.edu/~hmilller/papers/travel_exclusion.pdf, 29.08.2006
64. MILLER, Eric J.; ROORDA, Matthew J.; 2005, CARRASCO, Juan Antonio; “A Tour Based Model of Travel Mode Choice”, *Transportation 2005-32*, pp. 399-422
65. MOSES, Leon N.; WILLIAMSON, Harold F. Jr., 1970, “Value of Time, Choice of Mode, and the Subsidy Issue in Urban Transportation”, *The Demand For Travel*, ed. by. QUANDT, Richard E., Heath Lexington Books, Lexington, Massachusetts
66. NAGAR, Richa; “Women’s Theater and the Redefinitions of Public, Private, and Politics in North India”, *ACME: An International E-Journal for Critical Geographie*, <http://www.acme-journal.org/vol1/nagar.pdf>, 15.11.2008
67. NEWMAN, P.; KENTWORTHY, J.; 1999, “Sustainability and Cities”, *AIUS transport accessibility + mobility indicators (TAMI)*, <http://www.aius.org.au/transport/TAMI%201%20introduction.pdf> April 2008

68. NIELSEN, Lise Drewes; 2005, "Reflexive Mobility- A Critical and Action Oriented Perspective on Transport Research", pg 47-64, in "*Social Perspectives on Mobility*", eds. Thomsen, Thyra Uth; Nielsen, Lise Drewes and Gudmundsson, Henrik, 2005, England
69. URRY, John; 2000, "Sociology Beyond Societies- mobilities for the twenty-first century", Routledge, London
70. PAS, E.I.; 1984., "The effect of selected socio-demographic characteristics on daily travel-activity behavior". *Environment and Planning A* 16 (1984), pages 571-581
71. PATEMAN, Carole; 2006, "Feminist Critiques of the Public/Private Dichotomy", in *An Introduction to Women's Studies: Gender in a Transnational World*, by GREWAL, Inderpal and KAPLAN, Caren; Newyork
72. PETERS, Deike; 2001; "Gender Issues in Transportation: A Short Introduction", *Presentation Notes for the UNEP "Deals on Wheels" Seminar*, San Salvador, July 28-30
73. PETERS, Deike; 1999; "Gender and Transport in Less Developed Countries: A Background Paper in Preparation For CSD-9", *Background Paper for the Expert Workshop "Gender Perspectives For Earth Summit 2002: Energy, Transport, Information for Decision Making"*, Berlin, Germany, 10-12 January 2001.
74. PRIMERANO, Frank; 2003; "Towards a Policy Sensitive Accessibility Measure", *26th Australian Transport Research Forum*, Wellington New Zealand

75. Raad voor Verkeer en Waterstaat, Van Modal Split naar Modal Merge – Advice about the future of regional transport, 2001, 43p; available at <http://www.minvenw.nl/extdomein/raadvenw/Publicaties/Adviezen/2001/Vanmodalsplitnaarmodalmerge.aspx>.
76. RAJAMANI, Jayanthi; BHAT, Chandra R.; HANDY, Susan; KNAAP, Gerritt; SONG, Yan; 2003, “Assessing The Impact of Urban Form Measures In Non-work Trip Mode Choice After Controlling For Demographic and Level-of-service Effects”, TRB 2002:Submitted for Presentation and Publication Paper # 03-3392
77. RAUBAL, Martin; MILLER Harvey J.; BRIDWELL, Scott; 2004, “User-Centered Time Geography For Location-Based Services”, *Geografiska Annaler*, 86B (4), pp. 245-265
78. RECKER, W. W.; CHEN, C.; MCNALLY, M. G.; 2001, “Measuring The Impact Of Efficient Household Travel Decisions On Potential Travel Time Savings and Accessibility Gains”, *Transportation Research Part A*, 35, pp. 339-369
79. ROSSENBLOOM, S.; 1989, “Trip Chaining Behavior: A Comparative and Cross Cultural Analysis of the Travel Patterns of Working Mothers”, *Gender, Transport and Employment*, eds. M. GRIECO, L. PICKUP, R. WHIPP; Gower: Avebury, London, 75-87
80. ROSENBLOOM, Sandra; 1993; “Women’s travel Patterns At Various Stages of Their Lives” in *Full Circles: Geographies of women over the life course*, eds KATZ, Cindi and Monk, Janice; London and New York
81. ROSENBLOOM, Sandi; HAKAMIES-BLOMQVIST, Liisa; “How Men and Women’s Travel Differs: Societal Implications”, www.stellaproject.org/FocusGroup3/Lisbon2004/presentations/Rosenbloom_Hakamies-B05_04.ppt, 29.09.2006

82. SANGO, Hiroki; 2004, "Nonlinearity in Utility Function in Travel Mode Choice Model", www.enveng.titech.ac.jp/yai/pdf/2004/sango.pdf, 26.07.2006
83. SARMIENTO, Sharon; 1996, "Household, Gender and Travel", *Women's Travel Issues Second National Conference*, Baltimore
84. SHARP, Sue; "Transport and Inclusion: A Government View", http://www.extra.rdg.ac.uk/EQUAL/Transport/Sue_Sharp1.pdf, Mobility and Inclusion Unit, Department For Transport; 25.07.2006
85. TAAFFE, Edward J.; GAUTHIER, Howard L.; O'KELLY, Morton E.; 1996, "Geography of Transportation", Prentice Hall, New Jersey
86. STRATHMAN, J.G., DUEKER, J.K., DAVIS, J.S., 1994, "Effects of household structure and selected travel characteristics on trip chaining" *Transportation* 21, pp. 23–45.
87. ULBERG, Cy; Institute for Public Policy and Management, 1989, "Psychological Aspects of Mode Choice-WA-RD 189.1 Final Report"; Washington, USA
88. THE INSTITUTE OF TRANSPORTATION ENGINEERS, 1992, "Modal Choice", *Transportation Planning Handbook*, pp.114-115
89. Transport Journal; 2005, 25 April, <http://www.kmcinternational.com/media>, 08.08.2006
90. TURNER, Jeff; GRIECO, Margaret; April 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, University of Luneberg, Germany.*

91. VASCONCELLOS, Eduardo Alcantara De; 2005, "Urban Change, Mobility and Transport in Sao Paulo: three decades, three cities", *Transport Policy* 12 (2005), pp. 91-104.
92. VILHELMSON, Bertil; 1999, "Daily Mobility and The Use of Time for Different Activities. The Case of Sweden", *Geojournal*, 48, pp.177-185
93. WALKER, Lynne, 1998, "Home and Away: The feminist remapping of public and private space in Victorian London", in *New Frontiers of Space, Bodies and Gender*, ed. By AINLEY, Rosa, London and Newyork
94. WALLACE, B., BARNES, J., RUTHERFORD, G.S., 2000, "Evaluating the effects of traveler an trip characteristics on trip chaining, with implications for transportation demand management strategies", *Transportation Research Record* 1718, 97–106.
95. WALLE, Stefaan Wande; STEENBERGHEN, Therese; 2006, "Space and Time Related Determinants of Public Transport Use in Trip Chains", *Transportation Research Part A* 40, pp. 151-162
96. WEN, C., KOPPELMAN, F.S., 2000. "A conceptual and methodological framework for the generation of activity-travel patterns", *Transportation* 27, pp. 5–23
97. WILLIAMS, Brian; March 2005, "Gender and Urban Transport", UN-Habitat Forum
98. WILSON, Nigel H.M., Fall 2003, "1.258J/11541J/ESD.226J", *Lecture 11: October 14*
99. WHITLEY, Rob; PRINCE, Martin; "Fear of Crime, Mobility and Mental Health in Inner-City London", 2005, *Social Science and Medicine*, 61, 1678-1688

APPENDIX 1

RAYLI SİSTEM YATIRIMLARININ ANKARA'DAKİ KADINLARIN KENTSEL MEKANDAKİ HAREKETLİLİKLERİNE ETKİLERİ ÜZERİNE BİR ÇALIŞMA

BAHAR ERKOPAN ESER
Y. Şehir Plancısı
Orta Doğu Teknik Üniversitesi
Mimarlık Fakültesi, Şehir ve Bölge Planlama Bölümü

Merhaba benim adım ODTÜ Şehir Bölge ve Planlama Bölümü'nden bir doktora öğrencisinin tez çalışması için Veri Araştırma adına araştırma yapıyoruz. Araştırmanın konusu kadınların kent içindeki yolculuklarıyla ilgili. Araştırma sonucunda edineceğimiz bilgiler tamamen bilimsel amaçlıdır, vereceğiniz bilgilerin başka hiçbir yerde kullanılmayacağını temin ederiz. Vakit ayırabilirseniz size bazı sorularımız olacak.

BATIKENT METROSU HATTI

Görüşülen kişinin cinsiyeti: (x) Kadın () Erkek

Doğum tarihiniz: (x) 1993 ve öncesinde doğanlar () 1994 ve sonrasında doğanlar

İşe, alışverişe, gezmeye vs giderken kullandığınız özel aracınız, otomobiliniz var mı?
() Evet (x) Hayır-----→ Ankete başlayınız.

DEMOGRAFİK BİLGİLER

1. Evli misiniz? [X-2]1() Evet 2() Hayır
2. Çocuğunuz var mı? [X-3] 1() Hayır 2() Evet----→ Kaç çocuğunuz var?[X-4] .
3. Hanenizde toplam kaç kişi yaşıyor? [X-5]

4. Hanenizdeki kişilerin hane içindeki konum, cinsiyet ve doğum tarihlerini söyley misiniz?

	Hane halkı reisine göre konumu*	Cinsiyeti 1: Kadın, 2: Erkek	Doğum tarihi
[X-6 / X-8]	1. Kişi Hane reisi (1)	1() 2()	
[X-9 / X-11]	2. Kişi ()	1() 2()	
[X-12/X-14]	3. Kişi ()	1() 2()	
[X-15/X-17]	4. Kişi ()	1() 2()	
[X-18/X-20]	5. Kişi ()	1() 2()	
[X-21/X-23]	6. Kişi ()	1() 2()	
[X-24/X-26]	7. Kişi ()	1() 2()	
[X-27/X-29]	8. Kişi ()	1() 2()	
[X-30/X-32]	9. Kişi ()	1() 2()	
[X-33/X-35]	10. Kişi ()	1() 2()	

* Hane halkı reisine göre konum:

- 1: Hane halkı reisi 2: Hane halkı reisinin eşi 3: Hane halkı reisinin çocuğu
4: Akraba 5: Yakın

[X-36: 6565]

5. Hanenizde çalışanların geliri, kira geliri vs olarak düşündüğünüzde, aylık ortalama ne kadar geliriniz var? [X-37]

- 1() 0-499 YTL 2() 500-999 YTL 3() 1000-1499 YTL
4() 1500-1999 YTL 5() 2000 YTL ve üzeri

6. En son hangi okulu bitirdiniz? [X-38]

- 1() Okuma yazma bilmiyor 2() Okuryazar, bir okul bitirmemiş
3() İlkokul mezunu 4() Ortaokul mezunu
5() Lise mezunu 6() Yüksek Öğretim mezunu

7. Şu an oturduğunuz evde ev sahibi misiniz kiracı mı? [X-39]

- 1() Kiracıyız----→ Aylık kiranız ne kadar? [X-40].....(YTL)
2() Evsahibiyiz
3() Evsahibi değiliz, ama kira ödemiyoruz
4() Lojmanda kalıyoruz.

