The housing preferences of Dutch and international students.

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Colophon

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Abstract

Currently, there is a shortage of student housing in the Netherlands. The shortage is in combination with a qualitative mismatch, which means that the housing preferences of students differ from the current housing supply. International students seem to be affected in particular. New housing units and policies should be initiated according to the preferences of (international) students. Only this will reduce the quantitative and qualitative shortage on the student housing market. This study has studied the housing preferences of students in Groningen, with the emphasis on whether the housing preferences vary between Dutch and international students. In this thesis, the housing preferences of Dutch and international students were studied with the use of a choice-based conjoint experiment and a multi-attribute experiment. Within this experiment, hypothetical student-rooms were defined by nine housing attributes with different values: monthly rent, size of the room, number of housemates, cycling time to the city center, cycling time to the main study location, presence outdoor space, presence of a common area and walking time to the nearest supermarket and walking time to the nearest bus stop. In the choice-based conjoint experiment the respondents were asked to select the most preferred housing from multiple sets of three student houses. In the multi-attribute utility experiment, the respondents rated each attribute and attribute level separately. The results show that students show greatest importance to the attribute monthly rent, followed by the size of the room and cycling time to the city center. Furthermore, differences in relative importance are found between Dutch and international students. International students focus more on the monthly rent and cycling time to the main study location than Dutch students and Dutch students attach more importance to the size of the room.

Keywords: Housing preferences, student housing, conjoint experiment, multi-attribute utility experiment

Contents

1. Introduction

There is currently a quantitative shortage of student housing in the Netherlands. Around 40,000 extra student rooms are needed to meet the demand of the student population of the Netherlands (Kences, 2017; LSVB, 2017). The quantitative shortage is mainly caused by the increasing number of international students (Kences, 2017). In the last decade, the number of international students has been doubled and is expected to grow with another 40% to 2024 (Kences, 2017).

In recent years, several student unions gave signals that there are not enough suitable accommodations available for in particular international students (GSB, 2017; LSVB, 2017). At the start of the academic year 2017-2018, the national student union reported that thousands of international students did not found a place to stay. According to the union, students were forced to stay at hostels, camping grounds or sleep in their cars (LSVB, 2017). A number international of students even terminated their studies in the Netherlands, because they could not find a place to live (LSVB, 2017).

For the Dutch government, the provision of student houses is an important topic (Blok, 2015). In 2011, a national action plan student housing plan was initiated to reduce the shortage in the student housing market. This plan has initiated the creation of 16,000 new student rooms (Kences, 2011). In December 2017, the Dutch Lower House (In Dutch: Tweede Kamer) agreed that a new national student housing action plan is needed to combat the still existing shortage on the housing market (Futselaar & Özdil, 2017).

Besides the quantitative shortage, also a qualitative mismatch is present on the Dutch student housing market. 36 percent of the current student housing supply does not meet the expectations of the students (Kences, 2016). Galster (1987) argues when the gap for an individual between the housing preferences and the current housing situation is too large, dissatisfaction occurs. According to Rapley (2003), the level of housing satisfaction is a determining factor the quality of life. Furthermore, when there is a qualitative mismatch on the housing market, it is harder to find a suitable living place. This potentially leads to a longer search and wait time for an appropriate house (Weibull, 1983).

The newly planned student housing units should be planned according to the preferences and needs of the (international) students. Only this will reduce the quantitative and qualitative shortage on the student housing market.

The topic of housing preferences and needs has been researched in a lot of studies in various disciplines (Timmermans et al., 1992). The student housing sector is a particular niche market. This means that some salient attributes in the general housing preference studies are not applicable or relevant in the student housing niche market (Rugg et al., 2000).

Currently, few studies about student housing preferences are available (Nijenstein et al., 2015). The available academic studies about student housing preferences are often conducted

in a different setting. Studies performed in countries with other student housing systems than in the Netherlands may not be comparable. For example, in the United States students often live in dormitories on campus (Amole, 2009). In the Netherlands it is not common that students live on the campus and live in dormitories. Furthermore, student housing preferences change and differ over time (Jansen et al., 2011). Market conditions change. An up-to-date research in student housing preferences will therefore be valuable to initiate new policy to reduce the student housing shortage.

Among scholars, it is widely accepted that socio-demographic factors, cultural factors, the stage in the life-cycle and changes in life do influence housing needs and preferences of individuals (Jansen, 2011). In this theory, it is argued that international students have different needs and preferences than Dutch students (Kences, 2017). At this moment there is no specific academic research been done what the housing preferences are of international students and whether there is a difference in the housing preferences between Dutch and international students. Such a research would be valuable because the international student population is expected to grow substantially the upcoming years (Kences, 2017).

