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# FACTORS AFFECTING THE CITIZEN'S TRENDS TO USE THE PEDESTRIAN BRIDGES IN IRAN

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**Abstract**
Pedestrian bridges eliminate all conflicts with traffic on the road below. They would sound to be the great solution for getting pedestrians across the street. But do they constantly work well? The primary goal of this study was to determine the trends of the pedestrians as they made use of these bridges. Ten pedestrian bridges in Tehran and Shiraz, two major cities of Iran, were chosen for observation of their rate of use by pedestrians. A survey was conducted among 200 pedestrians including those who used the bridges, and those who chose instead to risk traffic and cross the street under the bridge. The respondents' perception about the safety of crossing the road was inversely related to the respondents' bridge use. Other factors positively influencing bridge use included time of day, density of people under the bridge, and previous involvement in a traffic accident.
**Keywords**: Pedestrian bridge, Pedestrian safety, Traffic injury, Habit

## 1. INTRODUCTION

In transport planning and engineering, pedestrian modes of travel are often treated as an afterthought and given less consideration than motorized modes. Although the external costs imposed by pedestrians on the system are minimal, no clear credit is given to them in the context of how they are treated in the mode hierarchy, particularly in urban areas (Litman, 2005).

One solution to the problem of vulnerability of pedestrians is installing facilities that separate pedestrian routs from motor vehicle flow. Pedestrian bridge is a safe channel for pedestrians without causing any delays in the motor vehicle flow. A particular topic of interest could be investigating the reasons of not choosing the available pedestrian bridges by pedestrians, even though the pedestrians are aware of the fact that these bridges provide a safer means for crossing the streets. While people understand the risks of accidents associated with crossing the traffic at the street level, some choose not to use the pedestrian bridges. Therefore, this study was designed to explore the influential factors on the perceived risk of crossing at the street level, versus the cost of using the bridges from the pedestrian's

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point of view. The information on the pedestrian's perceptions was obtained through a user survey completed by pedestrians using the study site.

The study sites for this research are chosen based on locations where the pedestrian could potentially choose between using the bridges, and crossing at the street level. The choice of these locations makes it possible to have a comparison when studying the influential factors on using the bridges. The primary goal of this study was to determine the trends of the pedestrians as they made use of these bridges. This required a comprehensive interview with pedestrians who use the bridge as well as pedestrians avoided them. The interviewees answered to questions that assist in determining the factors influencing their decision about crossing the street. Such factors may include traffic volume, vehicles speed, other pedestrians' behavior, etc.

There are two types of pedestrian bridges in Iranian cities. In traditional pedestrian bridges, which are simpler in construction, one has to walk up the bridge on foot. The more modern types of pedestrian bridges include an electrical escalator. We decided to focus our study on traditional pedestrian bridges, as they exist in larger numbers in the cities, and also, we believe that the reasons for not choosing the modern bridges with escalators can be very different from those for not choosing the traditional bridges. Hence, by focusing on the traditional pedestrian bridges, we eliminate the effect of escalators on the pedestrians' decisions.

## 2. BACKGROUND

As traffic congestion and air pollution become growing problems in major cities, many post-modern planners show an increased interest in promoting non-motorized travel options. They have started seeking ways to increase pedestrian activities and discourage automobile dependency, particularly by applying new technologies, economical motivations, and physical limitations. Therefore, the principles of Smart Growth for cities have been introduced, which promote concepts such as developing pedestrian-friendly neighborhoods, designing contiguous street networks that would encourage walking, and reducing the travel length and energy consumption (Bullard, 2007).

Successful initiatives that promote pedestrian travel provide potential users with an assured level of convenience, efficiency, and security. Such initiatives are more likely to be successful when city planners and traffic engineers take the pedestrian preferences and perceptions into consideration in the design of efficient pedestrian friendly facilities.

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Statistical figures show that in 2000, around 1.3 million people were killed in traffic collisions worldwide (World Health Organization [WHO], 2003). Also, %20 of more than 5 million injury related deaths per year are due to road traffic incidents. Around %80 of road traffic deaths occurred in low and middle income countries in 1998. By 2000, this figure rose to %90. Most of these fatalities occurred among pedestrians, cyclists, and riders of motorized scooters (WHO, 2002). In comparison, developed countries report significantly lower rates of pedestrian fatalities. For instance, %16 of all traffic fatalities in EU countries were among pedestrians. In the USA this figure is %13, versus %63 in Karachi, Pakistan (WHO, 2003).

