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# AN EVALUATION OF HIGHER EDUCATION STUDENTS' APARTMENT PREFERENCES: A REAL WORLD STUDY IN A NEWLY URBANIZED CITY

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**Abstract**

This paper presents an evaluation of higher education students' apartment preferences with respect to multiple criteria. In order to find out the importance rankings of these criteria and determine the optimum apartment option conjoint analysis method is used. Location, renter, room, price, floor, age were identified as attributes. 343 students participated in the study by rating sixteen apartment profiles with different combinations of above mentioned six attributes. According to the results, number of rooms, price and location attributes have the greatest influence on students' decisions and these are followed by age, floor and renter attributes. Additionally the optimum apartment option is a central, 0-5 years aged, 3 bedroom and 1 living room apartment, rented by the householder with a price of 300-400 Turkish Liras. As an evaluation of a real world decision problem, the outcomes will help real estate agencies, householders and constructing firms in probable future decisions. Researchers who will perform a study in this field will be able take advantage of the results as well.

***Keywords:*** Conjoint analysis, Apartment preferences, Housing, Higher education students, Urbanization, Decision-making
***Jel Classification:*** R210

## 1. INTRODUCTION

Urbanization is one of the most effective matters in developing countries. This process can be seen as a result of individual, corporate and governmental attempts bringing advantages in job opportunities, education, health, entertainment, transportation etc. Naturally this progress may also cause some disadvantages such as lack of options in housing alternatives, unsatisfactory urban services, increasing prices, overpopulation, pollution, etc. (Chakrabarty 2001). As a developing country, Turkey has a rapid growth in urbanization rates and therefore in number of universities accordingly. Thus students who will start the higher education (HE) have several options of cities and universities with different advantages and

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disadvantages. While some of the students prefer to study in their hometowns, others leave their family homes for HE.

University preferences are affected by various factors. In general, highest preference percentages belong to the institutions which are located in Turkey's biggest metropolitan areas such as Istanbul, Ankara, Izmir, Bursa, etc. due to well-known advantages in people's career and also social lives. For those who will start their educations in smaller cities, it is commonly accepted that the geographical location of this cities and their social and economic structure have a strong influence on students. These cities offer various benefits to students specifically on the financial aspect of living conditions compared to the expensiveness in metropolitan areas. As to disadvantages, less active career and social life compared to those metropolitan areas which is also connected to the newly developing urbanized structure seems to be the main concern in these cities.

With the above mentioned urbanization process, which primarily should consider the progressive nature of universities, several needs emerge in these small cities in parallel with the increasing number of HE students. Above all of these needs, rising demand of accommodation options seems to be the most effective factor. Thus a proper accommodation arrangement becomes a top priority problem for those who leave their family homes and move to another city for education. Since a proper choice will promote the study environment, provide the necessary security along with the improvements in socialization which is quite important for the psyho-social maturation of the students (Hassanain 2008). In terms of accommodation there are several options in cities of Turkey including state or private dormitories, one-room apartments or regular apartments. Among these alternatives, one-room and regular apartments are the most preferred options according to the related recent studies (Ersoy and Arpacı 2003; Filiz and Demir 2004; Koç and Polat 2006; Demir et al. 2006; Arlı 2013).

Therefore in this study, apartment alternatives were evaluated with respect to multiple criteria in order to find out the importance rankings of these criteria and determine the optimum apartment option for HE students in Kütahya which is a small city located in the Aegean region of Turkey. In accordance with this goal conjoint analysis method which is a

convenient tool for choice-based decision problems was accepted as the main methodology. In this study, several discussions were held with students, real estate agents and house holders therefore synthesis and combination of various attributes are taken in order to present a suitable approach with regard to real-world apartment selection problems.

This study is divided into four sections. In the first section a brief introduction to the problem and the chosen method for the solution is mentioned. Section 2 includes an overview of conjoint analysis, its applications and the real world study for determining the essential attributes and ideal option in apartment selection of HE students in Kütahya including the components and analysis. Results and evaluation of the outcomes is presented in the last section.