1.1 Research aim.

The aim of this research is to obtain knowledge of the housing preferences of students in the city of Groningen, with the emphasis whether there is a difference between housing preferences between Dutch and international students. With the results of this study specific policies could be initiated to create new suitable housing, which implies the housing needs and preferences, for Dutch and international students. Furthermore, with the results of this study further research on the housing situation of international student can be initiated. International students are projected to become a more important group, as the international student population is projected to be 40% larger in 2024 compared to 2017 (Kences, 2017).

1.2 Research questions

This research focuses on students in the Dutch city of Groningen during the academic year 2017-2018. The research question of this thesis is:

Which attributes determine the housing preferences of students in the city of Groningen and what are the differences in housing preferences between Dutch and international students?

Sub-questions

1) What mechanisms drive student housing preferences and housing choice behavior?

This question will be explored by doing a literature research. The student housing market is a particular niche market, with specific characteristics and features. Students have specific needs and preferences. A literature research will be performed to explore the different factors that possibly influence the housing preferences of students.

2) How are housing preferences measured and which methods are most useful?

Because housing preferences is a widely discussed and studied subject, many methods have emerged. The research process to obtain the most suitable methods will be set apart.

3) What is the relative importance of the different attributes that determine the housing preferences of students?

The survey results will be used to analyze the relative importance of the particular attributes to the overall housing preferences.

4) To which housing attributes attach Dutch and international students the most relative importance?

The results of the survey will be analyzed, whether there is a difference between Dutch and international students on which housing attributes the most relative importance is attached.

1.3 Case study

This thesis focuses on students studying in the Dutch city of Groningen. The city of Groningen is known for being a student city. There are two main higher educational institutes in Groningen, the Hanze University of Applied Sciences (HUA) and the University of Groningen (UoG). There are currently 25,000 students at the HUA and 30,000 students at the UoG enrolled respectively (CBS, 2017). The city of Groningen does not have a central campus were all the buildings and facilities of the higher educational institutes are located. Instead the buildings of the educational institutes are spread across the city.

The city of Groningen inhabits around 36,000 students, 18 percent of the total population of the city of Groningen (Gemeente Groningen, 2018). The international student population is around 7,500 (DVNH, 2017). The projection is that in the year 2024 the international student population in Groningen will increase by 39 percent (Kences, 2017).

At the start of the academic year 2017-2018, there was a shortage of 1,900 student rooms in the city of Groningen (LSVB, 2017). Especially international students had troubles to find a place to live (DVNH, 2017). The municipality of Groningen sheltered international students who did not have a place to stay temporarily in a former asylum seekers center (DVNH, 2017).

The municipality of Groningen has made multiple policy plans to combat the shortage and other issues on the student housing market. The municipality plans to create of around 4,000 new housing units for students to 2020 (Gemeente Groningen, 2018). In the policy plans, explicit attention is given to the housing of international students. The municipality of Groningen stated that the housing of international students has the priority. The municipality has the intention to co-operate with the higher educational institutes for the creation of multiple new accommodations for international students (Gemeente Groningen, 2018)

Next to quantitative shortage on student housing for international students, the municipality of Groningen also mentions that the current state of the international student housing lacks in quality and needs a renovation. The municipality of Groningen has initiated to create multiple new housing units especially for international students and improve the quality of the existing supply of international student housing (Gemeente Groningen, 2018).

1.4 Conceptual Framework

To better understand the housing preferences of households, it is important to have in-depth knowledge on the housing choice process. The conceptual framework is presented in figure 1. This framework shows the simplified housing choice process of households. The conceptual model illustrates that housing choice behavior is an outcome of an individual decision-making process (Kemperman, 2000).