The most common pedestrian actions leading to a fatality were improper crossing of a roadway or intersection. These actions alone were responsible for more than %55 of all pedestrian deaths (Martinez & Porter, 2004).

Recent statistics show that in Iran more than twenty thousand pedestrians are killed and one hundred and ten thousand are injured in traffic collisions each year. In Iran pedestrian fatality increases at a rate of %10 per year, which unfortunately is much higher than most of countries in the world and also other Middle Eastern countries (Iran newspaper, 1380). As reported in 2007 by Iranian Students' News Agency (ISNA), most injuries in Iran are among pedestrians.

## 3. LITERATURE REVIEW

Planning pedestrian-friendly environments requires multilateral investigation on pedestrians' attitudes towards characteristics of the environments as they choose their routes. For example, pedestrians usually prefer continuous and one-level routes, and avoid bridges or underpasses, since they would increase the walking distance compared to level crossing. On the other hands, the pedestrians' violation of traffic laws in crossing the streets may block the motor vehicle traffic flow and may cause accidents which generally result in injuries or deaths among the pedestrians.

The main behavioral assumption for this analysis is that pedestrians optimize some predicted pedestrian-specific utility function, which represents a trade-off between the utility gained from performing activities at a specific location, and the predicted cost of walking subject to the physical limitations and the kinematics of the pedestrians (Hoogendoorn and Bovy, 2004). Also, pedestrian bridge use is related to socio-economic characteristics of the pedestrians, features of the physical environment, and legal outfitting.

We explore the literature for the factors involved in the pedestrian decision-making process when choosing a pedestrian bridge. We identify these influencing factors in eight categories of age and

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gender, risk prediction ability, possession of a driver's license, being accompanied, travel time, waiting time, location of the bridge, and existence of regulation.

### *3.1. Age and Gender*

In general, one might expect that age and sex as factors affecting the pedestrians' decisions may vary in different circumstance. There is evidence that women are more law abiding than men (Keegan and Mahony, 2003). For example, Holland and Hill (2007) studied the effect of age, gender and driver status on pedestrians' intentions to cross the road in risky situations. They found that differences between the age groups in intention to cross seemed to be due to differences in the perceived value of crossing, rather than differences in the perceived risk. Women were less likely to intend to cross than men who perceived more risk. Also there were important age, gender and driver status differences in the behavioral patterns. A key implication of these findings is that road safety interventions need to be designed differently for different groups.

### *3.2. Risk Prediction Ability*

Velde et al. (2005) adopted a simulation approach to assess both pedestrian's ability to visually judge whether or not they could cross a road, and their adaptive walking behavior. Their results indicate that the verbal judgments were not similar to judgments to actually cross the road. They found that there is no significant difference in age groups with respect to safety and accuracy of judgments, although the youngest group tended to be more cautious. Young children waited longer on the curb before crossing the road than older children and adults.

The reported study employed virtual reality (VR) to investigate road-crossing behavior in children and young adults. The VR study showed that younger children (5–9 years old) made the greatest number of unsafe road crossings, and the oldest participants (over 19 years of age) had the fewest. There is also evidence that pedestrians base road crossing decisions on inter-vehicle distance rather than the vehicles' speed (Simpson et al, 2003).

In contrast, some studies (for example Racioppi et al, 2004) argue convincingly that vehicle speed is a critical factor. Based on the report published by the World Health Organization, pedestrians have a %90 chance of surviving car crashes at vehicle speeds of 30Km/h or less. The survival chance is less than %50 if the vehicle's speed is 45 Km/h or above. In fact, the probability of a pedestrian being killed rises by a factor of 8 as the impact speed of the car increases from 30 to 50 Km/h (Figure 1).