8. Kaç yıldır bu mahallede oturuyorsunuz? [X-41]

9. Bu mahalleden önce Ankara'da başka bir mahallede oturdunuz mu? [X-42]

- 1() Hayır
2() Evet a. Eski mahallenizin adı [X-43] (İlçe ve semt adı da isteyiniz).....

b. Metronun varlığı bu mahalleye taşınmanızda etkili oldu mu? [X-44]

- 1() Evet 2() Hayır

10. Hafta içinde günde ortalama kaç kez bir ya da birkaç taşıtla bir yere gidiyorsunuz? [X-45]

1 () Neredeyse hiç 2 () 1-2 Kez 3 () 3-4 Kez 4 () 5 veya daha fazla

11. Hafta sonunda günde ortalama kaç kez bir yada birkaç taşıtla bir yere gidiyorsunuz? [X-46]

1 () Neredeyse hiç 2 () 1-2 Kez 3 () 3-4 Kez 4 () 5 veya daha fazla

12. Dışarı çıktığımızda metro kullanıyor musunuz? [X-47]

1 () Hayır (15. soruya geçiniz)

2 () Evet-----→ **Metro olmasa da bu sıklıkta dışarı çıkar mıydınız? [X-48]**

1 () Evet 2 () Hayır

13. Size en yakın metro durağı çıkışı hangisi? [X-49]

1 () Akköprü Durağı

2 () İvedik Durağı

3 () Yenimahalle

4 () Demetevler

5 () Hastane Durağı

6 () Macunköy Durağı

7 () Batıkent Son Durak

14. Bu durak çıkışına nasıl gidiyorsunuz? [X-50]

1 () Yürüyerek-----→ **Kaç dakikada yürüyorsunuz? [X-51]**.....

2 () Servisle

3 () Dolmuş veya otobüsle

4 () Taksiyle

5 () Bir aile üyesi araba ile bırakıyor

[X-52: 6565]

15. Şu andaki çalışma konumunuz nedir? [X-53]

1 () Bir işyerinde çalışıyorum ----→ **ÇALIŞANLAR BÖLÜMÜNE GEÇİNİZ**

2 () Herhangi bir işyerinde çalışmıyorum,

işimi evden yürütüyorum----→ **GİYİM ALIŞVERİŞLERİ BÖLÜMÜNE GEÇİNİZ**

3 () Çalışmıyorum -----→ **Aşağıdaki soruyu yanıtladıktan sonra GİYİM ALIŞVERİŞLERİ BÖLÜMÜNE GEÇİNİZ**

Durumunuz aşağıdakilerden hangisine uyuyor? [X-54]

1 () Emekliyim

2 () Evkadını, ev kızıyım

3 () Öğrenciyim-----**Okulunuzun adı nedir?[X-55]**

4 () İşsizim, iş arıyorum

ÇALIŞANLAR

I. GENEL SORULAR

16. Kamu kesiminde mi özel kesimde mi çalışıyorsunuz? [X-56]

- 1 () Kamu kesiminde---Nerede? [X-57]
1 () Merkezi hükümete bağlı bir kurum / kuruluşta
2 () Kamu iktisadi teşekkülü
3 () Üniversite / yüksek okul
4 () Belediye / belediyeye bağlı bir kuruluş / şirket
Diğer; belirtiniz:

2 () Özel kesimde----Nerede? [X-58]

- 1 () Başkasına ait bir şirkette, işyerinde
2 () Ortağı olduğum / bana ait bir şirkette, işyerinde

17. Çalıştığınız işyerinin temel faaliyet alanı nedir? [X-59]

- 1 () Tarım
2 () Sanayi
3 () Hizmet

18. Ne iş yapıyorsunuz? [X-60] (Açıklama isteyiniz)

19. (Kişi Ankara merkezde çalışıyorsa) İşyerinizin bulunduğu ilçe ve mahalle ismi? [X-61]

- | İlçe | Mahalle |
|------------------------|---------|
| () Altındağ : | |
| () Etimesgut : | |
| () Çankaya. : | |
| () Keçiören : | |
| () Mamak : | |
| () Sincan : | |
| () Yenimahalle: | |
| () Gölbaşı : | |

20. Bütün gün mü yarım gün mü çalışıyorsunuz? [X-62]

- 1 () Bütün gün
2 () Yarım gün
3 () Haftanın belli günleri ---→Hangi günler? [X-63].....
() Diğer, belirtiniz:

II. ÇALIŞANLAR VE METRO

21. Metroyu işe gidip gelirken kullanıyor musunuz? [X-65]

1() Hayır

2() Evet----→ Metroyu işe gidip gelişinizde tercih etme nedenleriniz? [X-66]

1()	İşyerime yakın	5()	Güvenli
2()	Hızlı	6()	Temiz
3()	Ucuz	7()	Modern
4()	Aktarmasız, tek vasıtayla işyerime ulaşabiliyorum	Diğer, belirtiniz:	

(Sorunun yanıtını aldıktan sonra giyim alışverişleri bölümüne geçiniz)

22. Neden metroyu işe gidip gelirken kullanmıyorsunuz? [X-67]

1() İşyerim yürüme mesafesi içinde

2() Servisle gidip geliyorum

3() Maliyeti fazla geliyor

4() Aktarma yapmam gerekiyor

5() Çok kalabalık oluyor

6() Tek başıma güvenli gelmiyor

7() Metroyu çok iyi tanımıyorum

8() Temiz değil

9() Modern değil

10() Yol üstünde uğramam gereken başka yerler var; **Bu duraklarınız nerelerdir? [X-68]**

Diğer, **belirtiniz:**

23. İşe nasıl gidiyorsunuz? [X-69]

1() Yürüyerek gidiyorum

2() Servisle

3() Dolmuş veya otobüsle

4() Taksiyle

5() Bir aile üyesi araba ile bırakıyor

GIYİM ALIŞVERİŞLERİ

24. Giyim alışverişlerinizi genelde hangi zamanlarda yapıyorsunuz? [X-70]

- 1 () Hafta içi gündüz
2 () Hafta içi akşam
3 () Hafta sonu gündüz
4 () Hafta sonu akşam

25. Metroyu giyim alışverişine giderken kullanıyor musunuz? [X-71]

- 1 () Hayır, hiç kullanmıyorum
2 () Evet → Giyim alışverişine giderken metroyu tercih etme nedenleriniz nedir?

[X-72]

- 1 () Market / alışveriş yerine yakın
2 () Hızlı
3 () Ucuz
4 () Aktarmasız, tek yolculuk ile alışverişimi yapıp dönebiliyorum
5 () Güvenli
6 () Temiz
7 () Modern
Diğer, belirtiniz:

[X-73: 6565]

26. a) Giyim alışverişi için aşağıda belirtilen hangi alışveriş merkezlerine gidiyorsunuz? (Anketör dikkat: Alışveriş merkezi listesini gördüğünüz kişiye veriniz) b) Bu alışveriş merkezlerine nasıl gidiyorsunuz?

	Adı	Yeri	Bu yerlere nasıl gidiyorsunuz?					
			Metro	Yürüme	Servis	Dolmuş, otobüs	Taksi	Ailemden biri bırakıyor
X-74 ()	Ankamall	Akköprü	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-75 ()	Millenium Outlet Center	İstanbul Yolu	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-76 ()	Optimum Outlet Center	Eryaman	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-77 ()	Real-Ankuva	Bilkent	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-78 ()	Armada	Söğütözü	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-79 ()	Atakule	Çankaya	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-80 ()	Karum	Çankaya	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-81 ()	Carrefour	Batıkent	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-82 ()	Mesa Plaza	Çayyolu	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-83 ()	Arcadium	Çayyolu	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
GİRİŞ KONTROL DEĞİŞKENİ (X-84: 6565)								
X-85 ()	Beğendik	Kocatepe	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-86 ()	Diğer mağazalar	İvedik	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-87 ()	Diğer mağazalar	Yenimahalle	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-88 ()	Diğer mağazalar	Demetevler	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-89 ()	Diğer mağazalar	Ulus	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-90 ()	Diğer mağazalar	Batıkent	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X-91 ()	Diğer mağazalar	Tunalı Hilmi Caddesi ve civarı	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()

X-92 ()	Diğer mağazalar	Bahçelievler / Emek ve civarı	1()	2()	3()	4()	5()	6()
X-93 ()	Diğer mağazalar	Kızılay	1()	2()	3()	4()	5()	6()
X-94 ()	Diğer mağazalar	Sıhhiye	1()	2()	3()	4()	5()	6()

27. (Anketör dikkat, yukarıda işaretli alışveriş merkezleri arasında metroyla gidilmeyenler varsa bu soruyu yöneltiniz) Bu alışveriş merkezlerine neden metroyla gitmiyorsunuz? [X-95]

- 1() Yürüme mesafesindeki yerlere gidiyorum
2() Ücretsiz servisle gidip geliyorum
3() Maliyeti fazla geliyor
4() Aktarma yapmam gerekiyor
5() Çok kalabalık oluyor
6() Tek başıma güvenli gelmiyor
7() Metroyu çok iyi tanımıyorum
8() Temiz değil
9() Modern değil
10() Yol üstünde uğramam gereken başka yerler var; **Bu duraklarınız nerelerdir [X-96]?**

.....
11() Buraya metro gitmiyor.

Diğer, belirtiniz:

[X-97: 6565]

GEZİ EĞLENCE AMAÇLI YOLCULUKLAR

28. Arkadaş ziyareti/ gün için hangi uzaklıktaki mahallelere gidiyorsunuz? [X-98]

- 1() Oturduğum mahalle içindeki yerlere gidiyorum
2() Yürüme mesafesindeki komşu mahallelere gidiyorum
3() Taşıtla uzak bir mahalleye gidiyorum.
4() Arkadaş ziyaretine / güne gitmiyorum.

29. Gezmek eğlenmek için en çok ne zaman dışarı çıkıyorsunuz? [X-99]

- 1() Hafta içi gündüz
2() Hafta içi akşam
3() Hafta sonu gündüz
4() Hafta sonu akşam

30. Gezmeye, eğlenmeye giderken metroyu kullanıyor musunuz? [X-100]

- 1() Hayır
2() Evet-----→**Metroyu gezmeye eğlenmeye giderken tercih etme nedenleriniz? [X-101]**

- 1() Gezmeye gittiğim yerlere yakın
2() Hızlı
3() Ucuz
4() Aktarmasız, tek yolculuk ile ulaşabiliyorum
5() Güvenli
6() Temiz
7() Modern
Diğer, belirtiniz:.....

31. a) Gezmek, eğlenmek için genelde nerelere gidiyorsunuz? (Anketör dikkat: Gezi eğlence yerleri listesini gördüğünüz kişiye veriniz)

b) Bu yerlere nasıl gidiyorsunuz?