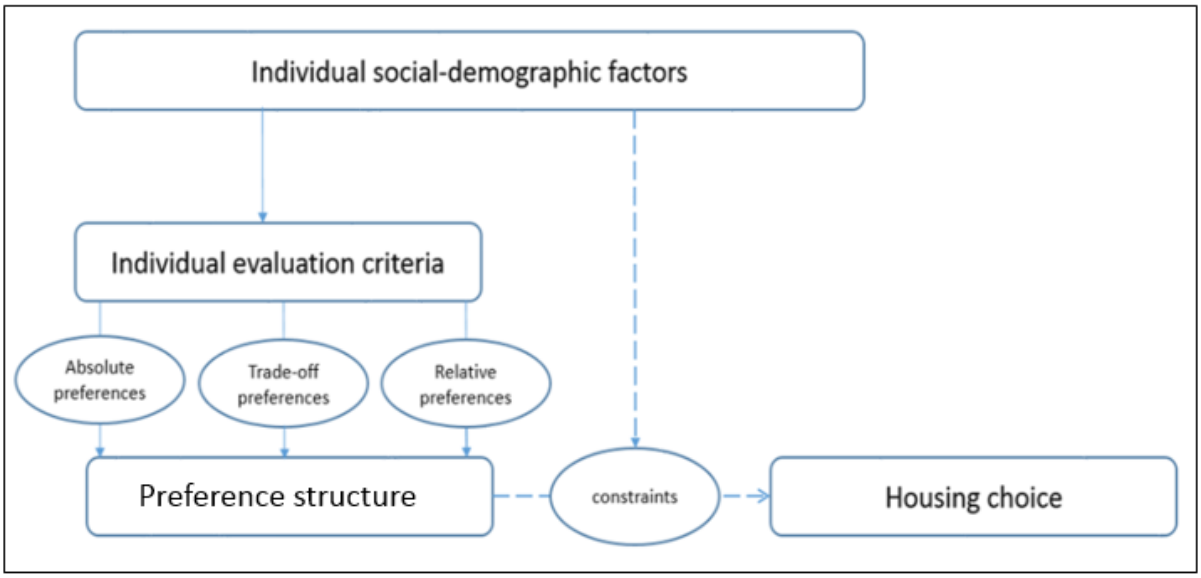

Figure 1: Conceptual Framework: housing choice process.

In housing studies, it is assumed that households make evaluation criteria according their current living conditions, such as social, demographic, cultural and economic conditions. With these evaluation criteria households evaluate the different features of a house. In housing studies, it is assumed that houses can be described by a bundle of features. A feature of a house is called an attribute and specific value of the feature is called an attribute level. An example of an attribute is the type of the house, with a possible attribute level being a studio-apartment (Timmermans et al., 2014).

Individuals evaluate the different attributes on importance and attractiveness according their evaluation criteria, which result in a preference structure. Floor and van Kempen (1997) have constructed three categories, which divide the attributes on indicated level of importance and attractiveness: Absolute preferences, trade-off preferences and relative preferences. If an

absolute preference is missing or doesn't reach satisfactory value, the housing situation is rejected. If a trade-off preference is missing, it needs a suitable compensation of another preference. When this is not occurring, the product will be rejected. A relative preference is considered important to an individual, but if the preference is missing the product will not be rejected. With the preference structure all combinations of attributes can be evaluated, the most preferred house can be formed. This preference structure is the main focus of this research.

Constraints, such as budget and governmental regulations, cause that not all housing options are achievable. In reality, households choose a house that come closest to their housing preferences and creates the highest amount of satisfaction.

2. Background

At the start of the academic year 2016-2017 around 730,000 students were enrolled at a public funded higher educational institute in the Netherlands for a full or dual program (CBS, 2017). There are broadly speaking two types of higher educational institutions in the Netherlands. The universities of applied sciences (In Dutch: Hoger beroepsonderwijs or i.e. HBO) and research universities (In Dutch: Wetenschappelijk Onderwijs or i.e. WO). Spread across the country, there are currently 37 HBO institutes with in total 452,000 students enrolled and 13 WO institutes with 278,000 students enrolled (CBS, 2017).

In recent years the Dutch higher education institutes were focused on internationalization. According to the VSNU and VH, the unions of Dutch higher education institutes, internationalization is an essential step if the Netherlands desires to keep developing as a knowledge economy and to stay a competitive market (VSNU, 2016). These organizations created policies that have the aim to brand the Dutch system of higher education and research, develop and improve international programs and monitor the internationalization progress. This resulted that in 2017, 60 percent of all programs at the WO institutes and 22 percent of the HBO institutes are in English (Nuffic, 2017).

In recent years the number of international students has increased substantially. The number of international students who are enrolled for a full degree more than doubled from around 40,000 in 2006 to almost 90,000 in 2017. Relative to the academic year 2016 the number of international students has increased to 8,500 in the 2017 (Nuffic, 2017). It is expected that in 2024 the international student population will grow with almost 40 percent (Kences, 2017).

Student housing situation in the Netherlands.

The organization of student housing in the Netherlands differs from that in many other countries. In the Netherlands, the higher educational institutes do not provide housing for the students, such as halls or dormitories on the campus. Students are expected to find their own accommodation on the housing market. In the Netherlands it is most common that students live in rooms with shared amenities throughout the university cities, but often very much concentrated in and around the city center. In addition, 46 percent of the students are living at their parental home (Kences, 2017).

3. Theoretical framework.

3.1 Housing choice process and housing preferences

Preferences are an outcome of personal subjective values and motivations (Molin, 1996). In micro-economics, preferences are considered to have an important element in choice-making processes. When an individual has to make a complex decision, the decision-maker has to take multiple attributes into account and evaluate them. The micro-economic consumer theory assumes that individuals derive a particular utility from each attribute, based on their preferences. It is assumed in this theory that individuals display rational choice behavior and allocate their budget to the different products in such way that the overall utility will be maximized. Particular attributes have a different level of importance.

