



# Gender differences in activity and travel behavior in the Arab world



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## ABSTRACT

The purpose of this study is to extend the research on gendered differences in travel patterns in the Arab world by an in-depth study of the interrelationship of travel-related activities and various socio-economic and demographic characteristics. This study is based on a unique data set that includes activity and travel diaries collected from three Arab communities in the Galilee region of Israel. Through descriptive statistics and nonlinear structural equations modeling, we found that gender plays an important role in both activity participation and travel behavior in these communities. Women tend to travel less than men in terms of both number of tours, defined as chain of trip segments that start and end at home, trips, and total time spent traveling. Women tend to work more within their communities and to conduct more of their activities by walking; they are also the ones who make more child-serving stops, which affect their travel patterns. Women tend to travel by car more as passengers, whereas men tend to be drivers. Those who made more tours also tended to make more complex tours, with more stops per tour, although, in general, complex tours are not substituted for making additional tours. People who work outside the community and make complex tours are more likely to drive, as the car is needed for these types of trips, which men make more than women.

From a policy perspective, these findings suggest that public transportation services are needed to help overcome gender differences in travel behavior. Improving transit service for school trips and improving urban design through a friendlier environment, especially for children, will beneficially affect the complexity of women's daily activity patterns and their quality of life.

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## 1. Introduction

Recent years have seen a growth of interest in the relations between travel behavior and other social spheres such as the family and the labor market. Specifically, the question of gender differences in travel behaviors has drawn considerable attention. Yet, while great deal has been learned about gender differences in travel patterns in developed urban societies, little is known about gender differences in travel patterns in nations of the developing world. In particular, there are insufficient studies that look at the complexity of women's daily travel patterns in those countries. This dearth of knowledge impairs the effective design and implementation of transportation policies.

One vast, understudied population is the Arab community of the Middle East and North Africa, whose roughly 325 million people compose the majority of citizens in a swath of nations

extending from the Atlantic Ocean in the west to the Persian Gulf in the east. This study focuses on Israel (excluding the occupied territories), where Arabs constitute a substantial minority. In 2012, Arab-Israelis numbered 1.6 million, constituting 21% of the total Israeli citizenry.

In the past few decades, cities have expanded tremendously, owing to fast-paced economic growth. In many cities, commercial and residential areas – and their related job opportunities related – are now spread across the municipality. These changes in urban form and in the geographical distribution of activities have generated significant effects on people's travel behavior (Pan et al., 2009). This is especially true for women, who normally take more responsibility for child-serving stops, such as picking up their children from schools and daycare centers, and bringing them to or collecting them from other social and leisure activities (McGuckin et al., 2005).

The purpose of this study is to extend the research on gendered differences in travel patterns in the Arab world by examining, in depth, the interrelationship of travel-related activities and various socio-economic and demographic characteristics. The study is based on a unique data set that includes activity and travel diaries

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collected following personal interviews in three Arab communities in the Galilee region of Israel: Rami, Majd-al-Krum, and Shefaram.

We investigate the relationship among several dimensions of travel and activity participation: travel mode, car ownership, tour complexity (in terms of making stops in general and child-serving stops in particular) and possession of a driving license. Activities were divided into primary and secondary activities of both long and short duration.

## 2. Literature review

Relatively few studies that have examined travel behavior in developing countries. Existing literature reveals a significant difference in travel patterns between men and women, especially with regard to commuting trips. Men tend to be more mobile, travel to work more frequently, and spend less time shopping than women. These results have been found in Brazil and Kenya (Turner and Fouracre, 1995), India (Srinivasan, 2005), Mali, Bangladesh, Turkmenistan, and Peru (Peters, 2001), as well as in the Arab communities in Israel (Blumen and Kellerman, 1990; Plaut, 2004; Mansfeld and Ya'acoub, 1995).

Few studies attempted to examine gendered differences in travel behavior in the Arab world (Assaad and Arntz, 2005; Abuhamoud et al., 2013; Elias et al., 2008; Hamed and Olaywah, 2000). Assaad and Arntz (2005) claimed that in Egypt, the commuting rates of women are lower than those of men, who traveled significantly more than women to obtain private sector jobs. Abuhamoud et al. (2013) show that in Libya demographic variables such as age and gender contributed significantly to explain mode choice behavior. Furthermore, they found that men are less likely than women to shift to public transport.

The literature provides input on a variety of factors influencing gendered differences in travel behavior. These studies reveal that the most influential demographic and socio-economic characteristics are age, household size, education, driving license, car ownership, income, workplace, and accessibility (Best and Lanzendorf, 2005; Boarnet and Sarmiento, 1998; Kwan, 1999a, b; MacKenzie and Rose, 1983; Hanson and Pratt, 1995a, b; Kwan and Kotsev, 2014).