	Adı	Yeri	Bu yerlere nasıl gidiyorsunuz?					
			Metro	Yürüme	Servis	Dolmuş, otobüs	Taksi	Ailemden biri brakıyor
X102 ()	Ankamall	Akköprü	1()	2()	3()	4()	5()	6()
X103 ()	Millenium Outlet Center	İstanbul Yolu	1()	2()	3()	4()	5()	6()
X104 ()	Optimum Outlet Center	Eryaman	1()	2()	3()	4()	5()	6()
X105 ()	Carrefour	Batıkent	1()	2()	3()	4()	5()	6()
X106 ()	Real-Ankuva	Bilkent	1()	2()	3()	4()	5()	6()
X107 ()	Armada	Söğütözü	1()	2()	3()	4()	5()	6()
X108 ()	Atakule	Çankaya	1()	2()	3()	4()	5()	6()
X109 ()	Karum	Çankaya	1()	2()	3()	4()	5()	6()
X110 ()	Mesa Plaza	Çayyolu	1()	2()	3()	4()	5()	6()
X111 ()	Arcadium	Çayyolu	1()	2()	3()	4()	5()	6()
GİRİŞ KONTROL DEĞİŞKENİ X-112: 6565								
X113()	Beğendik	Kocatepe	1()	2()	3()	4()	5()	6()
X114()	Göksu Parkı	Eryaman	1()	2()	3()	4()	5()	6()
X115()	Harikalar Diyarı	Sincan	1()	2()	3()	4()	5()	6()
X116()	Mogan Gölü	Gölbaşı	1()	2()	3()	4()	5()	6()
X117()	Altınpark	Aydınlıkevler	1()	2()	3()	4()	5()	6()
X118()	AOÇ		1()	2()	3()	4()	5()	6()
X119()	Kurtuluş Parkı		1()	2()	3()	4()	5()	6()
X120()	Botanik Parkı	Çankaya	1()	2()	3()	4()	5()	6()
X121()	Seğmenler Parkı	Çankaya	1()	2()	3()	4()	5()	6()
X122()	Abdi İpekçi Parkı	Sıhhiye	1()	2()	3()	4()	5()	6()
GİRİŞ KONTROL DEĞİŞKENİ X-123: 6565								
X124()	Atatürk Kültür Merkezi	Hipodrom	1()	2()	3()	4()	5()	6()
X125()	Gençlik Parkı	Ulus	1()	2()	3()	4()	5()	6()
X126()	Çankaya Bel. Dinlenme ve Spor Tesisleri	Ahlatlıbel	1()	2()	3()	4()	5()	6()
X127()	Dikmen Vadisi	Dikmen	1()	2()	3()	4()	5()	6()
X128()	Diğer	İvedik	1()	2()	3()	4()	5()	6()
X129()	Diğer	Yenimahalle	1()	2()	3()	4()	5()	6()
X130()	Diğer	Demetevler	1()	2()	3()	4()	5()	6()
X131()	Diğer	Ulus	1()	2()	3()	4()	5()	6()
X132()	Diğer	Batıkent	1()	2()	3()	4()	5()	6()
X133()	Diğer	Tunalı Hilmi Caddesi ve civarı	1()	2()	3()	4()	5()	6()
X134()	Diğer	Bahçelievler	1()	2()	3()	4()	5()	6()
X135()	Diğer	Kızılay	1()	2()	3()	4()	5()	6()
X136()	Diğer	Sıhhiye	1()	2()	3()	4()	5()	6()

32. (Anketör dikkat, yukarıda işaretli alışveriş merkezleri arasında metroyla gidilmeyenler varsa bu soruyu yöneltiniz) **Bu gezi eğlence yerlerine neden metroyla gitmiyorsunuz?**
[X-137] (Birden çok yanıt alınabilir)
1() Yürüme mesafesindeki yerlere gidiyorum

- 2() Ücretsiz servisle gidip geliyorum
 3() Maliyeti fazla geliyor
 4() Aktarma yapmam gerekiyor
 5() Çok kalabalık oluyor
 6() Tek başıma güvenli gelmiyor
 7() Metroyu çok iyi tanımıyorum
 8() Temiz değil
 9() Modern değil
 10() Yol üstünde uğramam gereken başka yerler var;

Bu duraklarınız nerelerdir? [X-138]

- 11() Buraya metro gitmiyor.
 Diğer, belirtiniz:

DIĞER DIŐARI ÇIKMA NEDENLERİ

33. Düzenli ya da zaman zaman evden çıkmanızı gerektiren başka işleriniz var mı? [X-139]

- 1() Hayır , yok
 2() Evet, var

**a) Bu işleriniz nelerdir?
 b) Buralara nasıl gidiyorsunuz?**

	Bu işleriniz nelerdir?	Buralara nasıl gidiyorsunuz?					
		Metro	Yürüme	Servis	Dolmuş, otobüs	Taksi	Ailemden biri bırakıyor
X140()	Çocukları okula, kreşe ya da başka herhangi bir yere bırakmak	1()	2()	3()	4()	5()	6()
X141()	Bakılması zorunlu olan bir kişiyi ziyaret etmek	1()	2()	3()	4()	5()	6()
X142()	Kendi okuluma / kursuma vs gitmek	1()	2()	3()	4()	5()	6()
X143()	İşimli ilgili diğer işleri yapmak	1()	2()	3()	4()	5()	6()
X144()	Hastane vb yerlere gitmek	1()	2()	3()	4()	5()	6()
X145()	Market / Pazar alışverişi yapmak	1()	2()	3()	4()	5()	6()
X146()	Banka/ fatura/vergi gibi ödemeleri yapmak	1()	2()	3()	4()	5()	6()
X147()	Diğer, belirtiniz:..... [X148]	1()	2()	3()	4()	5()	6()
X149()	Diğer, belirtiniz:..... [X150]	1()	2()	3()	4()	5()	6()

34. (Anketör dikkat, yukarıda işaretli yerler arasında metroyla gidilmeyenler varsa bu soruyu yöneltiniz) Bu yerlere (isim veriniz) neden metroyla gitmiyorsunuz? [X-151]

- 1() Yürüme mesafesindeki yerlere gidiyorum
 2() Ücretsiz servisle gidip geliyorum
 3() Maliyeti fazla geliyor
 4() Aktarma yapmam gerekiyor
 5() Çok kalabalık oluyor
 6() Tek başıma güvenli gelmiyor
 7() Metroyu çok iyi tanımıyorum
 8() Temiz değil

9() Modern değil

10()Yol üstünde uğramam gereken başka yerler var; **Bu duraklarımız nerelerdir? [X-152]**

11() Buraya metro gitmiyor.

Diğer, **belirtiniz:**

DEĞERLENDİRME SORULARI

35. Metroyla ilgili size okuyacağım cümleleri değerlendiriniz; sizce bu cümlelerden hangileri doğru hangileri yanlış?

		Doğru	Yanlış
X153	Gündüz metroda kendimi güvende hissetmiyorum	1()	2()
X154	Hava karardıktan sonra metroda kendimi güvende hissetmiyorum	1()	2()
X155	Gündüz metro duraklarında beklerken kendimi güvende hissetmiyorum	1()	2()
X156	Hava karardıktan sonra metro duraklarında beklerken kendimi güvende hissetmiyorum	1()	2()
X157	Gündüz metroya giderken kendimi güvende hissetmiyorum	1()	2()
X158	Hava karardıktan sonra metroya giderken kendimi güvende hissetmiyorum	1()	2()
X159	Boş vagona tek kalmaktan rahatsız oluyorum	1()	2()
X160	Tek başımayken metroya binmek istemiyorum	1()	2()
X161	Yerin altında ve kapalı olması nedeniyle rahatsız oluyorum	1()	2()
X162	Metroya yönelik terörist saldırılardan korkuyorum	1()	2()
GİRİŞ KONTROL DEĞİŞKENİ (X-163: 6565)			
X164	Taciz ve şiddet olaylarından korkuyorum	1()	2()
X165	Eşim, babam vs. izin vermediği için kullanamıyorum	1()	2()
X166	Şoförü göremediğim için metronun duraklarda durmamasından yada durağı kaçırmaktan çekiniyorum	1()	2()
X167	Kapılar otomatik olduğundan ve şoför görünmediği için kapının üstüne kapanmasından çekiniyorum	1()	2()
X168	Vagonlarda güvenlik kamerası olmaması bende güvensizlik hissi yaratıyor	1()	2()
X169	Metronun geliş gidiş saatlerine güvenemiyorum	1()	2()
X170	Çok kalabalık oluyor	1()	2()
X171	Temiz olmuyor	1()	2()
X172	Diğer toplu taşıma araçları güzergahıma daha uygun	1()	2()
X173	Gideceğim yerleri yaya mesafesi içinde seçiyorum	1()	2()
GİRİŞ KONTROL DEĞİŞKENİ (X-174: 6565)			
X175	Yolculuğum süresince uğramak zorunda olduğum ve metro güzergahı dışında duraklarım var, aktarma yapmam gerekiyor	1()	2()
X176	Yolculuğumu çocuklarla beraber yaptığım için metroya binmek uygun olmuyor	1()	2()
X177	Yolculuğum sırasında alışveriş yapacağım zaman elimde poşetlerle/yükle metroya binmek beni rahatsız ediyor	1()	2()
X178	Metro çok pahalı bir ulaşım aracı	1()	2()

X179	Metro yolculuk süresini uzatıyor	1 ()	2 ()
X180	Metroyu çok iyi tanımıyorum, nerelere gittiğini bilmiyorum, duraklarını bilmiyorum	1 ()	2 ()
X181	Metro kartı alma işlemleri çok uzun ve zor geliyor	1 ()	2 ()
X182	Metroya ilişkin başka olumsuz düşüncelerim var	1 ()	2 ()

36. Size sayacağım araçlardan en güvenli bulduğunuz ilk üçü hangileridir?

Ulaşım Araçları	En güvenlisi [X183]	İkinci en güvenlisi [X184]	Üçüncü en güvenlisi [X185]
Metro	1 ()	1 ()	1 ()
Dolmuş	2 ()	2 ()	2 ()
Otobüs	3 ()	3 ()	3 ()
Otomobil	4 ()	4 ()	4 ()
Taksi	5 ()	5 ()	5 ()
Yürüme	6 ()	6 ()	6 ()

Görüşülen kişinin adı, soyadı:

Görüşülen Kişinin Ev Adresi:

Mahalle [X-186]:

Sokak:

Daire kat no:

Cadde:

Apartman ve kapı no:

Görüşülen Kişinin Telefon İletişim Bilgileri [X-187]:

Ev Tel:

İş Tel:.....

Cep

Tel:.....

Anketör Ad, Soyad [X-188]:

Anketör notu:

APPENDIX 2

RAYLI SİSTEM YATIRIMLARININ ANKARA'DAKİ KADINLARIN KENTSEL MEKANDAKİ HAREKETLİLİKLERİNE ETKİLERİ ÜZERİNE BİR ÇALIŞMA

BAHAR ERKOPAN ESER
Y. Şehir Plancısı
Orta Doğu Teknik Üniversitesi
Mimarlık Fakültesi, Şehir ve Bölge Planlama Bölümü

Merhaba benim adım ODTÜ Şehir Bölge ve Planlama Bölümü'nden bir doktora öğrencisinin tez çalışması için Veri Araştırma adına araştırma yapıyoruz. Araştırmanın konusu kadınların kent içindeki yolculuklarıyla ilgili. Araştırma sonucunda edineceğimiz bilgiler tamamen bilimsel amaçlıdır, vereceğiniz bilgilerin başka hiçbir yerde kullanılmayacağını temin ederiz. Vakit ayırabilerseniz size bazı sorularımız olacak.

KEÇİÖREN METROSU HATTI

Görüşülen kişinin cinsiyeti: (x) Kadın () Erkek

Doğum tarihiniz: (x) 1993 ve öncesinde doğanlar () 1994 ve sonrasında doğanlar

İşe, alışverişe, gezmeye vs giderken kullandığınız özel aracınız, otomobiliniz var mı?
() Evet (x) Hayır-----→ Ankete başlayınız.