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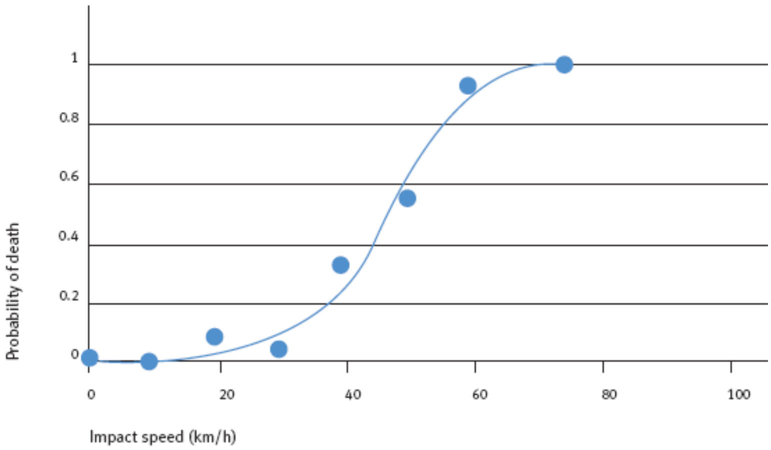


FIGURE 1- PROBABILITY OF A PEDESTRIAN DYING AS A FUNCTION OF THE IMPACT SPEED OF A CAR (WHO, 2005).

Hamed (2001) in his study of a broad range of road users and roadway factors influencing the accepted risk of crossing the street, concluded that pedestrians who frequently use a certain pedestrian crossing and who live nearby are likely to accept higher risk and cease their waiting time at the pedestrian crossing.

### *3.3. Possesion of a Driver's License*

The behaviors of drivers and non-drivers differ in large number of ways. As Holland and Hill (2007) pointed out, driver status is an important component as a predictor of intention to cross the road. In a study conducted on pedestrian crashes in Virginia, from 1990-1999, the results show that variables such as gender, age, pedestrian drinking, driver drinking, driver violation, and time of day significantly predicted the odds of dying versus being injured in a pedestrian crash. The typical fatality victim was an older male who had been drinking and was walking in a rural area between 12:00 and 5:59 a.m. A driver who had been drinking but would not be cited for a violation more likely struck this pedestrian (Martinez & Porter, 2004).

### *3.4. Being Accompanied*

The importance of being accompanied by a child has been highlighted by research on the behavior of more than 100 adult–child pairs as they crossed the road at pedestrian light-controlled crossings. Results showed that the observed adults provided reasonably good models of pedestrian behavior, but that they rarely treated the crossing event as an opportunity to teach the children explicitly about road safety. The only gender difference to emerge revealed that adults were more likely to hold girls' hands than boys' hands, even though boys' behaviors were more dangerous. No differences were observed in relation to the (estimated) age of the child (Zeedyk and Kelly, 2003).


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### *3.5. Travel Time*

One of the critical factors that influence the pedestrian's decision to use a pedestrian bridge is the travel time. Moore (1953) studied the use of pedestrian bridges and underpasses in London and noted that roughly 80% of pedestrians would use the safe path if it takes the same time as crossing the road. He showed that no pedestrian used the bridge if the traveled time was 1.5 times or more higher than the travel time at level crossing.

Ribbens (1996, p4) determined a threshold on the basis of the concept of pedestrian delay: "grade separation becomes a suitable alternative to a signal controlled crossing only when the cycle length of the signalized crossing has to exceed 110s (corresponding to pedestrian delay of 50s) to accommodate the traffic flow". These results suggest that safety is not the major concern for the choice of route by the pedestrians, but rather the extra travel time as the result of using the bridges is the factor impacting on the pedestrians' decision.

### *3.6. Waiting Time*

Recently, Tiwari et al. (2007) show that the probability for a pedestrian to cross the road when it is unsafe, i.e. when motor vehicles still have green or yellow light, varies with the waiting time. People do not want to wait too long to cross streets. They found that as signal waiting time increases, pedestrians get impatient and violate the traffic signal, and consequently the risk of being struck by a motor vehicle increases. Thus, installing the countdown traffic lights is likely to affect pedestrian behaviour. Empirical studies show that installing the countdown traffic lights raised the number of people waiting for vehicles to stop (Keegan & Mahony, 2003).

