Research into walking in Athens: Differences between men and women

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Abstract

Everyone does an amount of walking everyday, whether a little or a lot, and so planning for pedestrians concerns us all. Today pedestrians are weak and vulnerable in the face of the power of motorized transportation and only with solutions which give them the advantage are they able to remain on the street with dignity. People with special needs, the elderly and children justify special attention.

However, there are significant differences in the walking habits between men and women evident from the research carried out through questionnaires in Athens in the period 2004-2005 with 1086 participants.

- Working men walk very little. Male pensioners walk almost double the time young men do.
- The reverse is true of women; in contrast to men, women over the age of 64 walk less than younger, working women as the latter have the responsibility of day-to-day shopping.
- The main reason for walking among women of all ages is shopping while for young people it is to get to and from educational facilities.
- Men walk more as they grow older. The opposite is true of women.
- Women display greater movement than men when it comes to social associations. The majority of movement in women over the age of 64 is done through independent walking, and is evidently for neighborhood visits where they also do the most part of their shopping.

Apart from the outcome of the above research showing significant differences in the daily activity of men and women which are also translated into differences in the time they spend walking, this essay will present results from measurements of their walking speed and analysis of the way in which they walk (frequency of stops, observance of road signs etc).

All the above data is extremely useful for road environment planning with the aim of encouraging walking as a choice in movement. Planning solutions to this end will be presented in this essay.

Biographies

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Introduction

Although Athens is one of the most densely built-up cities in Europe without large open spaces in its interior, it does not function in a unified manner. The urban space is divided up administratively into more than sixty municipalities that display relatively autonomous rates of development. Each municipality has its own local centre with administrative, educational, commercial and recreational activities. Keeping such activities close to each other should create ideal conditions for access by many residents using environmentally friendly methods, especially walking.

In actual fact walking conditions are extremely unfavorable, for while the road network is limited in capability because of poor geometric characteristics, public transportation is also poor, resulting in residents being tied to their cars and motorcycles. Thus, for most part of the day, roads are heavily congested creating serious problems of pollution and noise and danger for pedestrians because of narrow pavements and busy crossroads. Aesthetic degradation is also important. According to the results of a transport research in Athens, done by questionnaire as preparation for a doctoral thesis and presented here, 55% of all trips takes place by car, 25% by public transport, and less than 15% by walking. This limited amount for a city so dense in activity and with a climate so conducive to walking is a worrying sign for the quality of life.

Who are the people most affected by these conditions? Obviously those who do not use a car and would like or are obliged to walk more, such as children, the elderly and the disabled and in fact these categories have drastically decreased their trips on foot. Thus it is all the more rare to see children playing or walking by themselves in neighborhood streets as they did in the past, the elderly avoid walking, and the disabled are permanently trapped in their apartments. Do women also belong to this group? Is their daily routine correspondingly affected? What are the differences between men and women when it comes to walking?

In order to look into these and other transport issues, we carried out research by questionnaire concerning the social environment of movement in Athens with 1086 respondents between December 2004 and June 2005.

The main aspects of a woman's daily routine in Athens

A large number of households in Athens have only one car, which, most usually, is used by the man. Therefore the woman is obliged to use other means of movement.

The role of the woman in the family is very different to that of the man. She is responsible for:

- the daily routine of the children. She often accompanies them in their movement for education, exercise and recreation.
- the daily shopping.

Women have more 'free' time after work, as their working hours are limited compared to the men who sometimes have second jobs and return home late at night. The movement of the latter is almost exclusively for work and dependent on the car.

In fact, in view of the above, the research naturally showed that there is a big difference between men and women when it comes to trips done with privately owned cars, public transportation and walking.

Table 1 Percentage of trips by men and women with private cars, public transportation, and walking.

	Private car	Public transport	Walking
Men	55%	14%	10%
Women	40%	24%	15%

Research done in 2002 also showed the unequal number between the sexes on public transport vehicles with women representing about two thirds of the passengers. The biggest number of men is recorded on the new metro lines, which constitute the fastest, most comfortable and dignified means of movement. The bus service, with its ageing fleet characterized by low speed because of the limited number of bus lanes, is the form of movement least favoured by men.