DEMOGRAFİK BİLGİLER

37. Evli misiniz? [X-2]1() Evet 2() Hayır

38. Çocuğunuz var mı? [X-3] 1() Hayır 2() Evet-----→ Kaç çocuğunuz var? [X-4]

39. Hanenizde toplam kaç kişi yaşıyor? [X-5]

40. Hanenizdeki kişilerin hane içindeki konum, cinsiyet ve doğum tarihlerini söyler misiniz?

		Hanehalkı reisine göre konumu*	Cinsiyeti 1: Kadın, 2: Erkek	Doğum tarihi
[X-6/ X-8]	1. Kişi	Hane reisi (1)	1() 2()	
[X-9 / X-11]	2. Kişi	()	1() 2()	
[X-12/X-14]	3. Kişi	()	1() 2()	
[X-15/X-17]	4. Kişi	()	1() 2()	
[X-18/X-20]	5. Kişi	()	1() 2()	
[X-21/X-23]	6. Kişi	()	1() 2()	
[X-24/X-26]	7. Kişi	()	1() 2()	
[X-27/X-29]	8. Kişi	()	1() 2()	
[X-30/X-32]	9. Kişi	()	1() 2()	
[X-33/X-35]	10. Kişi	()	1() 2()	

* Hanehalkı reisine göre konum:

1: Hanehalkı reisi 2: Hanehalkı reisinin eşi 3: Hanehalkı reisinin çocuğu
4: Akraba 5: Yakın

[X-36: 6565]

41. Hanenizde çalışanların geliri, kira geliri vs olarak düşündüğünüzde, aylık ortalama ne kadar geliriniz var? [X-37]

1() 0-499 YTL	2() 500-999 YTL	3() 1000-1499 YTL
4() 1500-1999 YTL	5() 2000 YTL ve üzeri	

42. En son hangi okulu bitirdiniz? [X-38]

1() Okuma yazma bilmiyor	2() Okuryazar, bir okul bitirmemiş
3() İlkokul mezunu	4() Ortaokul mezunu
5() Lise mezunu	6() Yüksek Öğretim mezunu

43. Şu an oturduğunuz evde ev sahibi misiniz kiracı mı? [X-39]

- 1 () Kiracıyız----→ Aylık kiranız ne kadar? [X-40].....(YTL)
2 () Evsahibiyiz
3 () Evsahibi değiliz, ama kira ödemiyoruz
4 () Lojmanda kalıyoruz.

44. Kaç yıldır bu mahallede oturuyorsunuz? [X-41]

45. Bu mahalleden önce Ankara'da başka bir mahallede oturdunuz mu? [X-42]

- 1() Hayır
2() Evet -----→ Eski mahallenizin adı? [X-43] (İlçe ve semt adı da isteyiniz).....

46. Hafta içinde günde ortalama kaç kez bir ya da birkaç taşıtla bir yere gidiyorsunuz?

[X-44]

1 () Neredeyse hiç	2 () 1-2 Kez	3 () 3-4 Kez	4 () 5 veya daha fazla
---------------------	---------------	---------------	-------------------------

47. Hafta sonunda günde ortalama kaç kez bir ya da birkaç taşıtla bir yere gidiyorsunuz? [X-45]

1 () Neredeyse hiç 2 () 1-2 Kez 3 () 3-4 Kez 4 () 5 veya daha fazla

48. Dışarı çıktığınızda metro kullanıyor musunuz? [X-46]

1 () Hayır

2 () Evet-----→ Metro olmasa da bu sıklıkta dışarı çıkar mıydınız? [X-47]

1 () Evet 2 () Hayır

49. Şu andaki çalışma konumunuz nedir? [X-48]

1 () Bir işyerinde çalışıyorum ----→ ÇALIŞANLAR BÖLÜMÜNE GEÇİNİZ

2 () Herhangi bir işyerinde çalışmıyorum,

işimi evden yürütüyorum----→ GİYİM ALIŞVERİŞLERİ BÖLÜMÜNE GEÇİNİZ

3 () Çalışmıyorum -----→ Aşağıdaki soruyu yanıtladıktan sonra GİYİM ALIŞVERİŞLERİ BÖLÜMÜNE GEÇİNİZ

Durumunuz aşağıdakilerden hangisine uyuyor? [X-49]

1 () Emekliyim

2 () Evkadımı, ev kızım

3 () Öğrenciyim-----**Okulunuzun adı nedir?[X-50]**

4 () İşsizim, iş arıyorum

[X-51: 6565]

ÇALIŞANLAR

I. GENEL SORULAR

50. Kamu kesiminde mi özel kesimde mi çalışıyorsunuz? [X-52]

1 () Kamu kesiminde---**Nerede? [X-53]**

1 () Merkezi hükümete bağlı bir kurum / kuruluşta

2 () Kamu iktisadi teşekkülü

3 () Üniversite / yüksek okul

4 () Belediye / Belediyeye bağlı bir kuruluş / şirket

() Diğer, **belirtiniz:**

2 () Özel kesimde----**Nerede? [X-54]**

1 () Başkasına ait bir şirkette, işyerinde

2 () Ortağı olduğum / bana ait bir şirkette, işyerinde

51. Çalıştığınız işyerinin temel faaliyet alanı nedir? [X-55]

1 () Tarım

2 () Sanayi

3 () Hizmet

52. Ne iş yapıyorsunuz?[X-56] (Açıklama

isteyiniz):.....

53. (Kişi Ankara merkezde çalışıyorsa) İşyerinizin bulunduğu ilçe ve mahalle ismi? [X-57]

- İlçe** **Mahalle**
- () Altındağ :.....
- () Etimesgut :.....
- () Çankaya. :.....
- () Keçiören :.....
- () Mamak :.....
- () Sincan :.....
- () Yenimahalle:.....
- () Gölbaşı :.....

54. Bütün gün mü yarım gün mü çalışıyorsunuz? [X-58]

- 1 () Bütün gün
- 2 () Yarım gün
- 3 () Haftanın belli günleri ---→Hangi günler? [X-59].....
- () Diğer, belirtiniz:.....

55. İşe nasıl gidip geliyorsunuz? [X-60] (Birden fazla yanıt alabilirsiniz)

- 1 () Yürüyerek ulaşıyorum
- 2 () Servisle gidiyorum
- 3 () Dolmuş veya otobüsle gidiyorum
- 4 () Taksiyle gidiyorum
- 5 () Bir aile üyesi araba ile bırakıyor
- 6 () Metro ile gidiyorum
- 7 () Ankaray ile gidiyorum
- () Diğer, belirtiniz:

[X-61: 6565]

GIYİM ALIŞVERİŞLERİ

56. Giyim alışverişlerinizi genelde hangi zamanlarda yapıyorsunuz? [X-62]

- 1 () Hafta içi gündüz 2 () Hafta içi akşam
- 3 () Hafta sonu gündüz 4 () Hafta sonu akşam

57. a) Giyim alışverişi için aşağıda belirtilen hangi alışveriş merkezlerine gidiyorsunuz? (Anketör dikkat: Alışveriş merkezi listesini görüştüğünüz kişiye veriniz)

b) Bu alışveriş merkezlerine nasıl gidiyorsunuz? (Birden fazla yanıt alabilirsiniz)

			Bu yerlere nasıl gidiyorsunuz?					
			Metro	Yürüme	Servis	Dolmuş, otobüs	Taksi	Ailemden biri bırakıyor
X63 ()	Ankamall	Akköprü	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X64 ()	Millenium Outlet Center	İstanbul Yolu	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X65 ()	Optimum Outlet Center	Eryaman	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()

X66 ()	Real-Ankuva	Bilkent	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X67 ()	Armada	Söğütözü	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X68 ()	Atakule	Çankaya	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X69 ()	Karum	Çankaya	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X70 ()	Carrefour	Batıkent	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X71 ()	Mesa Plaza	Çayyolu	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X72 ()	Arcadium	Çayyolu	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
GİRİŞ KONTROL DEĞİŞKENİ (X-73: 6565)								
X74 ()	Beğendik	Kocatepe	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X75 ()	Diğer mağazalar	İvedik	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X76 ()	Diğer mağazalar	Yenimahalle	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X77 ()	Diğer mağazalar	Demetevler	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X78 ()	Diğer mağazalar	Ulus	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X79 ()	Diğer mağazalar	Batıkent	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X80 ()	Diğer mağazalar	Tunalı Hilmi Caddesi ve civarı	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X81 ()	Diğer mağazalar	Bahçelievler / Emek ve civarı	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X82 ()	Diğer mağazalar	Kızılay	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()
X83 ()	Diğer mağazalar	Sihhiye	1 ()	2 ()	3 ()	4 ()	5 ()	6 ()

[X-84: 6565]

GEZİ EĞLENCE AMAÇLI YOLCULUKLAR

58. Arkadaş ziyareti/ gün için genelde hangi yakınlıktaki mahallelere gidiyorsunuz?[X-85]

- 1 () Oturduğum mahalle içindeki yerlere gidiyorum
- 2 () Yürüme mesafesindeki komşu mahallelere gidiyorum
- 3 () Taşıtla uzak bir mahalleye gidiyorum.
- 4 () Arkadaş ziyaretine / güne gitmiyorum.

59. Gezmek eğlenmek için en çok ne zaman dışarı çıkıyorsunuz? [X-86]

1() Hafta içi gündüz	2() Hafta içi akşam
3() Hafta sonu gündüz	4() Hafta sonu akşam

60. a) Gezmek, eğlenmek için genelde nerelere gidiyorsunuz? (Anketör dikkat: Gezi eğlence yerleri listesini gördüğünüz kişiye veriniz)**b) Bu yerlere nasıl gidiyorsunuz?**

Gezmek eğlenmek için nerelere gidiyorsunuz?		Bu yerlere nasıl gidiyorsunuz?						
Adı	Yeri	Metro	Yürüme	Servis	Dolmuş, otobüs	Taksi	Ailemden biri bırakıyor	
X87 ()	Ankamall	Akköprü	1()	2()	3()	4()	5()	6()
X88 ()	Millenium Outlet Center	İstanbul Yolu	1()	2()	3()	4()	5()	6()
X89 ()	Optimum Outlet Center	Eryaman	1()	2()	3()	4()	5()	6()
X90 ()	Carrefour	Batıkent	1()	2()	3()	4()	5()	6()
X91 ()	Real-Ankuva	Bilkent	1()	2()	3()	4()	5()	6()
X92 ()	Armada	Söğütözü	1()	2()	3()	4()	5()	6()
X93 ()	Atakule	Çankaya	1()	2()	3()	4()	5()	6()
X94 ()	Karum	Çankaya	1()	2()	3()	4()	5()	6()
X95 ()	Mesa Plaza	Çayyolu	1()	2()	3()	4()	5()	6()
X96 ()	Arcadium	Çayyolu	1()	2()	3()	4()	5()	6()
GİRİŞ KONTROL DEĞİŞKENİ (X-97: 6565)								
X98 ()	Beğendik	Kocatepe	1()	2()	3()	4()	5()	6()
X99 ()	Göksu Parkı	Eryaman	1()	2()	3()	4()	5()	6()
X100 ()	Harikalar Diyarı	Sincan	1()	2()	3()	4()	5()	6()
X101 ()	Mogan Gölü	Gölbaşı	1()	2()	3()	4()	5()	6()
X102 ()	Altınpark	Aydınlıkevler	1()	2()	3()	4()	5()	6()
X103 ()	AOÇ		1()	2()	3()	4()	5()	6()
X104 ()	Kurtuluş Parkı		1()	2()	3()	4()	5()	6()
X105 ()	Botanik Parkı	Çankaya	1()	2()	3()	4()	5()	6()
X106 ()	Seğmenler Parkı	Çankaya	1()	2()	3()	4()	5()	6()
X107 ()	Abdi İpekçi Parkı	Sıhhiye	1()	2()	3()	4()	5()	6()
GİRİŞ KONTROL DEĞİŞKENİ (X-108: 6565)								
X109 ()	Atatürk Kültür Merkezi	Hipodrom	1()	2()	3()	4()	5()	6()
X110 ()	Gençlik Parkı	Ulus	1()	2()	3()	4()	5()	6()
X111 ()	Çankaya Bel. Dinlenme ve Spor Tesisleri	Ahlatlıbel	1()	2()	3()	4()	5()	6()
X112 ()	Dikmen Vadisi	Dikmen	1()	2()	3()	4()	5()	6()
X113 ()	Diğer	İvedik	1()	2()	3()	4()	5()	6()
X114 ()	Diğer	Yenimahalle	1()	2()	3()	4()	5()	6()
X115 ()	Diğer	Demetevler	1()	2()	3()	4()	5()	6()
X116 ()	Diğer	Ulus	1()	2()	3()	4()	5()	6()
X117 ()	Diğer	Batıkent	1()	2()	3()	4()	5()	6()
X118 ()	Diğer	Tunalı Hilmi Caddesi	1()	2()	3()	4()	5()	6()
X119 ()	Diğer	Bahçelievler	1()	2()	3()	4()	5()	6()

	Gezmek eğlenmek için nerelere gidiyorsunuz?		Bu yerlere nasıl gidiyorsunuz?					
	Adı	Yeri	Metro	Yürüme	Servis	Dolmuş, otobüs	Taksi	Ailemden biri bırakıyor
X120 ()	Diğer	Kızılay	1()	2()	3()	4()	5()	6()
X121 ()	Diğer	Sıhhiye	1()	2()	3()	4()	5()	6()

DİĞER DIŞARI ÇIKMA NEDENLERİ

61. Düzenli ya da zaman zaman evden çıkmanızı gerektiren başka işleriniz var mı? [X-122]

1 () Hayır , yok

2 () Evet, var --→ a) Bu işleriniz nelerdir?

b) Buralara nasıl gidiyorsunuz?