### *3.7. Location of the Bridge*

Concrete barriers and fences could be important features to encourage pedestrians to use a pedestrian bridge, Empirical research on the actions performed by pedestrians show that the location of the bridge in relation to the origin and destination of the pedestrian route was a crucial element influencing the pedestrian's decision on using the bridge. Sisiopik and Akin (2003) also presented the results of a study on pedestrian bridges as one of nine crossing types. According to Räsänen et al (2007), convenience, safety, and existence of the bridge on the pedestrian's route, broadly impact the pedestrian's decision, with equal proportions.



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### *3.8. Existence of Legal Control*

Yang et al. (2006) divides people into two types: law-obeying ones and opportunistic ones. An opportunistic pedestrian decides whether to violate the traffic signals depending on the status of some external factor such as the existence of a policeman, vehicle flow, or other pedestrians' behaviours. Therefore, proper traffic control may significantly affect the rate of using the pedestrian bridges

Another factor that should be considered is the traffic law in every location. For example, people tend to believe that pedestrians have the right-of-way at all times, even when not crossing at crosswalks or intersections; this may be true in some countries, however, the traffic law in Iran does not yield the right-of-way to pedestrians in all cases.

According to above, the conceptual model of the study can be as Figure 2.

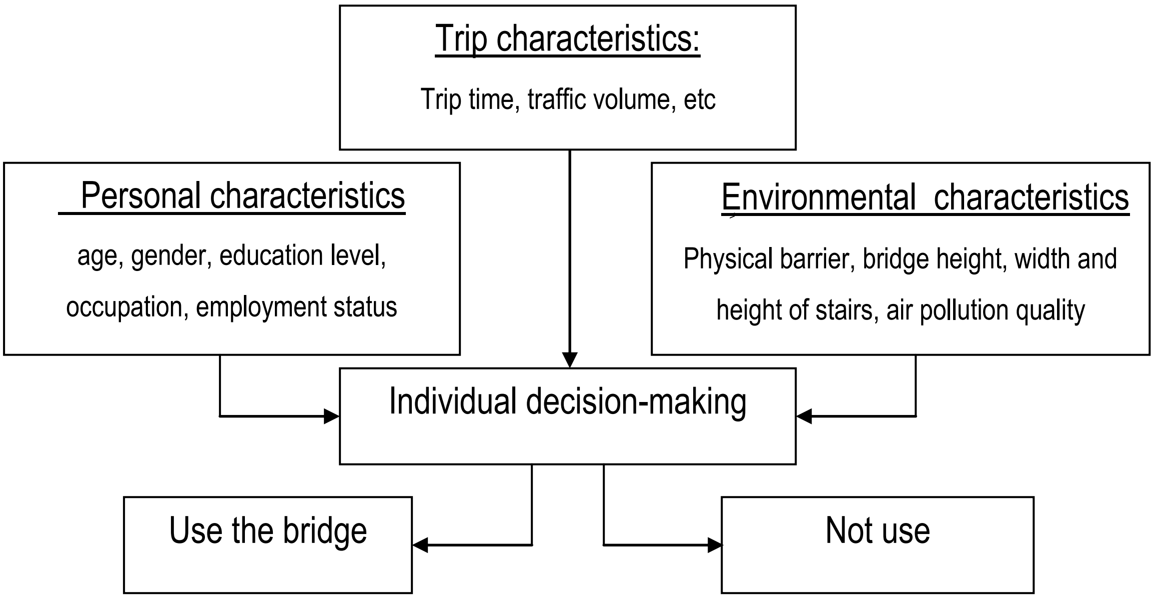


FIGURE 2 - THE CONCEPTUAL MODEL

## 4. SITE SELECTION METHODS BASED ON THE CHARACTERISTICS OF PEDESTRIAN BRIDGES

For the purpose of this study, ten different pedestrian bridges on the streets of Tehran and Shiraz were chosen. In order to eliminate the effect of facilitators such as the existence of escalators, we only considered those pedestrian bridges that have no escalators (Figure 3).

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The characteristics of the bridges are summarized in Table 1. The heights of the bridges were 5.5 to 6 meters, which could be accessed by 27 to 32 steps of each 18 cm to 23 cm high. Among the ten chosen bridges, bridge numbers 1, 3 and 7 were simple bridges with two stairways (at each side) going up. Six bridges were constructed over signalized intersections where pedestrian crossings or lights were implemented at ground level. There were high fences on parts of the streets under bridges 1 and 2 which would prevent pedestrians from crossing the streets at those parts at the ground level. Additionally, six bridges were covered.