Table 2 Gender of regular public transport passengers (%).

	Men	Women
Bus network	38,4	61,6
Trolley network	40,1	59,9
Old metro lines	41,8	58,2
New metro lines	45,0	55,0

It should be noted that table 1 includes trips as passengers in private cars, who as a rule are women. The difference between men and women as concerns driving a motorcar is even bigger. From our monitoring in Athens in 2001 the number of male drivers was estimated at 79%, and only 21% female drivers. An even wider gap is seen when it comes to driving motorcycles. The difference reflects the exceptionally adverse conditions in Greek cities from safety and environmental points of view which women find much more difficult to cope with. This means that women are deprived of using a means of transport that is efficient, fast and flexible.

Table 3 Division (%) of men and women as motorcycle drivers in some Greek cities (2002).

	Men	Women
Athens	96.0	4.0
Patra	82.5	17.5
Rhodes	88.0	12.0
Karditsa	80.0	20.0

It is noted that Athens, which experiences the worst congestion problems, also has the least number of female motorcyclists.

Walking, autonomous of and dependent on motorized transport. The choices of men and women

Apart from cyclists, motorcyclists and those with private parking lots the daily movement of everyone begins and ends with walking. However, for some it is supplementary to driving while for others it is the sole means of movement for some destinations.

Autonomous walking is used for relatively short distances. We estimated that in Athens walking compared to public transport is advantageous time-wise when the destination is less than seventeen minutes away or within a 1 km radius. It is also estimated that the average distance of the starting point or destination from a bus or trolley stop (which have a very dense network with frequent stops) is 296m (a 5 minutes walk), an 8 minutes walk for the tram, and 593m or a 10 minutes walk for the metro.

With car use, the walking distance depends on how far it is parked from the starting point or destination; it ultimately depends on how strict the parking restrictions are.

Autonomous walking is chosen when a large number of possible destinations (commercial, recreational and administrative) are accessible within a small radius of the starting point. Therefore when a substantial amount of autonomous walking is recorded in an area it means that it is rich in activities of different kinds, and this coincides with the image of the sustainable city. The extent of autonomous walking is a gauge for high quality of living as it implies independence, physical exercise, direct contact with every day needs, convenience and the chance to meet friends. Appropriate conditions for autonomous walking especially favour women who are responsible for daily shopping and other activities in the neighborhood related to their children. Autonomous walking is, then, an interesting town planning gauge and for this reason is recorded separately from walking associated with other means such as cars and public transport.

Autonomous walking covers 12.4% of total trips. The corresponding number of women is a significant 14.7%, higher than men.

Table 4 Average time (in minutes) of autonomous walking done per man daily for various activities. (Athens 2006).

Age	work	shopping	education	sports	entertainment	social	health	public services	other	Total
< 20	0	0,7	16,1	3,8	1,8	0,8	0	0	1,5	24,7
20-34	1,4	3,3	1,5	1,2	2,1	0,8	0,1	0,5	0,2	11,1
35-64	2,3	3,2	0	2,0	2,7	0,4	0,2	1,3	1,5	13,6
>65	0,3	7,2	0	1,8	5,8	0,5	0,8	1,5	2,8	20.7

Table 5 Average time (in minutes) of autonomous walking done per woman daily for various activities. (Athens 2006)

Age	work	shopping	education	sports	entertainment	social	health	public services	other	Total
< 20	0,2	1,5	14,6	2,9	2,1	1,2	0	0,1	0,2	22,8
20-34	1,4	4,1	2,3	2,0	2,1	1,9	0,5	0,4	0,7	15,4
35-64	3,0	7,6	0	1,5	1,3	1,4	0,2	0,6	2,8	18,4
>65	0	8,6	0	0,5	0,6	2,4	1,3	0,9	1,0	15,3

Walking speed. Differences between men and women

Walking speed is obviously affected by many factors:

- The geometric characteristics of pavements (width, gradient)
- The current obstructions
- The trip purpose
- The quality of the environment
- The aesthetic quality and attractiveness of activities
- The age

Where women are concerned, it should not be underestimated that an additional factor is the way of dressing and especially the height of heels.