## 2. MATERIALS AND METHODS

### 2.1. Conjoint analysis and its applications

Conjoint analysis was introduced in the late 1960s in the field of mathematical psychology (Luce & Tukey 1964) but its first appearance in consumer based literature was in 1971 (Green & Rao 1971). Along with the increasing importance of understanding consumer behavior in recent years conjoint analysis, which is a convenient and practical method, has attracted significant attention. The literature review suggests that during 1980's customer oriented applications of conjoint analysis were more than 400 (Wittink et al. 1992) while in 1990's this number was exceeded 1000 (Sattler and Hensel-Börner 2000). Because of its broad application area, an up to date collection of literature review concerning all fields of implementations is not present, yet during the research the authors encountered applications of conjoint analysis in various fields and some of them are mentioned below in Table 1.

**Table 1: Applications of conjoint analysis in various fields**

| **Fields** | **Authors** |
|---|---|
| Business and Management | Yano and Dobson (1998), Oppewal et al. (2000), Natter et al. (2002) Gustafsson et al. (2007), Borgers et al. (2011), Kuzmanovic and Martic (2012), Adhikari et al. (2013), Theysohn et al. (2013) |
| Engineering | Michalek et al. (2005), Liu et al. (2011), Wu et al. (2014) |
| Technology | Lee et al. (2009), Venkatesh et al. (2012), Acosta et al. (2013) |
| Urban Studies | Katoshevski et al. (2001), Tayyaran et al. (2003), Borgers et al. (2008) |
| Healthcare | Ween et al. (2005), Fisher et al. (2010), Kuzmanovic et al. (2012) |
| Education | Altun et al. (2010), Sohn and Ju (2010), Kuzmanovic et al. (2013) |

It can be clearly seen in Table 1 that conjoint analysis is a widely accepted and applied method in the literature (Vetschera et al. 2014). As the research focus of this study, housing preferences has been and still is being studied with the help of several approaches. In some studies this problem was handled for specific groups of people which are also presenting conjoint analysis approach; e.g. Louviere and Henley (1977) carried out a research regarding students' apartment selection. In this research, two models with three variables which were considered to effect apartment selection were inspected. Abdul Hamid et. al. (2008) examined attribute preferences concerning apartment selections of middle-income Malaysians. While Opoku and Abdul-Muhmin (2010) performed a research on housing preferences of low-income consumers in Saudi Arabia in order to figure out the socio-demographic backgrounds of consumers' decisions. Additionally De Jong et al. (2012) applied an empirical analysis for Dutch older citizens to determine the housing preferences and also to define potential differences between age groups. Apart from this, Timmermans et al. (1994) focused on housing preferences by means of revealed and stated modelling approaches. Tu and Goldfinch (1996) developed a new model in order to forecast the housing demand. Molin et al. (2000) examined two different conjoint methods for modelling housing preferences for groups while Earnhart (2002) used revealed and stated data with revealed preferences and discrete choice analysis in order to determine housing preferences. Wang and Li (2004) carried out a research in China with preference modelling approach to figure out the way that housing decisions are

made. Orzechowski et al. (2005) studied the effects of verbal and multimedia representation of profiles in conjoint analysis with regard to housing preferences.

Conjoint analysis mainly bases on profiles with combinations of various characteristics, namely attributes. The formation of these profiles hinges on carrying out statistical applications for all of these profiles (Jansen et al. 2011). Through conjoint analysis researchers can obtain much clearer insights into customer behaviors such as the real value that customers relate to above mentioned attributes when purchasing products (North and de Vos 2002). There are three different approaches in presenting above mentioned combinations to customers, namely full-profile, trade-off and pairwise comparisons (Zardari et al. 2007). As the full-profile approach was handled in this study, the analysis process in this approach consists of four steps: (i) Definition of the problem, (ii) Constructing profiles, (iii) Data collection, (iv) Analysis and evaluation of the results.

The first step of the conjoint analysis process is the definition of the problem. In this step, the problem and the objectives should be explained clearly within all related aspects. Especially the products or alternatives and their attributes and levels must be clearly listed and defined. Attributes indicates specific features of the products or alternatives such as size, color, speed, price, etc. and defined with at least two different levels of values. These levels express varied values of attributes and can be presented in numerical or verbal form in the study. These attributes and levels can be determined by organizing meetings with consumers and/or experts, making use of market researches, literature reviews and other various written and online sources.