FIGURE 3 - TWO SAMPLE BRIDGES: HAFT-TAN BLVD. AND MOALEM SQ. (SHIRAZ).

The average width of the bridges was 1.4 meters, and the average length of the bridges was 34.9 meters, which is 4 meters larger than the average width of the streets under them. Also, most of the bridges were located on major two way streets

TABLE 1 - CHARACTERISTICS OF THE STUDY AREA

| Bridge characteristics | | | | | | | | | Street characteristics | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bridge No. | Address | Roof cover | Height (m) | Width (m) | Length (m) | Number of stairways | Number of steps in each stairway | Visual accessibility | Dominant Land use | Width (m) | Directions | Number of lanes in each direction |
| 1 | Shiraz-Hafttanan Blv. | N | 5.6 | 1.5 | 50 | 2 | 31 | 50% | Res. | 45 | 2 | 4 |
| 2 | Shiraz-Moalem Sq. | N | 5.5 | 1.4 | 50 | 1 | 30 | 20% | | 45 | 2 | 4 |
| 3 | Tehran-Enghelab Sq. | Y | 5.5 | 1.2 | 20 | 2 | 29 | 100% | Com. | 16 | 2 | 3 |
| 4 | Tehran- Sardar Blv. | Y | 6 | 1.4 | 40 | 1 | 30 | 100% | Res. | 35 | 2 | 3 |
| 5 | Tehran- Ponak Sq. | Y | 6.2 | 1.5 | 50 | 1 | 27 | 100% | Com. | 45 | 2 | 4 |
| 6 | Tehran- Baghe Feiz Intersection | Y | 5.8 | 1.5 | 25 | 1 | 32 | 50% | Res. | 22 | 2 | 4 |
| 7 | Tehran- Saadi Intersection | N | 5.5 | 1.2 | 20 | 2 | 29 | 100% | Com. | 16 | 1 | 5 |
| 8 | Tehran- Molavi Ave. | Y | 6 | 1.2 | 22 | 1 | 30 | 100% | Com. | 20 | 2 | 2 |
| 9 | Tehran- Khayam Ave. | N | 6 | 1.2 | 22 | 1 | 30 | 100% | Com. | 20 | 1 | 4 |
| 10 | Tehran- Mirdamad Blv. | Y | 6 | 2 | 50 | 1 | 30 | 20% | Com. | 45 | 2 | 4 |
| Average | | - | 5.8 | 1.4 | 34.9 | - | 29.8 | - | - | 30.9 | - | - |

Y= Yes, N=No, Com. = Commercial; Res. = Residential



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## 5. GENERAL SITE OBSERVATION

In order to estimate the traffic volume and the average vehicle speed, video recordings were conducted. For measuring the traffic volume (including all motor vehicles) we used these recordings. Also, the speed of the traffic was estimated by calculating the time it took for a car to pass through two reference lines on the street with known distances. This process was repeated for the ten chosen bridges. Table 2 contains the information obtained from these observations.

TABLE 2 – BRIDGE USE RATE AND CHARACTERISTICS OF THE STUDY AREA

| Bridge No. | Traffic light or pelican crossing | Physical barrier | On the street | | Bridge users (%) |
|---|---|---|---|---|---|
| | | | Traffic Vol. (Veh./h) | Avg. Speed (Km./h) | |
| 1 | No | Fence | 5196 | 75 | 85 |
| 2 | Yes | Fence | 6260 | 60 | 80 |
| 3 | Yes | ---- | 5124 | 20 | 65 |
| 4 | No | Guardrail | 2220 | 65 | 60 |
| 5 | No | Guardrail | 4758 | 65 | 70 |
| 6 | Yes | Guardrail | 7290 | 40 | 30 |
| 7 | Yes | ---- | 5570 | 25 | 25 |
| 8 | No | ---- | 2841 | 25 | 20 |
| 9 | No | ---- | 1926 | 30 | 20 |
| 10 | No | Planting | 6852 | 55 | 50 |
| Average | N/A | N/A | 4804 | 46 | 50.5 |

The average traffic volume and average vehicle speed were 4804 vehicle per hour and 46 Km. per hour respectively. The maximum traffic volume was in Baghefeiz intersection, site of bridge number 6, and the minimum traffic volume was observed at Khayam Street, site of bridge number 9. The highest vehicle speed was at Haft-tanan Street in Shiraz, site of bridge number 1, and the lowest observed vehicle speed was at Enghelab Square in Tehran, site of bridge number 3.