	Bu işleriniz nelerdir?	Buralara nasıl gidiyorsunuz?					
		Metro	Yürüme	Servis	Dolmuş, otobüs	Taksi	Ailemden biri bırakıyor
X123 ()	Çocukları okula, kreşe ya da başka herhangi bir yere bırakmak	1()	2()	3()	4()	5()	6()
X124 ()	Bakılması zorunlu olan bir kişiyi ziyaret etmek	1()	2()	3()	4()	5()	6()
X125 ()	Kendi okuluma / kursuma vs gitmek	1()	2()	3()	4()	5()	6()
X126 ()	İşimli ilgili diğer işleri yapmak	1()	2()	3()	4()	5()	6()
X127 ()	Hastane vb yerlere gitmek	1()	2()	3()	4()	5()	6()
X128 ()	Market / Pazar alışverişi yapmak	1()	2()	3()	4()	5()	6()
X129 ()	Banka/ fatura/vergi gibi ödemeleri yapmak	1()	2()	3()	4()	5()	6()
X130 ()	Diğer, belirtiniz:..... [X131]	1()	2()	3()	4()	5()	6()
X132 ()	Diğer, belirtiniz:..... [X133]	1()	2()	3()	4()	5()	6()

[X-134: 6565]

62. (Anketör dikkat, yukarıda işaretli yerler arasında metroyla gidilmeyenler varsa bu soruyu yöneltiniz) Bu yerlere (isim veriniz) neden metroyla gitmiyorsunuz? [X-135]
(Birden fazla yanıt alabilirsiniz)

1 () Yürüme mesafesindeki yerlere gidiyorum

2 () Ücretsiz servisle gidip geliyorum

3 () Maliyeti fazla geliyor

4 () Aktarma yapmam gerekiyor

5 () Çok kalabalık oluyor

6 () Tek başıma güvenli gelmiyor

7 () Metroyu çok iyi tanımıyorum

8 () Temiz değil

9 () Modern değil

10 () Yol üstünde uğramam gereken başka yerler var; **Bu duraklarınız nerelerdir? [X-136]**

11 () Buraya metro gitmiyor.

Diğer, belirtiniz:

DEĞERLENDİRME SORULARI

63. Metroyla ilgili size okuyacağım cümleleri değerlendiriniz; sizce bu cümlelerden hangileri doğru hangileri yanlış?

		Doğru	Yanlış
X137	Gündüz metroda kendimi güvende hissetmiyorum	1()	2()
X138	Hava karardıktan sonra metroda kendimi güvende hissetmiyorum	1()	2()
X139	Gündüz metro duraklarında beklerken kendimi güvende hissetmiyorum	1()	2()
X140	Hava karardıktan sonra metro duraklarında beklerken kendimi güvende hissetmiyorum	1()	2()
X141	Gündüz metroya giderken kendimi güvende hissetmiyorum	1()	2()
X142	Hava karardıktan sonra metroya giderken kendimi güvende hissetmiyorum	1()	2()
X143	Boş vagona tek kalmaktan rahatsız oluyorum	1()	2()
X144	Tek başımayken metroya binmek istemiyorum	1()	2()
X145	Yerin altında ve kapalı olması nedeniyle rahatsız oluyorum	1()	2()
X146	Metroya yönelik terörist saldırılardan korkuyorum	1()	2()
GİRİŞ KONTROL DEĞİŞKENİ (X-147: 6565)			
X148	Taciz ve şiddet olaylarından korkuyorum	1()	2()
X149	Eşim, babam vs. izin vermediği için kullanamıyorum	1()	2()
X150	Şoförü göremediğim için metronun duraklarda durmamasından yada durağı kaçırmaktan çekiniyorum	1()	2()
X151	Kapılar otomatik olduğundan ve şoför görünmediği için kapının üstüme kapanmasından çekiniyorum	1()	2()
X152	Vagonlarda güvenlik kamerası olmaması bende güvensizlik hissi yaratıyor	1()	2()
X153	Metronun geliş gidiş saatlerine güvenemiyorum	1()	2()
X154	Çok kalabalık oluyor	1()	2()
X155	Temiz olmuyor	1()	2()
X156	Diğer toplu taşıma araçları güzergahıma daha uygun	1()	2()
X157	Gideceğim yerleri yaya mesafesi içinde seçiyorum	1()	2()
GİRİŞ KONTROL DEĞİŞKENİ (X-158: 6565)			
X159	Yolculuğum süresince uğramak zorunda olduğum ve metro güzergahı dışında duraklarım var, aktarma yapmam gerekiyor	1()	2()
X160	Yolculuğumu çocuklarla beraber yaptığım için metroya binmek uygun olmuyor	1()	2()
X161	Yolculuğum sırasında alışveriş yapacağım zaman elimde poşetlerle/yükle metroya binmek beni rahatsız ediyor	1()	2()
X162	Metro çok pahalı bir ulaşım aracı	1()	2()
X163	Metro yolculuk süresini uzatıyor	1()	2()
X164	Metroyu çok iyi tanımıyorum, nerelere gittiğini bilmiyorum, duraklarını bilmiyorum	1()	2()
X165	Metro kartı alma işlemleri çok uzun ve zor geliyor	1()	2()
X166	Metroya ilişkin başka olumsuz düşüncelerim var	1()	2()

64. Size sayacağım araçlardan en güvenli bulduğunuz ilk üçü hangileridir?

Ulaşım Araçları	En güvenlisi [X167]	İkinci en güvenlisi [X168]	Üçüncü en güvenlisi [X169]
Metro	1 ()	1 ()	1 ()
Dolmuş	2 ()	2 ()	2 ()
Otobüs	3 ()	3 ()	3 ()
Otomobil	4 ()	4 ()	4 ()
Taksi	5 ()	5 ()	5 ()
Yürüme	6 ()	6 ()	6 ()

Görüşülen kişinin adı, soyadı:

Görüşülen Kişinin Ev Adresi:

Mahalle [X-170]:

Sokak:

Daire kat no:

Cadde:

Apartman ve kapı no:

Görüşülen Kişinin Telefon İletişim Bilgileri [X-171]:

Ev Tel:

İş Tel:.....

