Demographic differences in the travel Behaviour: Case Study of regional route in Iraq

Hayder Mohammed AL-Taweel1, Ahmed Shaker Al-Bdairi1, Ahmed S. D. Al-Ridha2 and Younis M. Yousif1

1Highway and Transportation Department/ College of Engineering / Mustansiriyah University
2Civil Engineering Department / Al-Mustansiriyah University/ Baghdad/ Iraq.

Abstract.
Objective: The aim of this work is to the relation between age, and gender and choosing a certain mode of transport to travel between two main Iraqi cites.
Methods: a statistical method, T-test, is used to distinguish between these parameters.
Data: Infield survey data was collected using questionnaire.
Results: the results indicate that passengers are differentiated in terms of age, and gender. For instance:
1- As age of male traveler increased, participants were more likely to travel by train than other mode of transport.
2- As age of female traveler increased, participants were more likely to travel by small vehicles than other mode of transport.

1. Introduction
Several studies used different modelling techniques to explore the relationship between mode of transport and demographic characteristics of passengers [1-13]. The gender is considered as an important variable of travel behavior. Previous studies have revealed that females are expected to travel more frequently than males, however the total travelled distance is fewer for the females. This can be due to women natural roles in household. Their duties include escorting children or shopping, which makes their travels more often than males, although the trips are done close to origin as their destinations are not far away from their origin [14]. Age is additional element that has an influence on travel behavior. According to previous researches, young people, adults and older people have variations in their travel behavior [15–18]. These variances can occur due to they participate in various kinds of activities, young people primarily are engaged in social activities and educational. The adults or parents are mainly engaged in activities that related to work. The older essentially are engaged in social and leisure activities. These activities affect the distance of travel. For instance, children’s activities are generally concentrated in a small area. This literature concludes that mode choice behavior of travelers is influenced by social, economic, cultural, and environmental factors. Thus, this study devoted to understand the relation between age, and gender and choosing certain mode of transport to travel between two main Iraqi cites.

2. Data
Data is collected from four group of passengers who travel between Baghdad to Basra as seen in figure 1-1.
Regional Route Baghdad-Basra

Figure 1. Four group of passengers participate in the survey
Source: The map captured from Google map

The length of journey between these two cities is more than 500 km. It takes about 5 hours by driving a small car. This study selected these two main cities because their good geographic position and good transport connections. Where, Baghdad is the administrative capital, and Basra is the only seaport of the republic of Iraq. Three hundred and fifty passengers volunteered to participate in the questionnaire survey. Their details are used in this research using T-test as seen next.

3. Method of Analysis
T test is used to compare two different data population. It is generally applied to normal distribution which has a small population of data. This test compares the mean of two samples as Equation 1 (Field, 2009) is shown below:

\[ t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \]  (1)

for example, where \( \bar{x}_1 \) is the mean of age of the male passengers travel by train as seen in Table (1). \( \bar{x}_2 \) is the mean of age of male passengers travel by minibus. \( s_1 \) is standard deviation of male passengers travel by train, \( s_2 \) is standard deviation male passengers travel by minibus, \( n_1 \) is total number of male passengers travel by train, and \( n_2 \) is total number of male passengers travel by minibus.

4. Results and Discussions
This paper presents six relationships between mode of transport and differences in age and gender of the participants.

4.1 Differences between Train and Mini Bus:
Tables 1 and 2 display the relation between gender “male travelers”, mode of transport and mean of participants’ age. The mean of age for train travelers was higher than mini bus (37.8 vs 35.2). This may mean, within this data, the travelers who choose to travel by train are older than traveler who choose to travel by minibus. Therefore, within this data a higher proportion of elderly male-travelers choose train than minibus. Tables also show differences in mean of participants age was 2.6, in Std. Deviation was 12.3, and P-value was less than 0.05.