To investigate the relationship between the rate of using the bridges and the average speed of the vehicles and the traffic volume (as independent variables), Pierson correlation was calculated. According to the result of this calculation (Table 3), the only significant relationship is between the average speed of the vehicles and the percentage of the bridge users.

TABLE 3 - RESULTS OF PIERSON CORRELATION BETWEEN THE SPEED AND TRAFFIC VOLUME WITH THE PERCENTAGE OF BRIDGE USERS

| Variable | Percentage of bridge users | |
|---|---|---|
| | Pierson correlation | Sig. (2-tailed) |
| Avg. Speed of vehicle * | 0.737 | 0.015 |
| Traffic Vol. | 0.262 | 0.465 |

* Correlation is significant at the 0.05 level (2-tailed)

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## 6. QUESTIONNAIRE

A questionnaire was designed to gather information on the pedestrian perception of using the pedestrian bridges. The topics of the questions included importance of traffic volume, familiarity with the site, frequency of bridge use, beliefs on safety orientation, etc. In addition to the scores on these variables (mostly on the Likert scale), the respondents' age, gender, and driving license ownership were recorded.

The choice of people for the interview was made randomly from pedestrians using each bridge, or crossing at street level under the bridge (or within 50m of it). The observations for all bridges were conducted during 12:00–14:00 on a working day, in order to control the possible effects of the time of the day. The interviewers at each site consisted of 20 people, 10 on the bridge and the other 10 at the street level. Interviewers were asked to ensure that in their sample they aim for about %50 bridge users and %50 non-users.

TABLE 4 - AGE AND SEX OF THE RESPONDENTS BY INTERVIEW SITE

| Age | On the bridge (n) | | | On the street (n) | | |
|---|---|---|---|---|---|---|
| | Female | Male | Total | Female | Male | Total |
| 18-20 | 3 | 1 | 4 | 4 | 6 | 10 |
| 20-39 | 23 | 32 | 55 | 20 | 17 | 37 |
| 40-59 | 15 | 9 | 24 | 18 | 14 | 32 |
| Above 60 | 9 | 8 | 17 | 8 | 13 | 21 |
| Total | 50 | 50 | 100 | 50 | 50 | 100 |

Respondents for this study were 200 pedestrians (18–78 years of age, %50 male) who used the bridge or crossed under it at the 10 chosen bridges.

## 7. RESULTS AND CONCLUSIONS

In order to study the factors influencing the use of the bridges, the correlation coefficient between using the bridges and the factors obtained from the responses was calculated. The use of bridge (did not use the bridge versus used the bridge) was the dependent variable. The independent variables measured factors such as familiarity with the sites, frequency and convenience of the bridge use, safety beliefs, age, gender, etc. (variables shown in the first column of Table 5).

The results show that %33 of respondents have private cars, and %68 have a driver's license, but there is no significant relationship between use of the bridge, and car ownership or having a driver's license. %49 of the respondents regularly exercise; however, this does not influence their tendency to use the bridge.



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TABLE 5 - CORRELATION COEFFICIENT BETWEEN THE INDEPENDENT VARIABLES AND THE BRIDGE USE