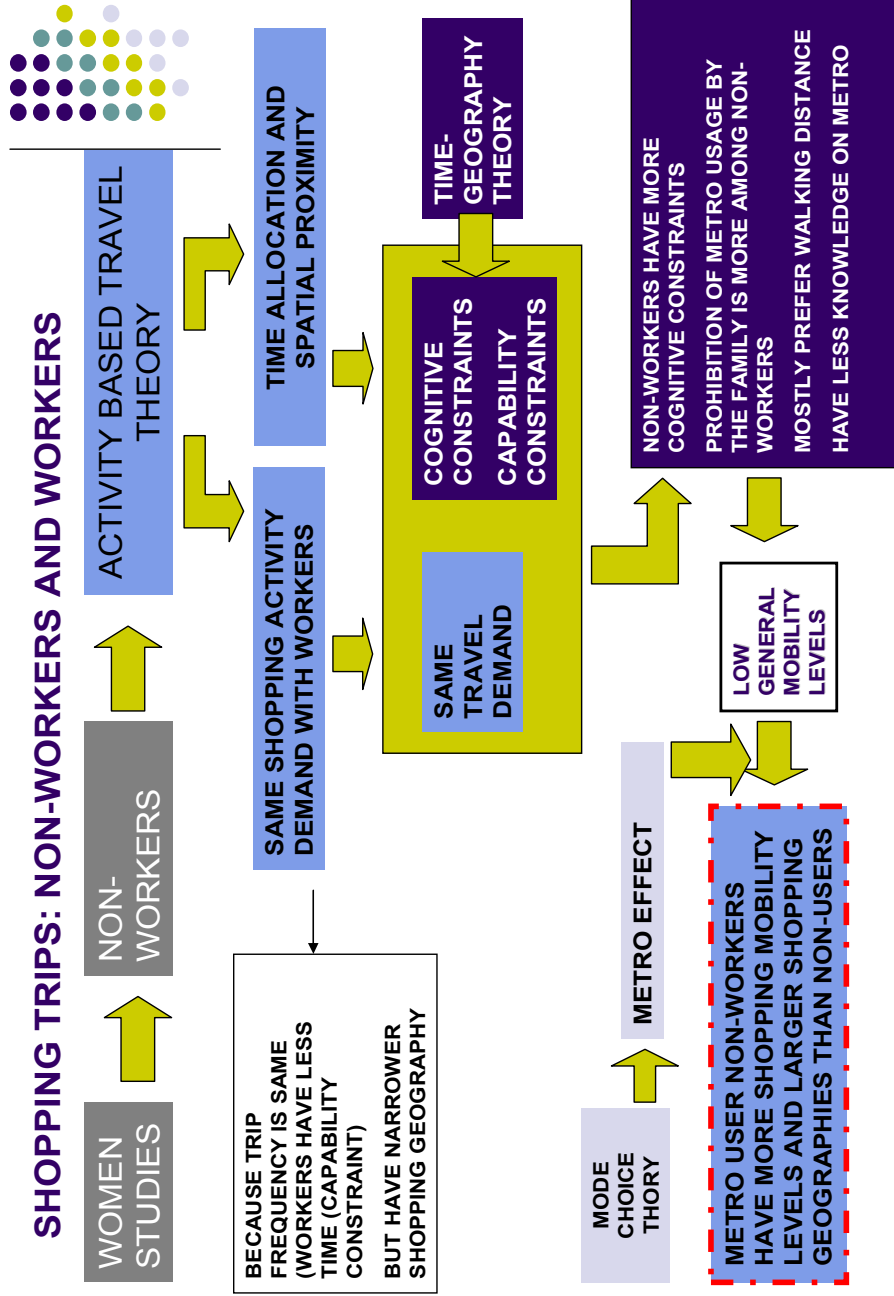
Cep

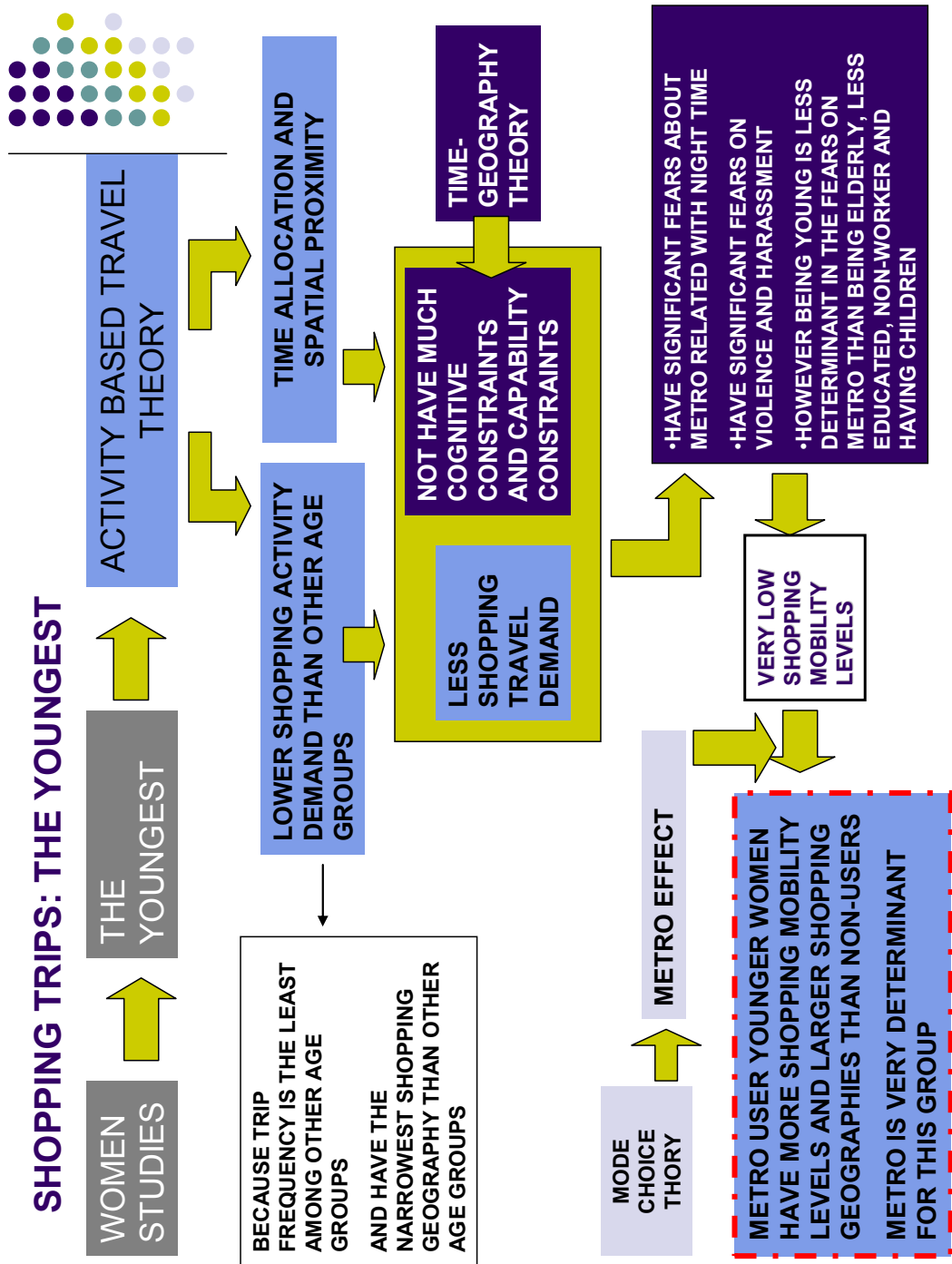
Tel:.....

Anketör Ad, Soyad [X-172]:

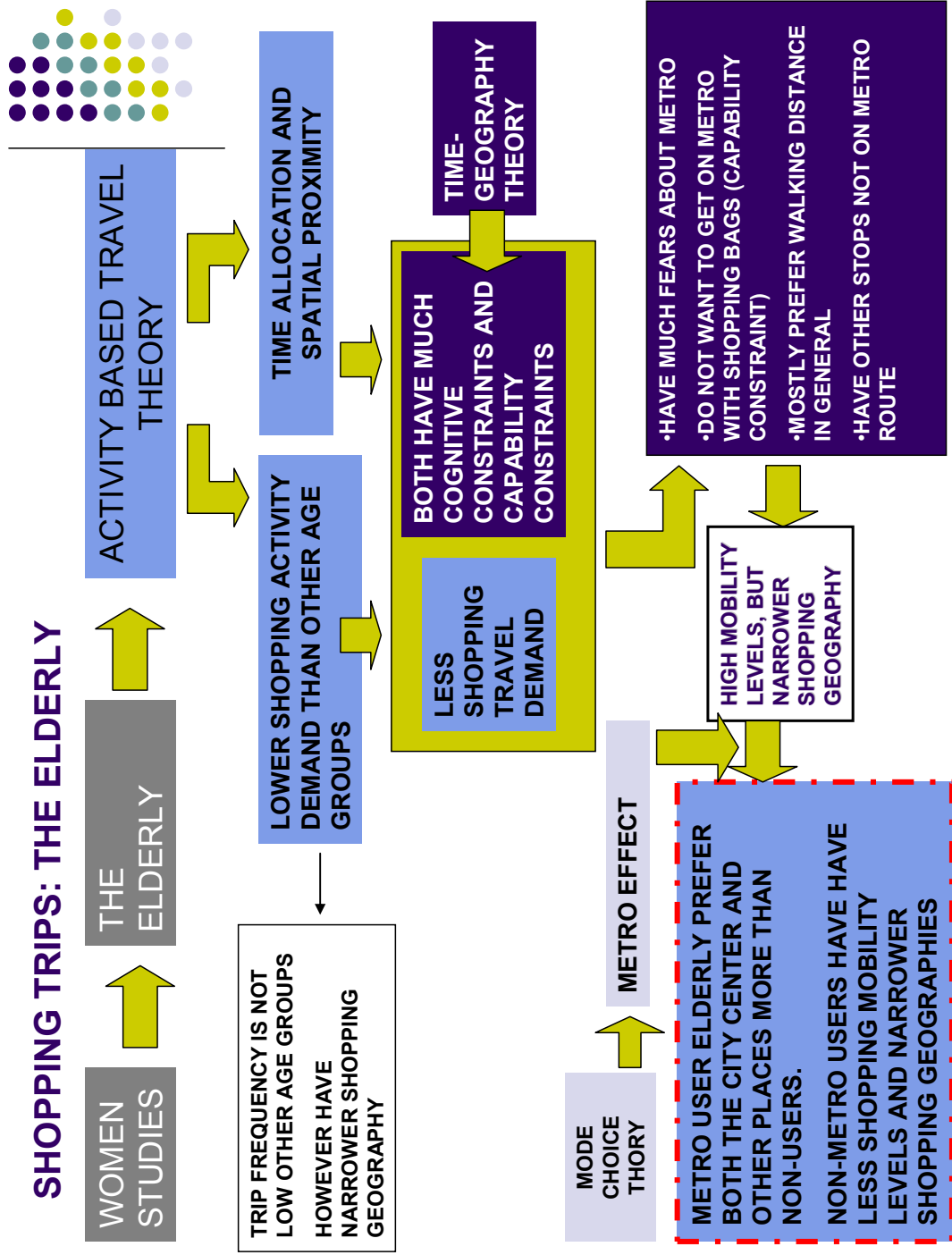
Anketör notu:

APPENDIX 3

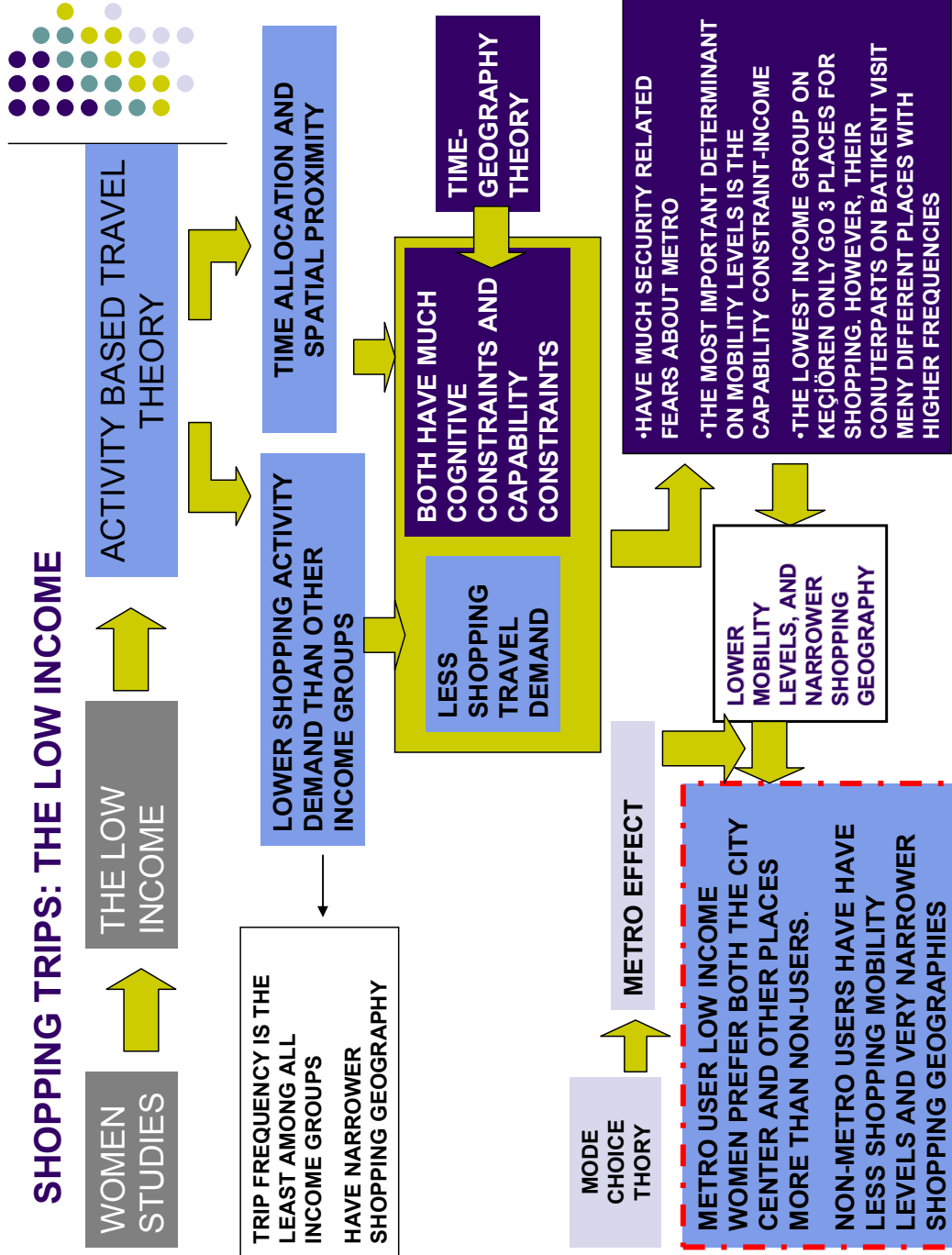




SHOPPING TRIPS: THE ELDERLY

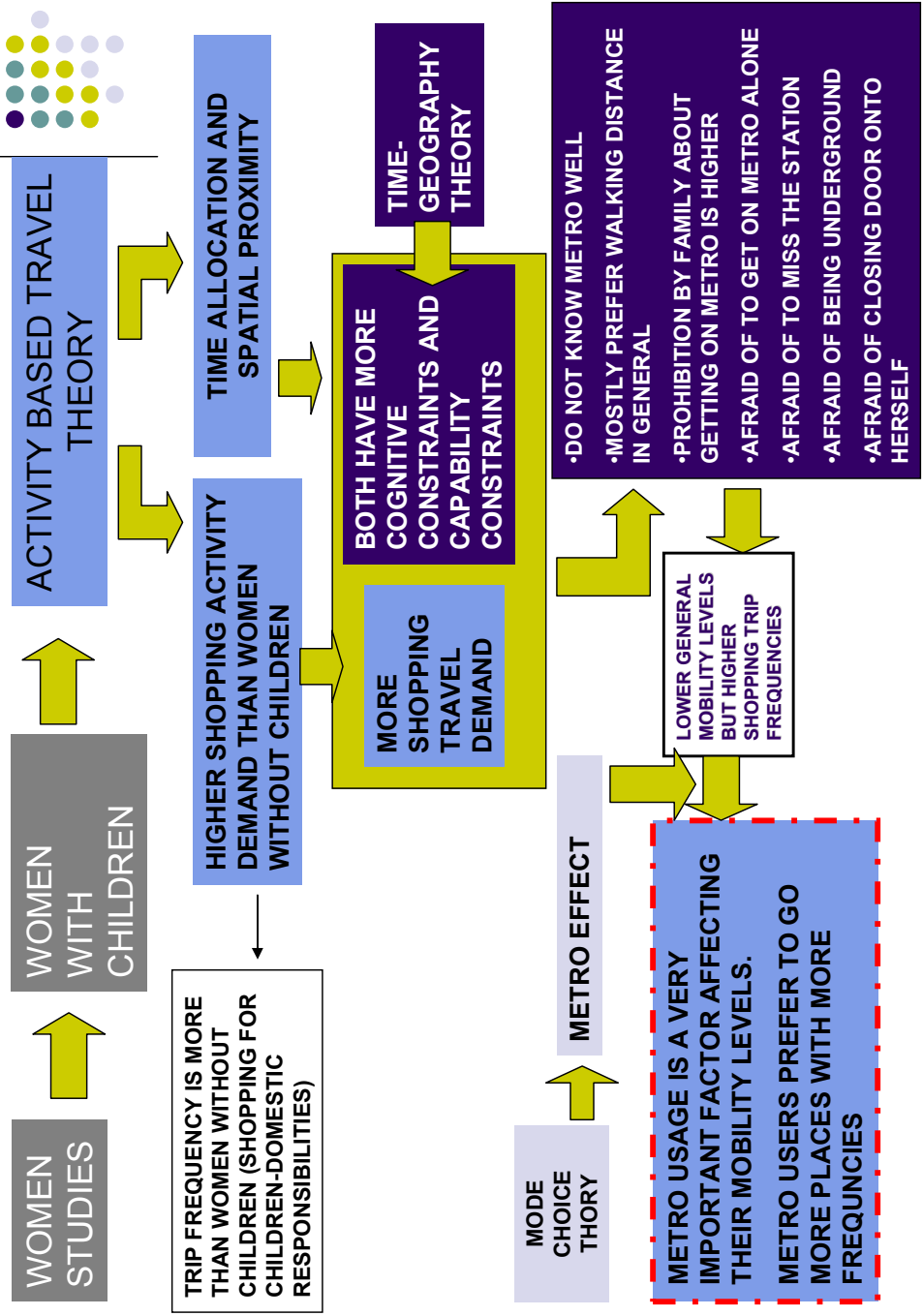


SHOPPING TRIPS: THE LOW INCOME



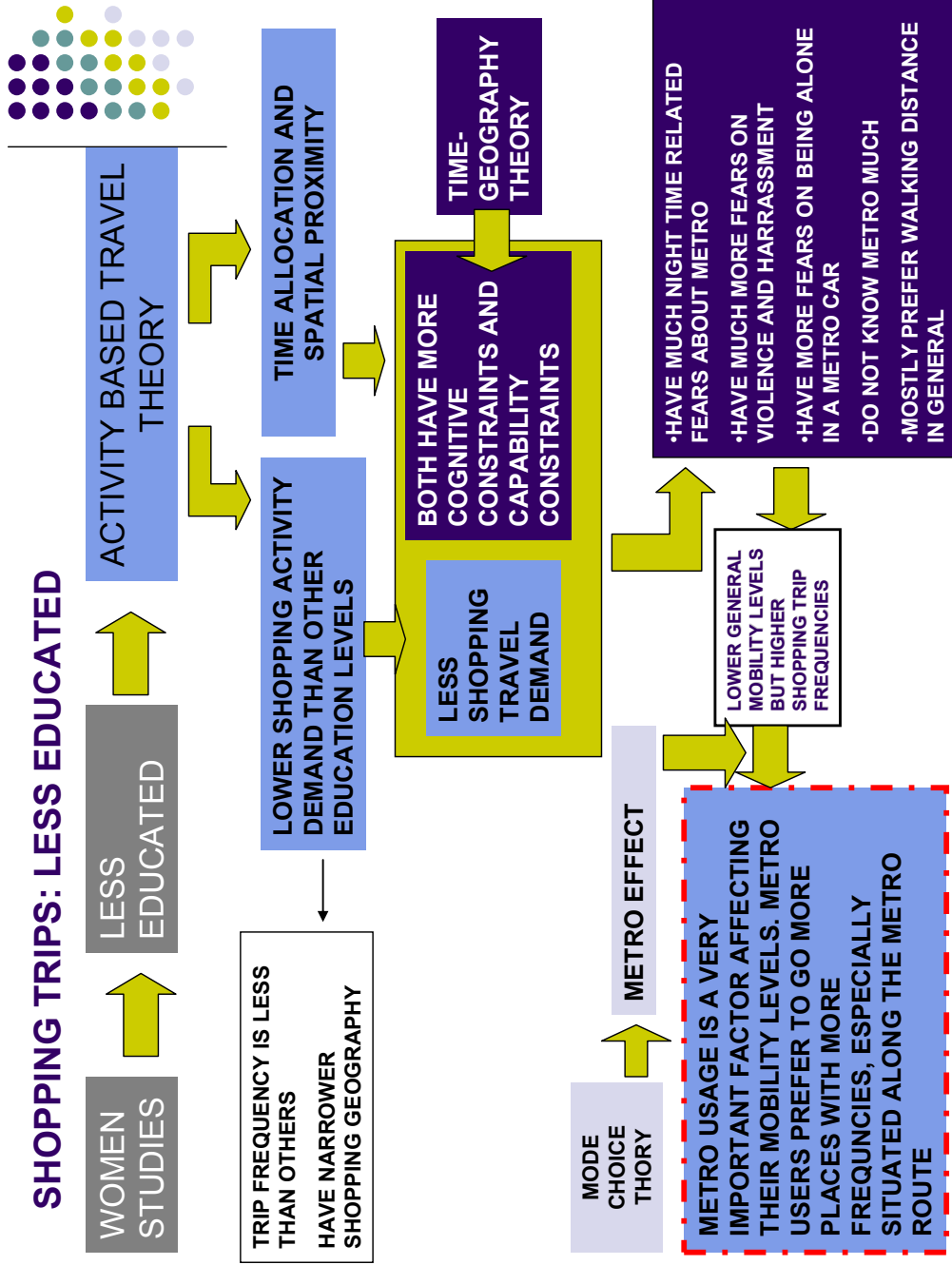


SHOPPING TRIPS: WOMEN WITH CHILDREN



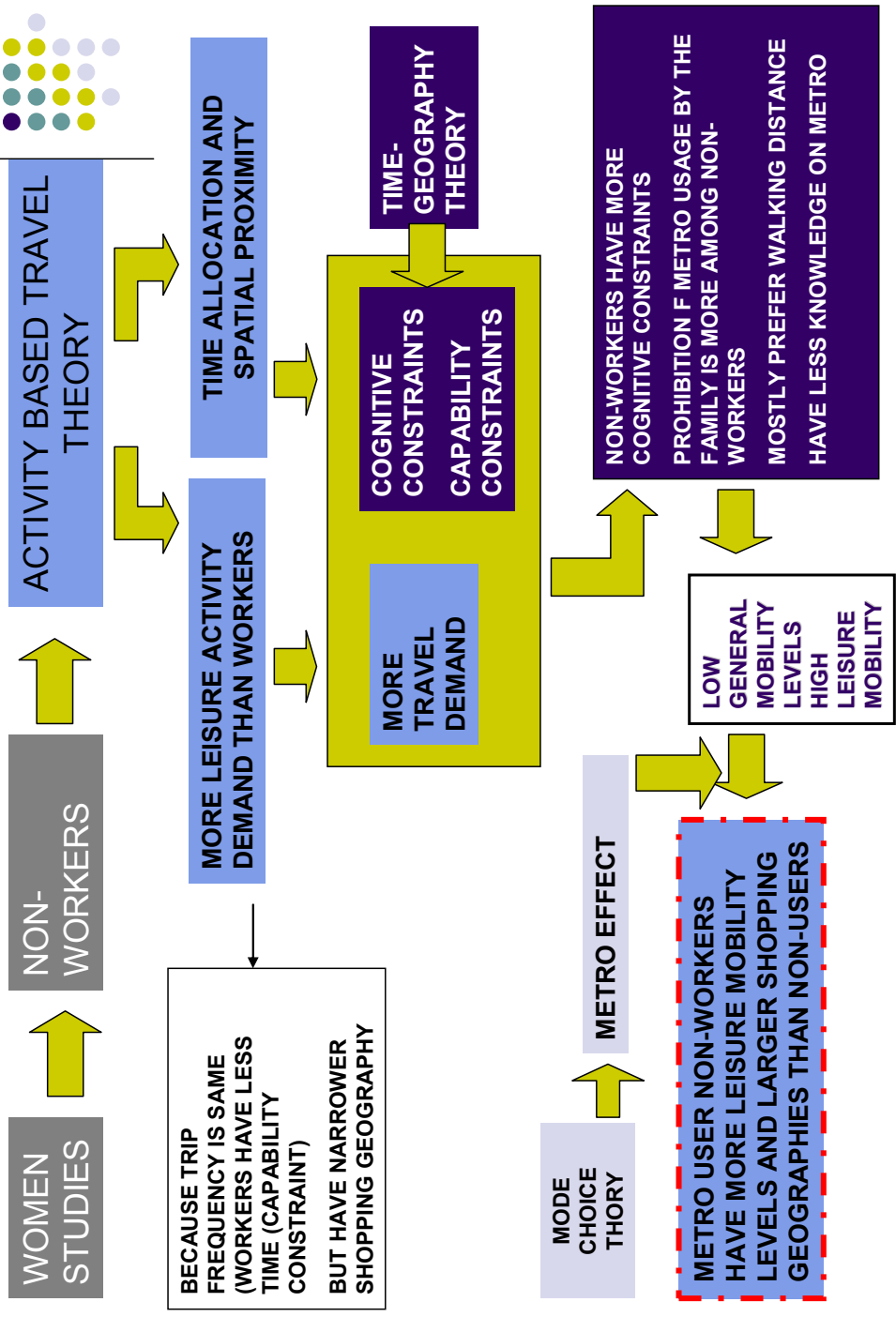
- DO NOT KNOW METRO WELL
- MOSTLY PREFER WALKING DISTANCE IN GENERAL
- PROHIBITION BY FAMILY ABOUT GETTING ON METRO IS HIGHER
- AFRAID OF TO GET ON METRO ALONE
- AFRAID OF TO MISS THE STATION
- AFRAID OF BEING UNDERGROUND
- AFRAID OF CLOSING DOOR ONTO HERSELF