After the determination of attributes and their levels, selection of a measurement task follows this step. There are three measurement tasks which are used in conjoint analysis, namely rating, ranking and choice-based tasks (Molin 2011). In rating based approach, respondents grade the profiles with the help of a numbered scale, while in ranking; the profiles are put in an order by respondents in accordance with their preferences and in choice-based approach, profiles are selected in doubles and one of these two profiles are selected by the respondent (Gustafsson et al. 2007).

After selection of measurement task, profiles are constructed by the combination of attribute levels. These profiles are being created by experimental design and will represent the alternatives which will be evaluated by the respondents. Experimental design has an essential role in this step as it provides the usability of statistical techniques and ensures the reliability of the acquired results. There are three kinds of designs in the literature: A *full-factorial design* is used if the number of attributes and their levels are limited. Yet this kind of design includes all possible combinations of the selected attribute levels. A *fractional factorial design,* namely *orthogonal design* is a reduced form of full-factorial design and is used if the attributes and their levels are several. The last type of design is *compromise design* which permits calculation of interaction-effects. This design includes a main-design which is associated with a second design that allows estimating above mentioned interaction effects (Molin 2011). Consequently by means of experimental design, number and combinations of profiles are determined, thereby profiles are constructed.

In the data collection process, the preference levels of profiles are quantified by taking the selected measurement task into account. In order to obtain this data from respondents' evaluations, an online or paper-based survey must be formed. Also, to perform an analysis concerning the data collected, the estimation of partial benefits of all attributes and levels are necessary. MONANOVA, LINMAP and OLS are mentioned as the most important estimation techniques in conjoint analysis (Gustafsson et al. 2007).

By obtaining the results an optimum option of alternatives can be constructed with respect to utility scores in addition to acquired importance scores of attributes. According to the results if there is any attribute that becomes prominent, this substantial information will guide decision-makers regarding the problem.

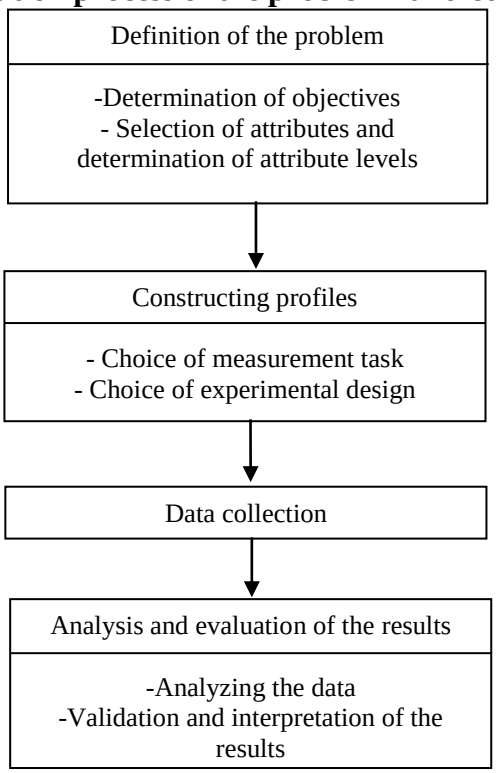
### 2.2. Determining the optimum apartment option and evaluation of attribute preferences of higher education students in Kütahya

In this study, a real world apartment selection problem of HE students in Kütahya was handled by determining the optimum option. As this problem includes multiple criteria which are considered to effect students' decisions, finding the importance rankings of these criteria, namely attributes of apartments were also aimed. Kütahya is a smaller city compared to other

metropolitan areas in the Agean region with a population of 350 thousand. Although according to a report of Zafer Development Agency (ZDA), which is a regional development agency, Kütahya has the highest development rate in this region with respect to social capital and quality of life (Zafer Development Agency 2011). In this city Dumlupınar University is the only higher education institution which has four institutes, ten faculties, five schools and thirteen vocational schools and was founded in 1992. The university has more than 40 thousand students and according to the numbers almost three quarter of these students is coming from the cities other than Kütahya.