For the comparison of walking speed between men and women under the same environmental conditions, 720 pedestrians were monitored on stretches of pavements free of obstructions for about 70m, and in open spaces. The pedestrians were chosen in conjunction with their sex and age. The measurements took place 7:00 – 10:00 in the morning and 13:00- 15:00 in the afternoon.

Walking speed depend on the size of the city. The bigger it is, the greater the speed. Residents of a large city cover longer distances and their activities are more intense. This influences their psychology and causes them to walk faster, especially the men. In general, the psychological state of mind is also affected by hostile environmental conditions which act as stressors. “Environmental stress” impels aggressive behaviour, especially in men when jostled or crowded, since they generally claim more personal space than women.

Where “environmental stress” is limited and the prevalent conditions are more human, as on the university campus, the measurements show that the average pedestrian speed decreases to 5.68 km/hr (from 5.78 km/h) for men, and 5.24 km/h (from 5.42 km/h) for women.

The measurements showed that the average walking speed in Athens is 5.3 km/h, a rate close to the highest one recorded in New York at the beginning of the seventies (Pushkarev et al, 1975). This is expected since New York is years ahead of Athens where the intensification of economic activity is concerned.

In general, the average speed of women is 5.1 km/h, whereas the men reach 5.5 km/h. The lowest speed for women was recorded on Solonos Street, where the pavement is only 1m wide. This low speed (4.49 km/h) is due solely to the width of the

pavement and not because of attractive transient uses of which this particular street offers none.

The highest speeds for both men and women of all ages were recorded on Vas. Sofia Ave for those heading towards the metro station (6.09 km/h). It concerns walking associated with public transport within the framework of a long distance trip, and this creates a relative amount of stress in men and women.

Table 6 Average walking speed of men (M) and women (F) in conjunction with age during the morning and afternoon rush hour.

Age groups: 1: <25, 2: 25-50, 3: >50

		Average speed (km/h)							
Place of measurement	**Sex-age**	**M-1**	**M-2**	**M-3**	**F-1**	**F-2**	**F-3**	**M,F-1,2,3**	**M,F-1,2**
Vas.Sofias Ave pedestrians heading towards metro station. Pavement width 6m. Road width 20m.	Morning	7,06	6,16	5,74	6,55	6,46	5,31	6,21	6,56
	Afternoon	6,77	5,79	5,36	6,65	5,79	5,45	5,97	6,25
	Average	*6,92*	*5,97*	*5,55*	*6,60*	*6,13*	*5,38*	*6,09*	*6,40*
Panepistimiou Ave. Pavement width 5 m. Road width 20m	Morning	5,83	5,62	5,12	5,56	5,24	4,73	5,35	5,56
	Afternoon	6,21	5,40	5,09	5,74	5,04	4,69	5,36	5,60
	Average	*6,02*	*5,51*	*5,10*	*5,65*	*5,14*	*4,71*	*5,35*	*5,58*
Solonos st. Pavement width 1m. Road width 7m.	Morning	5,77	5,46	4,78	5,38	4,89	4,10	5,06	5,38
	Afternoon	5,42	5,33	4,86	4,06	4,75	3,76	4,70	4,89
	Average	*5,60*	*5,40*	*4,82*	*4,72*	*4,82*	*3,93*	*4,88*	*5,13*
Syntagma Central square. Pavement width 20m.	Morning	5,61	5,57	4,64	6,09	5,24	4,11	5,21	5,63
	Afternoon	6,08	5,32	4,59	5,77	5,21	4,23	5,20	5,60
	Average	*5,84*	*5,44*	*4,61*	*5,93*	*5,23*	*4,17*	*5,20*	*5,61*
Vas.Sofia Ave. Pedestrians not heading towards metro station. Pavement width 11 m. Road width 20m.	Morning	6,32	5,77	5,02	5,09	5,33	4,20	5,29	5,63
	Afternoon	5,03	5,44	4,54	5,06	4,78	4,02	4,81	5,08
	Average	*5,68*	*5,61*	*4,78*	*5,07*	*5,05*	*4,11*	*5,05*	*5,35*
Pedestrianised Ermou st. Width 10m.		5,64	5,76	4,77	5,41	5,32	4,47	5,23	5,53
Zografou University Campus Pavement width 4m.		5,95	5,41		5,49	4,98		5,46	5,46
Average speed for men (M)		**5,95**	**5,59**	**4,94**					
			5,49						
Average speed for women (F)					**5,55**	**5,24**	**4,46**		
						5,08			