The choice process is considered to be a dynamic process in which people want to achieve the highest utility (Coolen & Hoekstra, 2001). Jansen et al. (2011) mention that the biggest difference between choice and preference is that preferences are relatively unconstrained. Preferences do guide choices but might not show a strong connection with the actual choice made. This especially the case in the housing choice process.

For many individuals, their most preferred house would for example be spacious, include a big garden, luxurious, closely located to urban facilities and located in a quiet and green environment. However, in reality such a house is not achievable for most people because of various constraints. The constraint could be the budget, government regulations, and the supply of housing and transparency of the housing market (Priemus, 1984; Gibler and Nelson, 2003). Instead, people search a house that creates the most amount of living satisfaction (Jansen et al., 2011). Constraints cause that people have to make a trade-off between preferences. This results in that different attributes have a different level of importance.

Priemus (1984) classified the search for the most suitable a house into three types; the subjective ideal dwelling, objective ideal dwelling and the aspiration level. The subjective ideal dwelling is the dwelling that is ideal according to a household or individual. It has all the specific features that a household wants, not constrained by budget, supply or other factors. The objective ideal dwelling is and the most rational house for a household according to housing experts. They base their choice by analyzing criteria that seem to be important for a household, but do not take constraints into account. At last the aspiration level: It refers to the dwelling for a household that is achievable when considering constraint and reaches the closest to objective and subjective ideal dwelling. In order to get to the highest aspiration level households will always try to come as close to subjective and objective ideal dwelling (Priemus, 1980). The success to obtain a house with the highest utility level, depends on different factors such as knowledge of the local market, financial resources, the search time and the needs of the individual (Priemus, 1994).

Housing choice process of students

According to Clark and Onaka (1983) and Mulder and Manting (1994), an accessibility to an education is a decisive factor to move and choose a new house. Students often change from living at their parental home to living on their own in the time that they are attending a higher educational institute. In the Netherlands many students live on their own. In the academic year 2015-2016, 56.1% lived outside their parental home (Kences, 2016). In the Netherlands leaving the parental home is influenced by where the parental home is located (de Jong et al., 2007). The average age that someone leaves their parental home is one year earlier in the Dutch more rural provinces Friesland, Groningen, Drenthe, Flevoland and Zeeland. This is mainly because of absence of higher education institutes closely to the parental home. Furthermore, almost all international students live on their own (Kences, 2016). The distance between the new location and parental home or original living place is too great to commute (Clark and Onaka, 1983).

To identify the housing conditions in different stages in life, Clapham (2005) introduced the term “housing pathways”. Clapham (2005) formulated housing pathways as a framework for housing research. The term is defined by Clapham (2005) as: "patterns of interaction (practices) concerning house and home, over time and space". According to Clapham (2005) everyone has a particular pathway through their life. This pathway is influenced by individual choices and abilities and by socio-demographic and cultural factors. Because it is impossible to examine all individuals separately, Clapham (2005) introduced the term common pathways. Common pathways examining general similar factors within a (sub) group. The knowledge of a common pathway is very useful, for example to create suitable housing for a particular group such as students or elderly (Clapham, 2002).

Ford (2002), introduced five common pathways for young adults. One of them is the student pathway. This pathway describes the group of young adults who leave their parental house to study and live at a different place. This group identifies it selves to have a limited amount of financial possibilities but get often support from an (governmental) institution (in terms of a loan or grant) or family (financial support)(Ford, 2002).

These constrains cause that students have their own particular kind of housing, often referred as student-housing. The student housing sector is a niche market. A niche market is a market where supply has become adapted to meet the needs of a specific, specialized group, and displays a reluctance to meet demand from another source (Rugg et al., 2000). Most students are subject to live, because of the limited financial resources, in student houses. In these houses live students in a one single room and share the amenities, such as the kitchen, the bathroom and the toilet, with other students (Thomsen & Eikemo, 2010). This kind of rooms are in general on a rental base. A student room is seen as temporal. Most students leave the student houses almost immediately after they finished their studies (Kenyon, 1999).

3.2 Housing studies

Housing preferences have been studied extensively the past decades. It has had the interest of academics from a wide range of various disciplines such as geography, urban planning, sociology, economics and environmental psychology (Timmermans et al., 1992). This resulted in that different approaches have emerged (Coolen and Hoekstra, 2001).

In the existing literature about housing preferences, numerous attributes are mentioned that influence the preferences of households significantly. A common key to determine, what kind of characteristics of a house are of greatest importance, does not exist (Coolen and Hoekstra, 2001). This discrepancy within the existing literature occurs because of several reasons.