With this observable increase of population and the priority of apartment accommodation preference it can be clearly stated that a high number of HE students in this city are facing a significant decision problem regarding apartments. This decision problem is maybe the first problem that the students face after leaving their hometowns for studying HE in another city. In addition, this problem includes various criteria namely attributes that influence preferences therefore conjoint analysis is accepted as the main methodology. This method can be used effectively in preference measurements and also it may expose motives that may not be observable at the first sight (Wu et al. 2014). In Figure 1, the steps of the analysis process followed in this study are shown.

**Figure 1: Solution process of the problem handled in this study**



### 2.2.1. Definition of the problem

The first step of the process includes the definition of the problem. As a rapidly urbanizing city, there is a distinctive need for accommodation options for increasing number of students in Kütahya. As it was told at the meetings that were held by the authors of this study, limited number of state and private dormitories and their restricted living conditions leads students to look for apartment accommodations. In accordance with this, the latest reports of Turkish Statistical Institute indicate that number of constructed apartments with one or more rooms have been doubled in two years in Kütahya (Turkish Statistical Institute 2012). Therefore the main objective of this study is specified as determining the importance rankings of apartment selection criteria and identifying ideal option for students. In this step attributes that are considered to affect the choice behavior were also selected.

This is followed by the determination of the attribute levels accordingly. In order to incorporate all aspects into this research and stay up to date regarding real world market conditions in Kütahya, meetings were organized with most recognized real estate agencies and various householders in addition to the preliminary meetings with students. Also with the contribution of literature reviews several attributes were taken into account which is considered to affect preferences of students regarding apartments. As a result six attributes with a total of eighteen levels were determined. Attributes and their levels were shown below in Table 2.

**Table 2: Attributes and levels of the research**

| Attributes | Levels |
|---|---|
| Location | Central, Not central |
| Renter | Real estate agency, Householder |
| Rooms | 1+1, 2+1, 3+1 |
| Price ("TL") | 300-400, 401-500, 501-600, >601 |
| Floor | 1, 2, 3, 4 or higher |
| Age | 0-5, 6-10, 11 or higher |

Regarding attributes and their levels shown in Table 2: *Location* of the apartments has two options namely close to the city center or far from the city center. As there are two types of *renters* in the market, real estate agencies and householders were taken into account. As a common expression in Turkey, *numbers of rooms* in the apartments were stated as sum of

bedrooms plus living rooms. In accordance with the market research, *price* attribute and its levels were determined in Turkish Liras (TL) as mentioned above. Next attribute, namely *floor* indicates the floor level where the apartment is situated in the building. *Age* attribute represents the age of the building.

### 2.2.2. Constructing profiles

In the first phase of constructing profiles, the measurement task was determined. A measurement task is about the kind of answer which is asked from the respondents. In this study, individual rating-based task was chosen because of its usefulness in surveys with a large number of contributors and also it presents a real-world simplification of real estate market conditions (Moore 2004).

In the following sub-step of the process, concerning presentation of experimental design, a full-profile approach is used. Additionally regarding number of profiles to be submitted, a reduced form is chosen for it eases the data collection step compared to the complete factorial design (Gustafsson et al. 2007). In this study there are pairs of two-level, three-level and four-level attributes therefore students would have to rate 576 profiles ($2^2x3^2x4^2$) if a complete factorial design were given. Instead sixteen profiles were presented to the respondents by using fractional factorial design, namely orthogonal design. These profiles are given in Table 3 below.