From table 6 it appears that men and women walk more slowly as they get older. The average speed for the first age group (<25 yrs) is 5.76 km/h, slightly higher than the second group (25-50 yrs) which is 5.45 km/h, but significantly higher than the elderly group (>50 yrs) which reaches 4.7 km/h.

The trip purposes when walking is used

The questionnaire research was addressed to residents from 75 municipalities of Athens and the sample was specified in conjunction with the population of each municipality and its ratio of age and gender. The ages were divided into four groups: 0-19, 20-34, 35-64, and 65+. For each respondent, the sex and profession of every member of the household as well as ownership of cars and homes were recorded.

What sets this particular study apart from other transport research in Athens is the simultaneous recording of activities and movement on a weekly basis. The starting points and destinations, the reason for movement, the duration, and the time spent for each activity were all recorded. Also recorded was the amount of time spent in open space, since this represents exposure in the increased pollution of Athens.

Table 7 Trip purposes by men and women using all means.

	Work	Daily shopping	Other shopping	Education	Health	Entertainment	Social	Sports	Public services	Other
Men	28.2%	5.9%	8.5%	13.3%	0.4%	19.4%	9.0%	7.2%	2.9%	5.3%
Women	24.2%	9.4%	15.0%	13.0%	0.8%	19.2%	8.0%	4.9%	1.2%	4.2%

The term “Other Shopping” covers shopping for items not bought daily such as clothing, furniture, books etc.

From table 7 it can be seen that the main trip purpose by both men and women is work. Entertainment follows, especially in the 19-34 and 65+ age groups. This includes visits to cafés, restaurants, taverns, the theatre, cinema, nightclubs, attending athletic games, walking for pleasure etc…

The third biggest trip purpose is education for men, and shopping for women.

Table 8 Trip purpose by men and women in relation to the transport means (%).

	Work	Daily shopping	Other shopping	Education	Health	Entertainment	Social	Sports	Public Services	Other
Autonomous Walking										
Men	2.2%	28.4%	3.5%	11.2%	2.8%	17.7%	6.1%	11.3%	10.5%	6.3%
Women	2.0%	33.8%	6.8%	8.5%	3.9%	9.5%	13.3%	7.5%	7.2%	7.5%
Taxi										
Men	3.6%	0.0%	7.1%	0.0%	0.0%	67.9%	14.3%	3.6%	3.6%	0.0%
Women	0.0%	0.0%	12.2%	0.0%	0.0%	61.2%	20.4%	0.0%	4.1%	2.0%
Car										
Men	3.9%	6.6%	8.3%	3.6%	1.4%	44.4%	19.2%	7.6%	2.8%	2.2%
Women	3.2%	11.8%	12.6%	2.6%	0.8%	43.5%	16.8%	5.7%	1.7%	1.3%
Public transport										
Men	12.3%	0.9%	26.4%	21.1%	2.6%	19.8%	10.6%	2.2%	2.6%	1.3%
Women	21.0%	0.9%	26.2%	18.8%	1.2%	23.1%	8.0%	0.0%	0.0%	0.6%

The average walking time till a taxi is found is 2 minutes for men and 3 minutes for women. The average walking time towards a parked car is 4 minutes for men and 5 minutes for women. Finally, the average walking time to and from a public transport stop is 4.5 minutes for men and 6 minutes for women.

- **Autonomous walking**

The main purpose for both sexes is daily shopping. Naturally, the corresponding amount for women is much greater (33.8%) than that for men (28.4%).

The second most stated purpose is entertainment for men, and socializing for women.

- **Taxis**

The main trip purpose by taxi for both sexes is entertainment: 68%for men and 61% for women. This is followed by socializing gatherings: 14% and 20% respectively.