Several studies have stressed the role of culture in shaping women's travel patterns (Peters 2001; Overton 1996; Assaad and Arntz, 2005). Thus, Peters (2001) argues that in societies characterized by a culture of gender segregation it would be conducive for the movement of women to promote such segregation in public transportation (segregated seats and doors). Many studies also show that women face personal safety and security issues, which contribute to the gender differences in travel behavior (Kabeer, 2004; Siddiqi, 2003; Whitzman, 2007). While culture is increasingly recognized as an important factor shaping transportation choices, when treated as a variable it should be viewed with caution due to the elusiveness of 'culture' and the difficulty to operationalize it (Swidler, 1986; Hammel, 1990).

Rosenbloom and Burns (1993) pointed out that women's travel patterns differed from those of men both because of the former's household and child care roles and because of their norms regarding appropriate travel behavior. Similarly, Kwan (1999b) showed that women in Columbus, Ohio, when compared to men, tended to have more structured travel patterns, limiting their activity to a small number of specific locations; relatedly, they were also more likely to work part time. In richer countries, where the total distance traveled by women comes closer to that of men than in it does in developing countries (Rosenbloom and Burns, 1993), women's trips are nevertheless likely to be closer to home. This pattern probably reflects women's greater responsibility for home and children. Kwan and Kotsev (2014) showed that women in

Sofia, Bulgaria, when compared to men, were found to have spent more of their time traveling and yet had a more restricted access to opportunities (i.e. work and study) in the urban environment, mainly as a result of their reliance on public transit as their primary mode of transport.

Few studies focus on Israel, but the picture emerging from the existing literature corroborates that these patterns hold for the Israeli case in general and for the Arab-Israeli population in particular. Mansfeld and Ya'acoub (1995) found that for Arab-Israelis in Northern Israel, tradition and cultural affiliation are more influential factors than socio-economic characteristics in affecting tourism travel. However, their study did not consider either gender or daily travel behaviors. Blumen and Kellerman (1990) examined both Jewish and Arab individuals in a major city (Haifa) and found that women in commute shorter distances than men. Elias et al. (2008), examining travel behaviors in two Arab communities in northern Israel, found that women in Israel make fewer trips, travel less time and walk more than do men.

Several studies have examined commuting patterns, which are becoming more complex because of an increasing tendency to make non-work stops during the commute to and from work, especially in the evening (Bhat et al., 2005). Some research results show differences in commuting trip-chaining (sequence of trips) behavior between men and women and between different household structures (Hanson and Pratt, 1988; Strathman and Dueker, 1995; Kwan, 1999a; Elias et al., 2008). Women are more likely than men to trip-chain on the way to and from work, and they make more trip chains with stops to serve passengers (McGuckin et al., 2005; McGuckin and Murakami, 1999). Strathman and Dueker (1995) determined that the more school-age children there are in a household, the more trip chaining will be performed. Working mothers are more likely than working fathers to link trips, especially when they have younger children (Strathman and Dueker, 1995). McGuckin and Murakami (1999) determined that trip-chaining was predominantly the domain of women, even when women entered the workforce. The practice of trip-chaining has been found to structure women's travel patterns and to have significantly impacted commuters' in-vehicle travel time, route choice, and distance (Li et al., 2004). Nevertheless, there are insufficient in-depth studies of these issues in developing countries in general and among the Israeli Arab minority in particular.

Both Turner and Fouracre (1995) and Peters (2001) call for improved surveying and a more holistic understanding of travel behavior that considers the interplay of activities within the household. Elias et al. (2008), using a tour-based approach to analyze travel behavior in Arab-Israeli communities, found that gender constituted a significant predictor of travel. Men were found to make more tours, spend more time traveling, make more stops, and spend more time in activities at those stops than did women. Men disproportionately traveled by private vehicle modes whereas women disproportionately walked. It should be noted that the provision of transit is very low in these communities. More detailed analyses concluded that demographic factors affected tour frequency differently for women and men.

Many researchers have turned to activity-based analysis, where travel is a demand that is derived from the desire for personal activity. Travel decisions, therefore, form a part of a broader activity scheduling process. The basic travel unit is a tour, which is defined as a sequence of trip segments that start at home, proceed to activities on time and end back at home (Shiftan, 2000). Activity-based research emphasizes that activities may change on a daily basis, thus influencing travel choices. Copperman and Bhat (2007) showed that explicitly considering the activity patterns of children was important when accounting for the linkage between the activity-travel patterns of children and adults and accurately

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