The first reason is that the attributes are defined differently. For example, almost all studies evaluate different attributes and attribute levels. The second reason is that studies are performed at different locations and periods. The third reason is that different studies use different methods to measure housing preferences. Different methods result in different outcomes (Jansen et al., 2011). One of the main differences in methods is the difference in the origin of the data. The differences between the stated and the revealed approach of collecting data.

Studies based on revealed preferences collect data on actual observed choices in real markets. Housing studies based on revealed preferences assume that households reveal their real preferences in the act of choosing a house (Jansen et al., 2011). Revealed preference data is useful to policy makers because it shows which combinations are chosen in the real market. A fundamental disadvantage of the revealed approach is that the revealed preferences approach is not well-suited to identify the underlying preference structure. The housing choice always is influenced by constraints. For example, households may choose to live relatively far away from the city center because of budget constraint and not because they really want to live there.

Studies based on the stated preferences approach are based on expressed preferences and choices in a controlled (hypothetical) environment designed by the researcher (Timmermans et al., 1994). Stated preferences are usually conducted with a questionnaire. The stated preferences approach is well suited to find the underlying preferences, because households can express their preferences without considering constraints.

Despite the many differences in the current studies, there are some attributes that are frequently mentioned as influential to households. Housing attributes, such as price, size and the presence of facilities in the neighborhood are often studied and found to affect housing choice behavior. Furthermore, in all studies attribute levels are valued in a certain direction. Lower rent, larger size and a lower number of housemates are probably more preferred than a higher rent and smaller size (Thomsen and Eikemo, 2011).

Another commonality, is that scholars often make a classification for the different housing attributes. In this study it is assumed that when someone has to make a complex decision,

such as choosing a place to live, influential attributes are being categorized into subsets (Andersen, 2009).

One of the classifications was by Louviere and Timmerman (1990), they studied housing attributes in the Dutch city Roermond. 315 households were researched who recently had moved to or in the city of Roermond. In this study, they made a distinction of four different classifications: (intrinsic) housing attributes, residential environment attributes, economic and social ties, and relative location. Housing attributes describe the intrinsic elements of a house, it includes attributes such as size, costs and building period. The other three subsets describe the location and surrounding neighborhood of the dwelling. The environmental attributes relate to factors such as distance to the nearest park, amount of traffic in the direct surrounding and view. Economic and social ties refer to the distance to work, family and friends. At last relative location refers to the presence of amenities such as shops and restaurants in the direct surroundings.

Lindberg et al. (1988) used a more simplified method to categorize the different attributes. Lindberg divided the housing attributes in three different sub-categories: (A) intrinsic attributes from dwelling. This includes cost, size, interior, etc. (B) Locational attributes such as distance to school, city center. (C) Neighborhood attributes which relate to (public transportation and distance to shops.

Both studies found similar results. Linderg et al. (1988) found out that intrinsic attributes were of greatest relative importance. Followed by the locational attributes and neighborhood attributes. Louviere and Timmerman (1990) indicated that intrinsic housing attributes have significant the most effect on the overall housing preferences, follow by residential environment and social and economic ties. Relative location, or accessibility, is the least important set of attributes.

Student housing studies.

The student housing sector is a particular niche market. This means that some salient attributes in the general housing preference studies are not applicable or relevant in the student housing niche market (Rugg et al., 2000).

The most frequently noted attributes for determining the housing preferences of students are rent and the personal space or also called the size of the student room. Verhetsel et al. (2016) argue that these attributes are considered influential for students, because the rent is relatively low and size of student rooms is relatively small. A small increase or decline could already have a relatively big impact on the total living condition. Thomsen and Eikemo (2011) also argue, that the rent and size of the room are correlated, a larger room correlates often with an increase rent.

As mentioned before, students share amenities with other students. Therefore, the number of housemates, is often mentioned as an important influential attribute (Nijenstein et al, 2015).

Locational factors are also found to be important on the housing satisfaction and housing preferences (Lu, 1999; Nijenstein et al., 2015). Thomsen and Eikemo (2010) formulate that living close to the city center is a significant factor when students are searching for a house. Chatterton (1999) argues that city centers are important for students because of the vibrancy and to express their identity as a young human being. Another salient locational factor for is the distance to the campus or main study location. Students prefer to live close to their main study location to limit their travel time and costs (Thomsen and Eikemo, 2010).

Other attributes that are considered important but are mentioned less often, are the presence of an outdoor space or a common room (Nijenstein et al, 2015). In addition, attributes such as distances to facilities, such as public transport, shops and public parks, are also occasionally mentioned as important (Nijenstein et al., 2015).