Table 1. Age of Participants and Mode of Transport (Train and Mini Bus)
Table 3. Age of Participants, Gender and Mode of Transport (Train and Mini Bus)

| Gender | Mode of Transport | Mean of Participants Age |
|--------|-------------------|--------------------------|
| Female | Train             | 31.6                     |
| Female | Mini Bus          | 32.6                     |

Table 4. Result of T–test when gender of Participants is Female

| Gender of Participants | Mode of Transport | Mean of Participants Age | Std. Deviation | 95% Confidence Interval of the Difference | P-value |
|------------------------|-------------------|--------------------------|----------------|------------------------------------------|---------|
| Female                 | Train             | -1.0                     | 9.53           | -6.7 to 4.75                             | > 0.05  |
| Female                 | Mini Bus          |                          |                |                                          |         |

4.2 Differences between Train and Small Vehicles:

Tables 5 and 6 display the relation between gender “male travelers”, mode of transport and mean of participants’ age. The mean of age was higher with train travelers (37.6 vs 28). This may mean, within this data, the travelers who choose to travel by train are older than traveler who choose to travel by small vehicles. Therefore, within this data a higher proportion of elderly travelers choose train than small vehicles. They also show the differences in mean of participants age was almost 10, in Std. Deviation was 14.2, and P-value was less than 0.05.

Table 5. Age of Participants, Gender and Mode of Transport (Train and Small Vehicles)

| Gender | Mode of Transport | Mean of Participants Age |
|--------|-------------------|--------------------------|
| Male   | Train             | 37.6                     |
| Male   | Small Vehicles    | 28.0                     |

Table 6. Result of T–test when gender of Participants is Male and Mode of Transport (Train and Small Vehicles)
### Table 7. Age of Participants, Gender and Mode of Transport (Train and Small Vehicles)

| Gender | Mode of Transport | Mean of Participants Age |
|--------|------------------|--------------------------|
| Female | Train            | 31.6                     |
| Female | Small Vehicles   | 32.3                     |

### Table 8. Result of T-test when gender of Participants is female and Mode of Transport (Train and Small Vehicles)

| Gender | Mode of Transport | Paired Differences | P-value |
|--------|------------------|--------------------|---------|
| Female | Train            | -0.7               | > 0.05  |
| Female | Small Vehicles   | -0.7               | > 0.05  |

### Differences between Train and Large Bus

Tables 9 and 10 display the relation between gender “male travelers”, mode of transport and mean of participants’ age. The mean of age was higher with large bus travelers (32.9 vs 35.7). This may mean, within this data, the travelers who choose to travel by large bus are older than traveler who choose to travel by train. Therefore, within this data a higher proportion of elderly travelers choose large buses than trains. They also show the differences in mean of participants age was -2.8, in Std. Deviation was 15.0, and P-value was more than 0.05.

### Table 9. Age of Participants, Gender and Mode of Transport (Train and Large Bus)

| Gender | Mode of Transport | Mean of Participants Age |
|--------|------------------|--------------------------|
| Male   | Train            | 32.9                     |
| Male   | Large Bus        | 35.7                     |

### Table 10. Result of T-test when gender of Participants is female and Mode of Transport (Train and Large Bus)

| Gender | Mode of Transport | Paired Differences | P-value |
|--------|------------------|--------------------|---------|
| Female | Train            | -0.7               | > 0.05  |
| Female | Large Bus        | -0.7               | > 0.05  |
### Tables 11 and 12 display the relation between gender “female travelers”, mode of transport and mean of participants’ age. The mean of age was higher with large bus travelers (31.6 vs 41.6). This may mean, within this data, the travelers who choose to travel by large buses are older than traveler who choose to travel by train. Therefore, within this data a higher proportion of elderly travelers choose large buses than trains. They also show the differences in mean of participants age was (-10.0), in Std. Deviation was 13.5, and P-value was less than 0.05.

#### Table 11. Age of Participants, Gender and Mode of Transport (Train and Large Bus)

| Gender | Mode of Transport | Mean of Participants Age |
|--------|-------------------|--------------------------|
| Female | Train             | 31.6                     |
| Female | Large Bus         | 41.6                     |

#### Table 12. Result of T–test when gender of Participants is female and Mode of Transport (Train and Large Bus)

| Gender | Mode of Transport | Paired Differences | 95% Confidence Interval of the Difference | P-value |
|--------|-------------------|--------------------|------------------------------------------|---------|
|        |                   | Mean              | Std. Deviation                           | Lower   | Upper   |         |
| Female | Train             | -10.0             | 13.35                                    | -18.14  | -2.0    | <0.05   |
| Female | Large Bus         |                   |                                          |         |         |         |

5. Conclusions

A T-test was conducted to investigate the distribution of demographic characteristics of passengers in regards choosing the preference the mode of transport. The results within this data show that:

- As age of male traveler increased, participants were more likely to travel by train than other mode of transport.
- As age of female traveler increased, participants were more likely to travel by small vehicles than other mode of transport.

The results in agreement with study of [20] where male and female passengers are differentiated in terms of choosing particular mode of transport.

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