

Role of personal barriers on willingness to walk in daily work trips across Rasht citizens

Zeinab Etemadi Naeini¹, Meeghat Habibian^{2*}

¹ MSc student of Transportation Engineering, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran

² Assoc. Prof. in Civil and Environmental Engineering Department, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran

ABSTRACT

The walk oriented pattern is an alternative travel pattern for daily trips; that a person walks more than her/his regular pattern. In order to examine the tendency to fulfil this pattern, it is necessary to examine the role of different types of barriers on pedestrian walking. This study intends to address the role of personal barriers which avoid people to walk more in their daily work trips. The studied barriers include laziness/tend to wake up late, physical/health problems, not interested in more walking, the importance of neat appearance at workplace and not feeling good about being seen on streets. For this purpose, a sample of 432 employees living in the city of Rasht, Iran has been used. The studied variables are classified into three categories: socio-economic, travel and environmental characteristics. Five ordered logit models have been calibrated to investigate the importance of personal barriers including 11 variables of socio-economic characteristics, 6 variables of travel characteristics and 5 variables of environmental characteristics. The results show that while the effect of socio-economic characteristics on each of the personal barriers studied is different, the contribution of these characteristics on each of the five barriers: laziness/tend to wake up late, physical and health problems, not interested in more walking, the importance of neat appearance at work and not feeling good about being seen on streets are 41, 30, 13, 7 and 8 percent, respectively. Furthermore, the background variable of having at least 5 minutes daily walking in non-work trips of socio-economic characteristics, the total travel time variable of travel characteristics and the variable of walkability index of environmental characteristics are effective in tendency to walk more.

KEYWORDS

Pedestrian, ordered logit model, Individual barriers, walk oriented pattern, Rasht.

* habibian@aut.ac.ir

Introduction

Nowadays, walking is an important issue toward sustainability in transportation planning. While this issue is approached from several points of view including walkability[1, 2], walking accessibility[3, 4], walking behavior[5], few studies have investigated the barriers and problems affecting walking. The review of these studies shows that the lack of information about the barriers and limitations of people for walking causes the results of the intended measures to increase citizens' desire to walk, to be different from the expectations of transportation planners. In other words, in order to try to increase walking, it is necessary to identify and remove the barriers to walk that citizens face. On this basis, it is important to identify various factors that cause a phenomenon to be perceived as a barrier for walking. Therefore, the problem identified in this article is the lack of awareness of the importance and effectiveness of the factors that lead to the formation of walking barrier. Investigations carried out in recent studies indicate the existence of various barriers for people to walk. In these studies, personal barriers, travel-related barriers, and weather-related barriers are recognized as the most important barriers[6-8].

Based on this, identifying the effect of various factors on personal barriers in the willingness of citizens of an Iranian city to walk can be treated as an innovation. Hence, this study analyzes personal barriers in the willingness of Rasht citizens to walk on daily work trips. Personal barriers are considered an important factor in reluctance to walk more, and by identifying it, you can achieve a proper planning to encourage people to follow the walk oriented pattern. The walk oriented pattern is an alternative travel pattern for daily trips; so that a person walks more than her/his daily travel pattern[9]. Therefore, the role of barriers related to the person, such as laziness/desire to wake up late, physical/health problems, not liking to walk more, the importance of appearing neat at work and not feeling good about being seen on street are important (Figure 1).

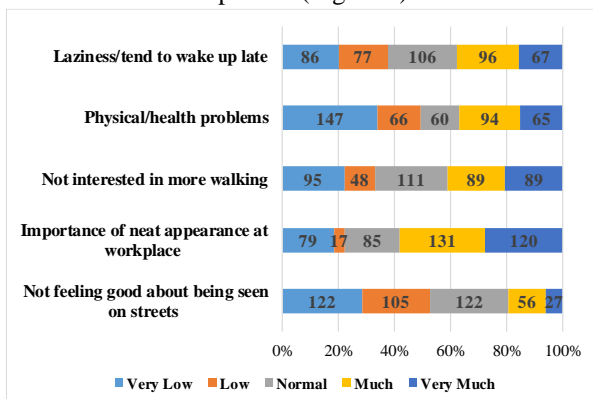


Figure 1 Distribution of importance levels of walking barriers.

Methodology

The data used in this study were collected through a research questionnaire to investigate the tendency of citizens to walk on daily trips in 2014[10].

The pedestrian barrier variables are recorded as ordinal variables with a five-point Likert scale. Therefore, an ordered fitting methods should be used to model it. In this study, the ordered logit choice model is used to understand the importance of each of the personal barriers in avoiding the walk oriented pattern.