SHOPPING TRIPS: LESS EDUCATED

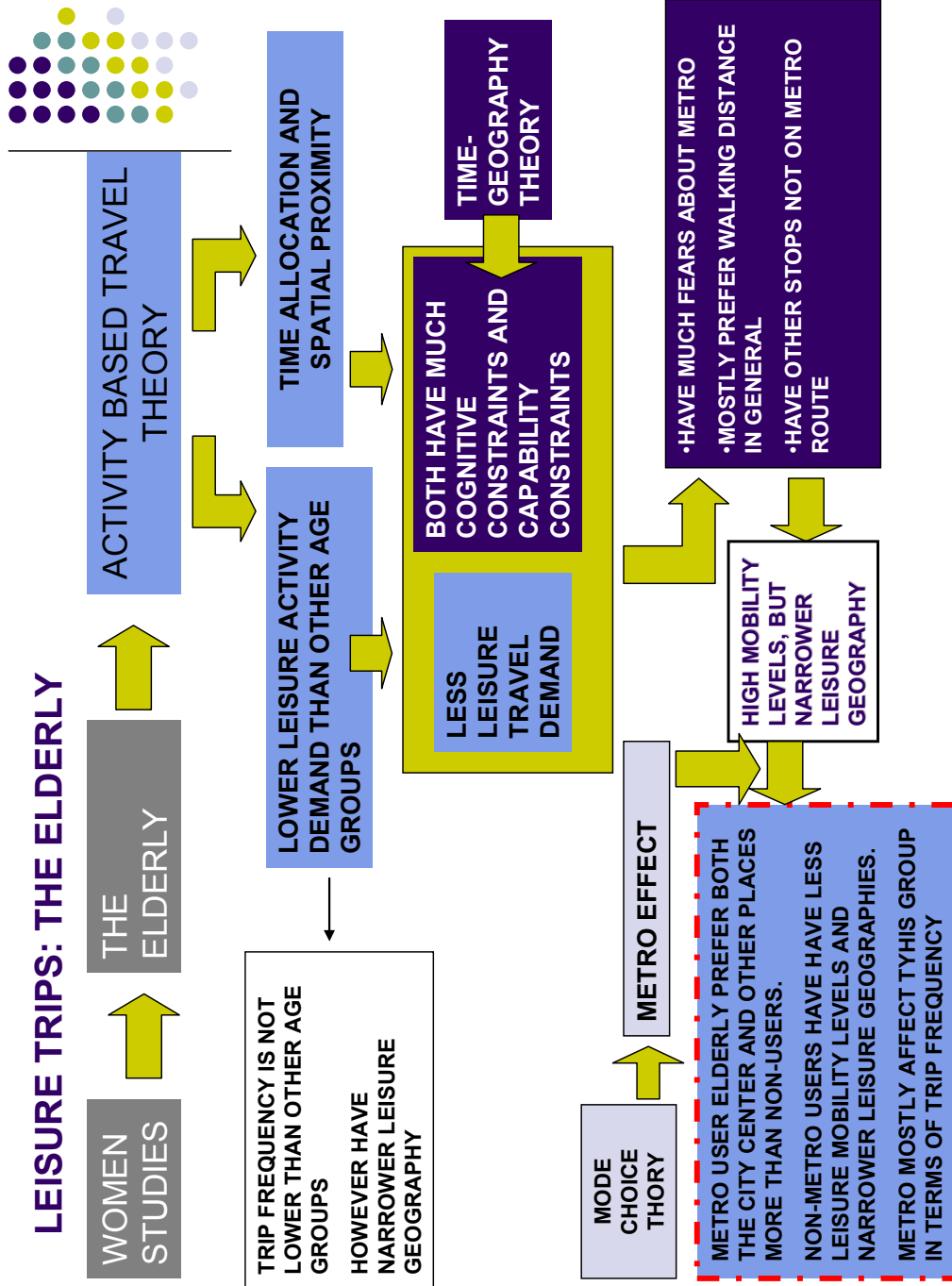


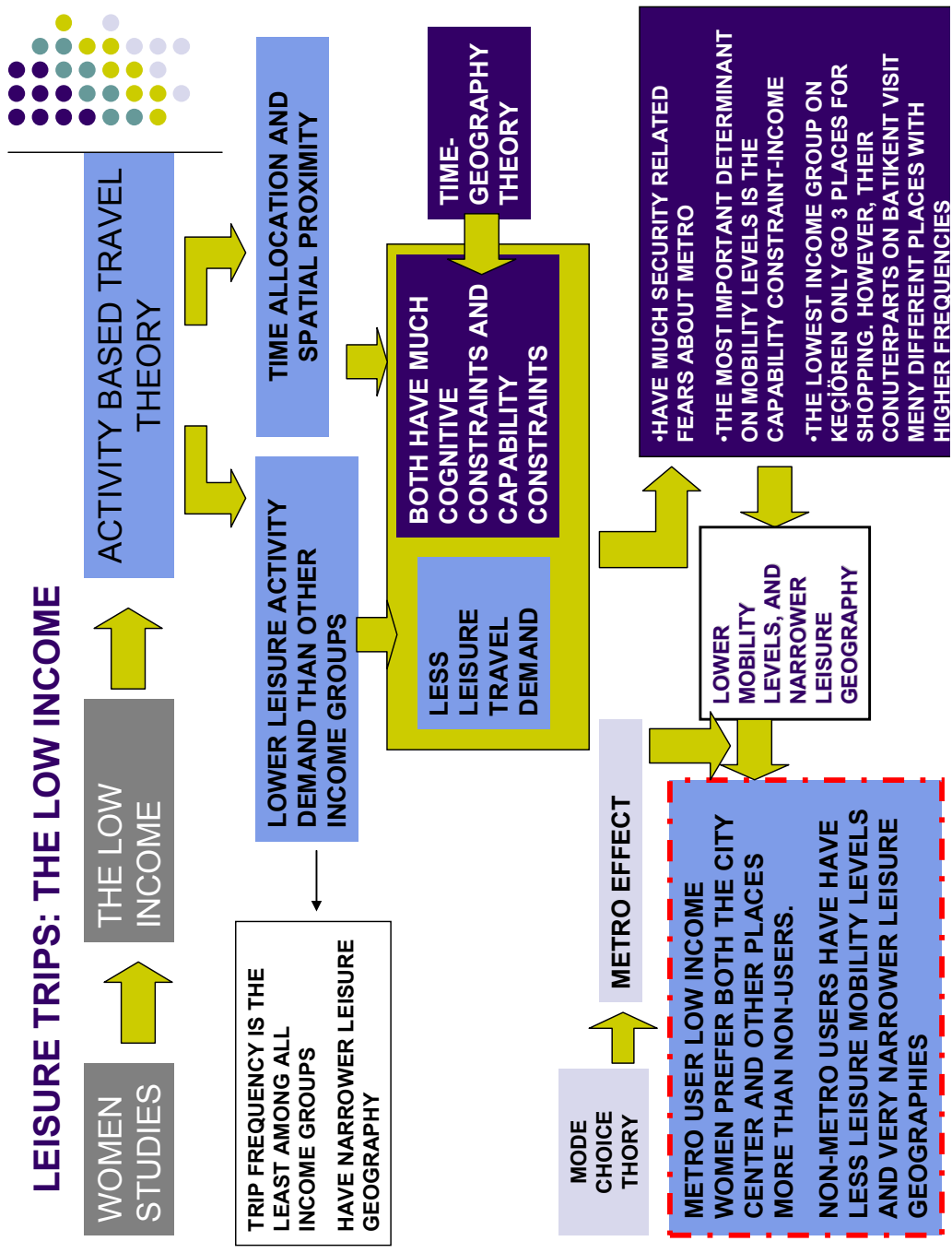


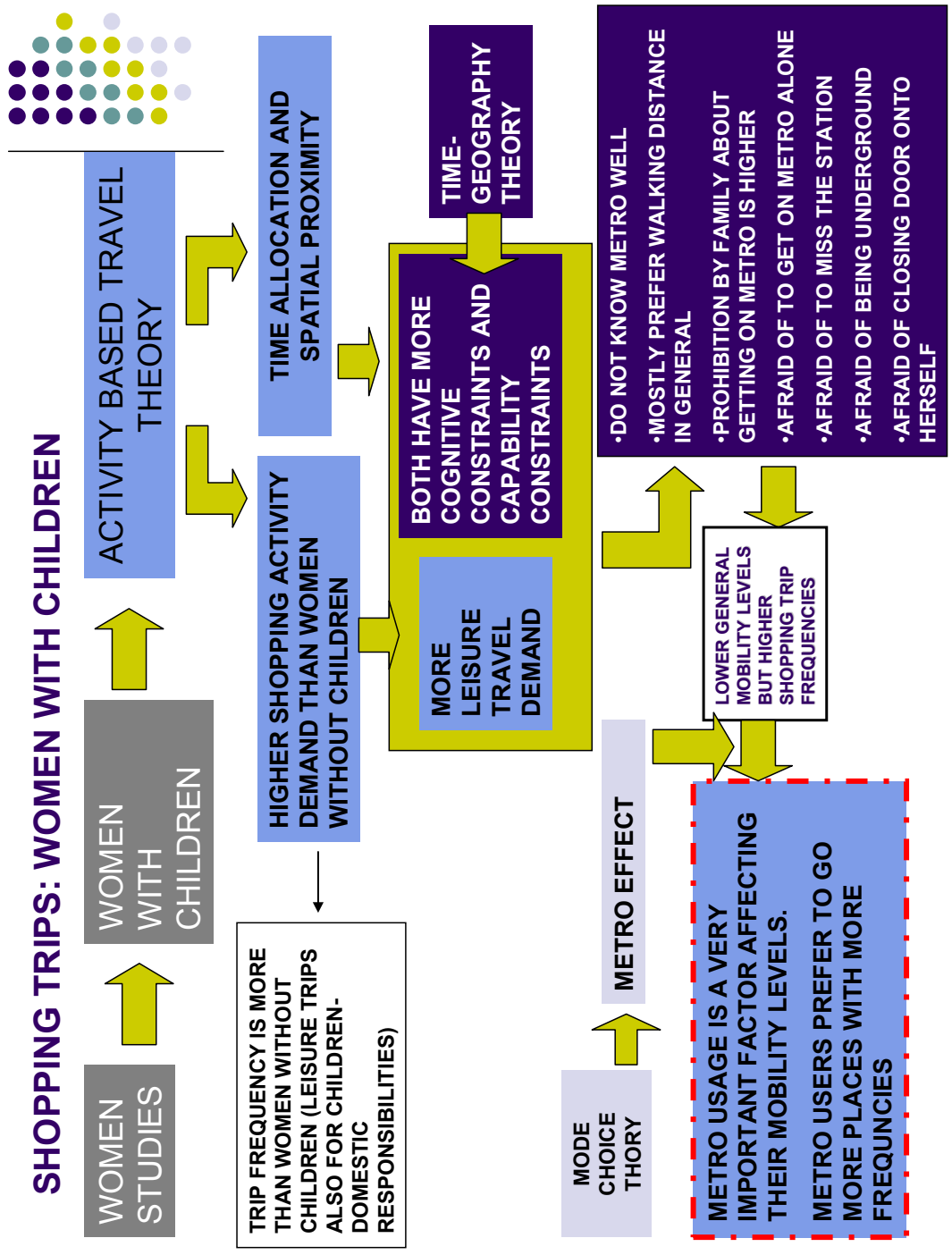
LEISURE TRIPS: NON-WORKERS AND WORKERS



LEISURE TRIPS: THE ELDERLY







CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Erkopan Eser, Bahar
Nationality: Turkish (TC)
Date and Place of Birth: 9 July 1976, Eskişehir
Marital Status: Married
Phone: +90 312 207 61 65
email: bahareser@hotmail.com

EDUCATION

Degree	Institution	Year of Graduation
MS	METU City Planning	2001
BS	METU City and Regional Planning	1998
High School	Cumhuriyet High School, Eskişehir	1993

WORK EXPERIENCE

Year	Place	Enrollment
2000-Present	Çevre ve Orman Bakanlığı	City and Regional Planner

FOREIGN LANGUAGES

Advanced English

PUBLICATIONS

1. Eser B. "Türkiye'de Sağlık Hizmeti Yoğun Konut (SHYK) Modeli'nin Olabilirliği", Konut Kurultayı Bildiriler Kitabı 22-23-24 Mayıs 2002-İstanbul, tmmob Şehir Plancıları Odası Yayını, Ankara, (2002)

HOBBIES

Computer Technologies, Tennis, Trekking, Swimming, Books