3.3 Heterogeneity in housing preferences

Preferences are largely affected by the personal circumstances in life. These circumstances are largely determined by socio-demographic factors (Schwartz, 2009). Multiple studies have found that preferences change over lifetime (Timmermans, 1999). Different stages in life connect to different housing preferences (Rossi, 1955). Older people have for example different housing preferences than younger people (De Jong et al., 2011).

Changes in life are also seen as one of the most important factors to get different housing preferences (Skifter Andersen and Bonke, 1980; Clark and Onaka, 1983; Howell and Freese, 1983). For example, when households take getting children are in consideration, the preferences for room, amenities and location change. Households often change houses when they are planning to get children (Floor and van Kempen, 1997).

Also, sociodemographic factors such as gender, type of education are used to explore whether there is a difference in the housing choice behavior between individuals with different socio-demographic factors. (Jansen et al., 2011).

Students differ for example in gender, age and nationality. Nijenstein et al. (2015) found out that female students were more concerned about the amount of people they have to share the facilities with. This thesis focusses on the differences between Dutch and international students. In the study of Nijenstein et al. (2015) found out that there are difference in housing preferences between Dutch and International students. International students attach a higher relative importance to the monthly rent of a room and the cycling time to the campus than Dutch students. Dutch students attached relative more importance to the size of the room than international students.

3.4 Hypotheses.

Although not much is known of housing preferences of students, some general hypotheses can be stated following the theoretical framework.

In this thesis, nine different attributes for student housing are included according to the literature study. These attributes are: Size of the student room, monthly rent, number of housemates, cycling time to the city center, cycling time to the study location, presence of outdoor space, presence of a common area, walking time to the nearest supermarket and walking time to the nearest bus stop. These attributes will be defined by different attribute levels. In this thesis it is hypothesized that people will value different attribute levels in a certain direction. Lower rent, larger room, lower number of housemates, shorter cycling and walking times and the presence of an outdoor space and common area are expected to be

Housing plans have been initiated by various institutions to combat the shortage on the student housing market. To initiate specialized plans for Dutch and international students. From the existing literature, little is known about the differences of housing preferences between Dutch and international students. Based on the study of Nijenstein et al. (2015), who performed a research in the city of Tilburg, a few differences between Dutch and international students are found. These results are the basis of the following hypotheses.

1. *Dutch students attach relatively more importance on the size of the room than international students.*
2. *International students attach relatively more importance to the distance to the main study location than Dutch students.*

4. Methodology

The preferences of households can be gathered and analyzed in different ways. Over the last decades, numerous methods have emerged to measure housing preferences of households (Coolen and Hoekstra, 2001; Jansen et al., 2011). Which particular method that is considered should be in line with the goal of the study (Hooimeijer, 1994).

In this thesis, the stated preference approach is preferred above the revealed preference approach because of several arguments. The first reason is that the stated preference approach is less time consuming and less costly (Nijenstein et al., 2015). The stated preferences approach can apply a survey questionnaire to get the required data instead of making real life observations in a vast amount of time. Furthermore, by using a survey questionnaire, multiple observations per respondent can be made (Timmermans et al., 1994). Secondly, the stated preference approach is not dependent on to the real market sensitivity and the constraints of the households. Finally, the researcher has more control of the experiment and the outcomes. The researcher is able to design the experiment in its own preferred manner (Louviere et al., 2000).

The different stated preferences methods can be divided with two different methodological approaches (Jansen et al., 2011). The first division is whether the respondent will have freedom of attribute choice or not. When respondents have the freedom of attribute choice, they are allowed to contribute housing attributes to the research. When respondents have no freedom of attribute choice, the respondents only evaluate a pre-selected set of attributes chosen by the researcher.

The benefit of the freedom of attribute choice, is that all possible salient attributes will be included in the study. When respondents do not have the freedom of attribute choice there is the possibility that some important attributes are not included in research design. The downside of the freedom of attribute choice is that that the results could be difficult to analyze on general preferences. Every single respondent could add a different particular attribute to the study. This can make the study idiosyncratic (Coolen, 2011). In addition, the collection of data is relatively costly and time-consuming. In particular if a large sample is needed. This is because the data is in general collected by interviews by phone or face-to-face interviews, when respondent have the freedom of attribute choice (Jansen et al., 2011). In this thesis the respondents do not have the freedom of attribute choice because of these arguments.

The second division is the difference between the compositional and decompositional approach. The decompositional approach implies that respondents evaluate combinations of attribute levels. In the analysis, it is possible to decompose these combinations in which measure each of the different particular attributes contribute to the overall evaluation. This approach enables to analyze the trade-offs individuals make between the different attributes, the relative importance of each attribute can be estimated. The downside of the decompositional approach is that a relatively small number of attributes can be included in the analysis.