To calibrate ordered choice models, as the options have a ordinal relationship, the dependent variable, y , can be considered as a variable that takes the values of $0,1,\dots,m$ in order. A basic hypothesis of ordered choice models is the hypothesis of parallel fit. In fact, the hypothesis of parallel fitting means that in a series of binary fitting, the coefficients of descriptive variables are equal[11]. However, if this hypothesis is rejected, generalized ordinal logit models should be used. According to Brant method, by applying the Wald test, the validity of the parallel fit hypothesis is examined for the significant variables appeared in the model. In this situation, the null hypothesis of the Wald test shows that the coefficients in these models are the same[12].

Results and Discussion

As expected, more of the significant variables are related to socio-economic characteristics. In the barrier of laziness/desire to wake up late, most socio-economic and environmental characteristics are effective and travel characteristics are not significant for this barrier. In physical/health problems, socio-economic characteristics and, then, travel characteristics are more effective but environmental characteristics are not significant. All three socio-economic, travel-related and environmental characteristics are effective in the barrier of not being interested in walking more and the importance of appearance in the workplace. In the barrier of not feeling good about being seen on the street, more variables have become significant, which include socio-economic characteristics, environmental characteristics, and travel characteristics in order of number. In total, in these five models, 11 variables of socio-economic characteristics, 6 variables of travel characteristics and 5 variables of environmental characteristics are significant. Among the most significant variables of socio-economic characteristics, one can see the experience of at least 5 minutes of walking per day in non-work trips. Also, in the barriers studied, the total duration of the trip is one of the most important characteristics of the trip, which in most of the barriers including physical/health problems, not being interested in walking more, the importance of

appearing neat at work, and not feeling good about being seen on the street appeared with a positive sign. It is indicating that as the total travel time increases, the importance of barriers related to the individual to do more walking increases. One of the environmental features is also the walkability in the area of residence that appeared in the barrier of laziness/tend to wake up late, the barrier of not being interested in walking more and the importance of appearance in the workplace. The negative sign of this variable indicates that in areas with higher levels of walkability, the mentioned barriers are decreased.

According to the coefficient of walkability in the area of residence in the model of the barrier of not being interested in walking more, it was found that the higher levels of walkability results in decrease in the probability of the importance of this barrier. As walkability is a function of diversity, population density, network design, and access to destinations, it could increase the desire and interest of people to walk. Therefore, in order to increase the share of pedestrians, attention should be paid to the development of pedestrian infrastructures through the index of walkability.

Conclusion

Today, various studies have investigated the factors affecting the willingness to walk, and in total, three categories of factors including socio-economic characteristics, travel-related characteristics, and environmental characteristics have been introduced. The main purpose of this study is to investigate the role of obstacles related to the person, including laziness/wanting to wake up late, physical and movement problems, not liking to walk more, the importance of appearing neat at work and not feeling good about being seen on the street. This study explores the importance of walkability as well as a number of socio-economic and travel-related variables on developing walking for transportation.

References

[1] F. Fonseca, P.J. Ribeiro, E. Conticelli, M. Jabbari, G. Papageorgiou, S. Tondelli, R.A. Ramos, Built environment attributes and their influence on walkability, *International Journal of Sustainable Transportation*, (2021) 1-40.

[2] M. Habibian, A. Hosseinzadeh, Walkability index across trip purposes, *Sustainable cities and society*, 42 (2018) 216-225.

[3] E. Berjisian, M. Habibian, Developing a pedestrian destination choice model using the stratified importance sampling method, *Journal of transport geography*, 77 (2019) 39-47.

[4] E. Berjisian, M. Habibian, Walking Accessibility, Gravity-Based Versus Utility-Based Measurement, 2017.

[5] Y. Hatamzadeh, M. Habibian, A. Khodaii, Walking Mode Choice Across Jobs with Different Travel Patterns, 2016.

[6] G. Kash, N. McDonald, Travel Behavior and Perceived Barriers to Walking More Frequently: An Analysis of the Relationship Between Mode Choice and Attitudes in California, 2012.

[7] A.F. Clark, D.M. Scott, Barriers to walking: an investigation of adults in Hamilton (Ontario, Canada), *International journal of environmental research and public health*, 13(2) (2016) 179.

[8] T. Yousefinezhadi, H. Soori, Study of obstacles and restrictions of pedestrians for commuting on foot in the city of Tehran: a qualitative study, *Safety promotion and injury prevention (Tehran)*, 5(4) (2018) 185-192.

[9] A. Farzaneh Movahed, M. Habibian, A Review of the Factors Influencing the Tendency to Walk More in Daily Trips, *Road*, 28(104) (2022) 25-34.

[10] Y. Hatamzadeh, M. Habibian, A. Khodaii, Commuters' Preference to Walk: Developing a Structural Equation Model Considering Current Amount of Walking and Subjective and Environmental Factors, *Journal of Urban Planning and Development*, 147(4) (2021) 04021043.

[11] R. Williams, Generalized ordered logit/partial proportional odds models for ordinal dependent variables, *The Stata Journal*, 6(1) (2006) 58-82.

[12] R. Brant, Assessing proportionality in the proportional odds model for ordinal logistic regression, *Biometrics*, 46 (1990) 1171-1178.