**Table 3: Profiles obtained from the orthogonal design**

| Profile | Location | Renter | Rooms | Price (TL) | Floor | Age |
|---|---|---|---|---|---|---|
| **1** | Central | Agency | 2+1 | 501-600 | >4 | 0-5 |
| **2** | Central | Agency | 1+1 | 401-500 | 3 | >11 |
| **3** | Central | Holder | 1+1 | 401-500 | 2 | 0-5 |
| **4** | Central | Holder | 1+1 | 300-400 | >4 | 6-10 |
| **5** | Not Central | Holder | 2+1 | 300-400 | 2 | >11 |
| **6** | Not Central | Agency | 1+1 | 501-600 | 2 | 0-5 |
| **7** | Not Central | Holder | 3+1 | 401-500 | >4 | 0-5 |
| **8** | Not Central | Agency | 2+1 | 401-500 | 1 | 6-10 |
| **9** | Central | Agency | 3+1 | >601 | 2 | 6-10 |
| **10** | Central | Holder | 3+1 | 501-600 | 1 | >11 |
| **11** | Not Central | Agency | 1+1 | >601 | >4 | >11 |
| **12** | Not Central | Holder | 1+1 | >601 | 1 | 0-5 |
| **13** | Not Central | Agency | 3+1 | 300-400 | 3 | 0-5 |
| **14** | Central | Holder | 2+1 | >601 | 3 | 0-5 |
| **15** | Not Central | Holder | 1+1 | 501-600 | 3 | 6-10 |
| **16** | Central | Agency | 1+1 | 300-400 | 1 | 0-5 |

### 2.2.3. Data collection

After obtaining profiles, data were collected by application of paper based surveys to 343 students. Students asked to rate sixteen profiles on a 0-10 scale, where 0 indicates definitely not preferable in renting the apartment and 10 indicates absolutely preferable in renting the apartment. This phase of the study is performed in accordance with the ethical standards by the principals of the Declaration of Helsinki.

### 2.2.4. Analysis and evaluation of the results

After the completion of the analysis, firstly we obtained the value of Kendall's tau as 0.879 and the value of Pearson's R as 0.975. It can be seen that these values are considerably high with a significant p value of 0,000. Therefore it can be said that our conjoint model has predictive accuracy with internal validity (Rao et al. 2011). After this phase, utility scores were obtained. Table 4 lists the utility scores for six attributes.

**Table 4: Utility scores of the attributes**

| Attributes | Levels | Utility Scores | Std. Error |
|---|---|---|---|
| Location | Central | 0,769 | 0,115 |
| | Not central | -0,769 | 0,115 |
| Renter | Real estate agency | -0,197 | 0,115 |
| | Householder | 0,197 | 0,115 |
| Rooms | 1+1 | 1,138 | 0,139 |
| | 2+1 | 2,277 | 0,278 |
| | 3+1 | 3,415 | 0,417 |
| Price (TL) | 300-400 | -0,765 | 0,103 |
| | 401-500 | -1,530 | 0,206 |
| | 501-600 | -2,295 | 0,309 |
| | >601 | -3,059 | 0,413 |
| Floor | 1 | 0,031 | 0,103 |
| | 2 | 0,062 | 0,206 |
| | 3 | 0,093 | 0,309 |
| | 4 or higher | 0,124 | 0,413 |
| Age | 0-5 | -0,253 | 0,139 |
| | 6-10 | -0,506 | 0,278 |
| | 11 or higher | -0,759 | 0,417 |

Based on the utility scores shown in Table 4 the attribute levels that have positive and negative effect on utilities can be seen. By making use of these scores, the optimal apartment option for HE students in Kütahya is mentioned on Table 5.

**Table 5: The optimum apartment option preferred by HE students**

| Attributes | Levels | Utility Scores |
|---|---|---|
| Location | Central | 0,769 |
| Renter | Householder | 0,197 |
| Rooms | 3+1 | 3,415 |
| Price (TL) | 300-400 | -0,765 |
| Floor | 4 or higher | 0,124 |
| Age | 0-5 | -0,253 |

According to the Table 5, the optimum option consists of a central, 0-5 years aged, 3+1 apartment, rented by the householder with a price of 300-400 TL.

Apart from the utility scores of these six attributes, conjoint analysis also gives importance score results out of a total 100 for each of them. These results were given in Table6.

**Table 6: Average importance scores of the attributes**

| Attributes | Scores |
|---|---|
| Location | 19,09 % |
| Renter | 8,57 % |
| Rooms | 25,69 % |
| Price | 25,22 % |
| Floor | 9,76 % |
| Age | 11,65 % |

According to the importance scores in Table 6, *rooms*, *price* and and *location* are the most effective attributes in students' decisions. This is followed by *age*, *floor* and finally *renter*.