- **Cars**

Again, the main purpose is entertainment: 44% of all trips for men and 43% for women. Socializing comes second with 19% and 17% respectively.

- **Public transport**

Here, weekly shopping, and not entertainment, is the main purpose. It covers 26% for both sexes. The next purpose is education for men (21%) and work for women (21%).

Trip purpose of walking according to age

In the 0-19 age group the main purpose for autonomous walking is education: 40% for men and 37% for women. This is followed by sports where the two sexes display a big difference: 25% for men and 16% for women.

In the 20-34 age group the main purpose for autonomous walking for both men and women is daily shopping: 38% and 35% respectively. This is followed by entertainment: 16% and 13% respectively.

In the 35-64 age groups daily shopping remains the main reason with 33% for the men and 41% for the women. Entertainment follows with 21% and 11% respectively.

Finally, in the 65+ age group, daily shopping is again the main purpose with 39% for men and 43% for women. Entertainment comes next with 21% and 19% respectively.

It appears that only younger men choose autonomous walking more than women for daily shopping.

Table 9 Trip purposes of walking for men and women according to age.

Autonomous walking		Work	Daily shopping	Other shopping	Education	Health	Entertainment	Social	Sports	Public Services	Other
Men	0 - 19	0.0%	6.3%	1.2%	40.0%	0.3%	12.5%	9.6%	24.8%	0.6%	4.8%
	20 - 34	3.3%	38.1%	6.3%	3.0%	1.9%	15.9%	7.4%	9.6%	10.4%	4.1%
	35 - 64	4.8%	32.8%	4.0%	0.0%	3.4%	20.6%	4.0%	5.6%	18.0%	6.9%
	65+	0.3%	39.2%	3.1%	0.0%	5.6%	21.5%	3.8%	4.9%	12.2%	9.4%
Women	0 - 19	0.4%	9.9%	4.6%	36.6%	0.4%	14.1%	13.0%	15.8%	2.5%	2.8%

	20 - 34	1.7%	34.8%	7.9%	5.2%	2.8%	13.4%	11.0%	9.3%	8.3%	5.5%
	35 - 64	4.3%	41.1%	9.3%	0.0%	2.4%	8.1%	11.4%	5.7%	7.5%	10.2%
	65+	0.0%	42.6%	3.8%	0.0%	10.6%	3.8%	18.6%	1.3%	10.3%	9.0%

Conclusions

- Men move more than women and these trips are mainly for professional reasons. However, women walk more.

- Autonomous walking is related to short distance trips within the neighbourhood, mainly for daily shopping. It is this type of movement that is directly affected by environmental and safety problems. Public transport, which constitutes the basic foundations for sustainable mobility, is also affected indirectly because of the problems encountered by walking related to its use.

- Men walk faster than women. The difference is small but indicative of the difference between men and women in psychology and behavior on the road.

- Age, as well as the size of the space available for walking, significantly affects the speed.

- The trip purposes of walking vary significantly with increasing age.

- Young people under the age of twenty choose autonomous walking more than any other age group. The purposes of their trips are education and sports.

- Private cars and motorcycles are the means mainly used by men. For women, most common are autonomous walking and public transport.

- Men move about more for work, recreation and education, in that order; while women's movements are carried out for work, recreation and 'other' shopping.

- Both men and women use autonomous walking for daily shopping, and cars or taxis for entertainment and socializing. Both sexes use public transport for 'other' shopping, entertainment and work, in that order.

- In general, autonomous walking is chosen for activities that are related to the neighborhood; cars and taxis for activities related to free time and which are outside the neighborhood; and public transport for work and leisure activities.

- Each age group use walking only for those specific activities that are typical to their daily routine. So, working men do not walk a lot, but this does not apply to women. Obviously the family car is driven by the former.

- Men under the age of 20 and over the age of 64 walk a good deal more than the others (the former almost exclusively for education and sports, and the latter mainly for shopping and recreation).

- For women, the walking distances are not very long. Those under the age of 20 walk more than any other age group. Women over the age of 64 walk less than men of the same age.

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