In the compositional approach, respondents evaluate single attribute levels and attributes apart from each other. The evaluation of each attribute level can be weighted and combined with the other attributes to get an overall evaluation of a particular house (Timmermans et al., 1994). The advantage of the compositional approach is that a larger number of attributes can be included in the study than within the decompositional approach (Janssen et al., 2011). The discussion is that the compositional approach is thought to be too simplistic to measure housing, because trade-offs between different attributes cannot be involved (Molin, 1996). In the compositional approach it is assumed that people can evaluate a particular attribute irrespective of other attributes. In reality this is considered questionable (Timmermans et al., 1994).

In this thesis, two methods are applied to analyze the housing preferences. The conjoint analysis method and the multi-attribute utility method. The conjoint analysis method has a decompositional approach and the multi-attribute utility method has a compositional approach.

4.1 The Conjoint analysis method

The conjoint analysis method is one of the most widely applied methods for measuring housing preferences (Nijenstein et al., 2015). The conjoint method has a decompositional approach. This indicates that in a specially constructed experiment hypothetical housing alternatives, called housing profiles, are presented to the respondents. The housing profiles are described by attributes and attribute levels that are assumed to influence the housing preferences of the respondents (Molin, 2011).

The respondents have to evaluate profiles in the conjoint analysis method. That is why it is considered a good method to reveal the trade-offs households make between the different housing attributes. The relative importance of each attribute can be calculated (Molin et al., 1996; Train, 2009). The downside of the conjoint analysis is that only a limited number of attributes (i.e. five) can be included in the experiment and that it is relatively complicated to execute (Eggers and Sattler, 2009).

There are three different approaches to present the profiles to the respondents. The rating-based approach, which requires the respondent to rate each profile. The ranking approach, where respondents rank each profile from best to worst and the choice-based approach, where respondents choose their most preferred profile several times between two or more options. The choice-based approach is preferred because it is widely acknowledged by scholars that making choices best resembles the decision-making process of individuals in real markets (Molin, 2011).

Utility Function

In the choice-based conjoint experiment, respondents make choices between housing profiles evaluating the multiple attributes and attribute levels of a house. In this light, the utility function is the most applied function to measure the overall preferences of a housing profile.

Attributes of greater importance have a greater effect on the overall utility than attributes that are less important. The utility function describes the importance of each attribute and the overall preference for a housing profile (Louviere et al., 2000). The utility function is based on the assumption that every individual tries to optimize the overall utility (Molin, 2011).

The utility function gives an insight of issues related to housing preferences. First, the predicted utility function can derive in which extent each attribute level contributes to the overall utility. Second, the utility function is able to estimate the relative importance of each attribute. This indicates which attribute has the largest impact on the utility function and choice decisions. Third, the utility function is able to give insight in the trade-offs respondents make between different housing attributes. Fourth, the utility function is able to estimate the overall utility of every possible housing profile. This allows showing the most preferred profile overall (Train, 2008).

$$U_{ni} = V_{ni} + \varepsilon_{ni} = \sum_{k=1}^{k} \beta_k X_{nik} + \varepsilon_{ni} \quad (1)$$

The utility function is as follows:

Where,
U_{ni} = the overall utility that household *n* creates from combination *i*;
V_{ni} = the structural component of utility (*i*) for individual *n*;
ε_{ni} = the error term or the random part of the utility;
β_k = The coefficient or utility weight for attribute level *k*;
X_{nik} = The value of attribute level *k* describing alternative *i* for individual n;
$\beta_k X_{nik}$ = marginal utility contribution to the overall utility.

The overall utility U_{ni} is the sum of the error term and the structural component. The structural component V_{ni} can be derived by the summation of the utility weight β_k multiplied by the attribute level that is corresponding. In the Utility function it is assumed that individuals make rational decisions, they make trade-offs between attributes and attribute levels, that maximizes their utility (Kemperman, 2011). Hence, the probability that a respondent (n) chooses one profile (i) over all other alternative profiles (j) can be written as:

$$p_{ni} = prob\left(U_{ni} > U_{nj}\right) \quad (2)$$

Where,

$$\forall\ j \neq i \quad (3)$$

Pni = probability of individual *n* choosing alternative *i* out of the set of available alternatives *j.*

Multinomial logit model

The answers of the respondents are nominal data, because, the conjoint experimented is performed as a choice task. It indicates which housing profiles the respondent choose out of a subset. This implies that a limited dependent analysis technique is required and is not able to be analyzed by an ordinary least square regression analysis (Molin, 2011). There are a few models that allow to model the choice behavior of the respondents, according to the utility function with the choice-based conjoint analysis method (Nijenstein et al., 2015). The multinomial logit model is the most simple and applied model in the choice-based conjoint analysis (Ben-Akiva and Lerman, 1985; Train, 2003; Nijenstein et al., 2015).