| Variable | Correlation coefficient | Type of correlation | Sig. (2-tailed) |
|---|---|---|---|
| Income | -0.066 | Spearman's rho | 0.356 |
| Education | 0.018 | Spearman's rho | 0.805 |
| Familiarity with the site | -0.006 | Spearman's rho | 0.935 |
| Vehicles' speed | -0.016 | Spearman's rho | 0.817 |
| Location of the bridge | -0.074 | Spearman's rho | 0.299 |
| Noise pollution | -0.116 | Spearman's rho | 0.100 |
| Travel time | 0.117 | Spearman's rho | 0.098 |
| Pedestrian's Physical condition | 0.087 | Spearman's rho | 0.222 |
| Bridge convenience | 0.101 | Spearman's rho | 0.156 |
| Density of people on the bridge | -0.023 | Spearman's rho | 0.742 |
| Private car ownership | 0.011 | Phi & Cramer's V | 0.880 |
| Driving license ownership | 0.050 | Phi & Cramer's V | 0.479 |
| Regular exercise | 0.021 | Phi & Cramer's V | 0.762 |
| Security in day | -0.009 | Spearman's rho | 0.902 |
| Security at night | -0.006 | Spearman's rho | 0.928 |
| Safety of the bridge | -0.067 | Spearman's rho | 0.349 |
| Frequency of the bridge use * | -0.479 | Spearman's rho | 0.000 |
| Past involvement in traffic accidents * | 0.179 | Phi & Cramer's V | 0.011 |
| Time of the day * | 0.161 | Spearman's rho | 0.023 |
| Density of people under the bridge * | 0.158 | Spearman's rho | 0.025 |
| Safety of intersection crossing * | -0.205 | Spearman's rho | 0.004 |
| Safety of unofficial crossings (without traffic lights)* | -0.500 | Spearman's rho | 0.000 |

* Correlation is significant at the 0.05 level (2-tailed)

Our results imply that there is no significant relationship between using a pedestrian bridge, and socio-economical characteristics such as level of income, access to private cars, familiarity with the site, possession of a driver's license, and doing regular exercise. There was a strong relationship between the responses to Question 5: "How often do you cross this street using this pedestrian bridge?" and the use of the bridge at the interview time. Therefore, we may conclude that the bridge use or non-use is rather a habit rather than coincidental behaviour. According to these results, habit or past behaviour seems to be strong predictors of the current behaviour.

According to the respondents, they felt that the pedestrian bridges were secure, and only a few of the respondents (6%) were worried about the bridge's security. There was no significant difference in feeling secure while using the bridge during the day or at night. Also, the differences in the types of the bridges or background factors did not impact the bridge use. Noise pollution was not an important factor for %65 of the respondents; this implies the compatibility of citizens with existing noise level on the city streets.

When the pedestrians were asked about safety of crossing the intersections with traffic lights compared to the unofficial crossing places (where there is no traffic control device for the crossing pedestrians),

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almost all of the respondents believed latter to be much more dangerous than former, and %88 of the respondents described bridges as a safe way to cross busy roads.

As expected, high speed of vehicles moving through streets makes pedestrians more cautious, and as a result most pedestrians use bridges for crossing streets. Hence, vehicle speed is an influential factor on the pedestrian's decision. Nonetheless, pedestrians prefer signalized crossings to bridges or underpasses because of the potential savings in time and energy for them.

It was also evident that the crosswalk location, relative to the origin and destination of the pedestrians, was the most influential decision factor for pedestrians deciding to cross at a designated location (%62 of interviewees agreed to the statement).

We noticed that there is no considerable difference between the number of respondents who take into account the time of the day when crossing the street, and those who don't. Responses about the density of people on or under the bridge showed that the density of people is not a significant factor in a pedestrian's decision.

Physical ability of different age groups, and the convenience of using the bridge, were among important factors, as described essential by more than %80 of respondents. Also, %87 of people stated that when they accompany a child, they always use a pedestrian bridge.

In general, elderly pedestrians indicated exhaustion and carrying occasional baggage in hand as excuses for not using the bridges. The justification given by younger pedestrians for not using bridges included being in a hurry and saving time. In order to increase the use of pedestrians' bridges, escalators may seem to be a good solution, especially since they address the problems of the elderly pedestrians. However, the existence of traffic signals under a bridge may deteriorate the rate of use. Moreover, dense vegetation and tall barriers may influence the decision of a significant number of pedestrians. Proper traffic control can further encourage pedestrian crossings at designated locations, since the effect of the availability of pedestrian signals on the pedestrian's decision to cross at a specific location was relatively high. The findings from this study could potentially assist traffic engineers, urban planners and policy makers in understanding pedestrians' behaviours and their opinion on pedestrian bridges.

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