## 3. RESULTS AND DISCUSSION

The relation between economic growth and urbanization is evident with regard to developing countries. Urbanization may not be seen as a cause but a result of economic progress which tends to bring advantages and disadvantages to public life. In this study the mutual relationship between an advantageous result and an adverse outcome of this rapid development in Turkey is handled for HE students who leave their hometowns to study in Kütahya. In rapidly urbanizing Kütahya, the number of HE students is increasing every year. In 2014 Dumlupınar University ranked 8$^{th}$ in top ten universities concerning occupancy rate with 14 thousand newcomers. As a result of several interviews that were held with students, real estate agents and house holders, it can be clearly stated that a rising demand of accommodation options is non-negligible in this city. Therefore as the most preferred option, apartment alternatives were evaluated in this study in order to find out the importance rankings of the criteria and determine the optimum apartment option for HE students. To achieve this goal conjoint analysis method was accepted as the methodology and the process in Figure 1 was followed respectively.

In the first step the research problem is defined with the objectives. Along with the contribution of interviews and literature review, attributes and their levels were also determined in this step. These attributes and their levels are shown in Table 2. In the following step, rating-based method was chosen as the measurement task with the full-profile approach. With the help of orthogonal design sixteen profiles which are presented in Table 3 were obtained. By presenting these profiles in paper-based surveys data were collected from

343 HE students. In the last step the analysis was carried out. After ensuring the predictive accuracy and validity, obtained results were shown in Tables 4, 5 and 6. According to the utility scores in Table 4; apartments located in the city center increases utility while apartments that are far from city center decreases the utility. Therefore apartments in the city center are preferred to apartments away from the city center. Concerning the renter of the apartment, apartments which are rented by the householders are increasing the utility while agencies decrease. The reason is that agencies demand a payment of an agency commission, mostly the same amount with the renting price. Therefore students prefer to avoid paying this price by renting the apartment from the householders. In order to reduce the living expenses, students mostly prefer living with their friends (Arlı 2013). Hence, an apartment with three bedrooms and a living room are the most preferable ones among other alternatives as it can be seen through the scores. Also this alternative has the highest utility scores among all other attributes and levels. Naturally the price attribute has a reverse effect on utility scores. Thereby it is obvious that respondents are attracted by apartments with lower prices. Also a high level of floor presents the highest score regarding utility which means that students prefer living in upper floors. The age of the building has also a reverse effect on utility scores. It means that increasing number of years regarding the age of an apartment makes it less preferable. In accordance with these scores, optimal apartment option from HE students' point of view was shown in Table 5.

Concerning the importance scores which are presented in Table 6; number of rooms has a score of 25,69 which means this attribute helped 25,69 % to the outcome of the student's decision making. Similarly price has almost efficient as the rooms attribute with a contribution of 25,22 % to the decision making. The importance scores of these two attributes confirm the financial priorities while making decisions in real-world problems. Location is the third most important attribute with a contribution of 19,09 % which is also a high score. As a natural consequence students prefer to stay in the city center since all aspects of the social life takes place in city centers with regard to entertainment opportunities and several needs. Additionally Dumlupınar University is located on the north edge of the city center therefore a central location of the apartment also ensures a much easier and less tiring transportation opportunity to the students. As it was mentioned in the meetings with students, the age of the apartment –with a score of 11,65 %- has two different influences on decision-

making process. First and most importantly although Kütahya is included in Zone 2 regarding earthquake zoning map of Turkey, the city is quite close to the most dangerous zone, known as Zone 1. Therefore it is quite reasonable to prefer much newer buildings in order to prevent from fatal and/or damaging effects of earthquakes. Secondly a newer apartment appeals to the eye with its never or slightly used conditions. Floor level has a score of 9,76 % which is seemingly relevant to the security advantage. Although renter attribute also has a financial consequence, students seem to discard this expense as it is only paid once if the apartment is rented by an agency and never paid if the apartment is rented by the householder. This attribute has a contribution of 8,57 % to the decisions. As a result, number of rooms, the price of the apartment and location has the highest influence on the decision of students in Kütahya while the age, the floor level and the renter attributes have relatively less importance in these decisions.

This study presents an evaluation of a real world decision problem, real estate agencies and householders even constructing firms in Kütahya may take advantage of the outcome and also these results will guide researchers who will perform a study in this field.

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