The multinomial logit model is as follows

$$p_{ni} = \frac{\exp(Vni)}{\sum_{J=1}^{J} \exp(Vnj)} \quad (4)$$

Where *Pni* is the probability of choosing alternative *i* for individual n out of *j* possibilities.

Relative importance of attributes.

The impact an attribute has on the overall utility is called the relative importance. The relative importance of each attribute can be calculated with the estimated utility range of the attribute levels. The utility range is the difference between the lowest and the highest utility value of each attribute level. The utility ranges of the attributes are summed up and the relative contribution of each attribute to this sum represents the relative importance.

4.2 Multi-Attribute Utility (MAU) method

The MAU method is one of the multi-criteria decision-making techniques. Multi-criteria decision techniques were initially created for making choice-decisions, but they can also be used for housing preference measurement (Janssen et al, 2011). The MAU method has a compositional approach. Which implicates that it is possible to give information about more attributes, to obtain the most optimal choice-decision or preference.

The MAU method is doing this by combining the relative attractiveness of each attribute level with the relative importance of each attribute. This results in function 5.

$$U_{(ni)} = \sum_{k=1}^{n} W_i U_{ki}$$

(5)

Where *U(ni)* is the total overall utility of a housing profile j (the combination of attribute levels). *Wi* is the weight assigned to the *i th* attribute, n is the number of different attributes and *Uki* is the particular utility for attribute level k of attribute *i* (Von Winterfeldt and dwards, 1986).

In the MAU experiment the *Uki* is estimated by evaluation of all salient attribute levels separately. The respondents assign scores to all attribute levels on numerical scale with two anchors of attractiveness. A mean score for every attribute level can be estimated.

It is assumed that attributes of greater importance have a larger impact on the determination of preferences and choices. The second task for the respondents is to assign scores on numerical scale with two anchors to all attributes, to indicate the level of importance of each attribute. The important scores are thereafter transformed into weights. The weight of each attribute *Wi* is calculated by the percentage contribution a single attribute has on the sum of all attributes.

Subsequently the estimated mean scores for each attribute level are combined with the mean weights of the corresponding attribute. This results in the aggregated score or utility for each of the attribute levels. With these results every possible housing profile can be evaluated. Housing profiles with a higher overall utility are more preferred than housing profiles with a lower overall utility. Furthermore, the impact of changing attribute levels on the overall utility can be explored.

5. Data collection

No data about housing preferences of students in the Netherlands existed, hence the data had to be self-collected. The data that is analyzed in this research is collected by a custom-made survey for students who study at a higher educational institute in Groningen (appendix A). According to McLafferty (2010), a standardized survey is a useful manner to get information of the characteristics and judgments of the required population in a short notice of time.

In February and March 2018, the survey was distributed to students at the multiple buildings of the Hanze University of Applied Sciences and the University of Groningen in a hard copy form. This form of sampling in called purposive sampling; only a specific target group is asked to fill out the survey (Clifford et al., 2016). The advantages of purposive sampling is that it is relatively cost-effective, less time consuming and easy to execute (Clifford et al., 2016). A drawback of this sampling method is a possible under- or overrepresentation of a certain (sub-) group (Clifford et al., 2016). Under-or overrepresentation is prevented by sampling at different times and in different buildings of the Hanze University of Applied Sciences and the University of Groningen.

To increase the response rate, students were directly and personally (face-to-face method) asked to fill out the survey. A possible risk to contact the respondents face-to-face is that 'interviewer-induced-bias' can occur and the respondent will only provide social desirable answers. This occurrence was avoided by giving the respondents as much time as needed and the survey was on paper and self-explanatory (Kobayashi, 1994 in Clifford et al., 2016).

Around 500 students were asked to fill out the survey. Most students were willing to fill out the survey, a few declined because they mentioned that they did not have enough time or they were busy studying. A total number of 440 students filled out the questionnaire. That the researcher himself was a student in the city of Groningen could be related to the high response rate. Respondents indicated that they could identify themselves with the researcher positionality.

There are currently 48,000 students studying at the higher educational institutes in Groningen. According to Rice (2010), the sample size should be a compromise between the desired precision of the sample results and the sampling resources available. The precision of the sample estimation rises with an increasing sample size in a curvilinear way. The precision of the sample estimates gets more accurate with larger sample size, but the relative improvements in the precision decrease at larger sample sizes. Fowler (2008) argues, that the benefits in the precision of bigger sample size begin to level off at a sample size of 150 to 200.

McLafferty (2008) adds that it is more useful to focus on the subgroups than the population as a whole to get a sufficient sample size. The sample size must be big enough to provide reasonable precise sample estimation for each subgroup. In this thesis, there are two subgroups identified: Dutch and international students. The sample size for both of these groups should be of a sufficient size.

5.1 Construction of the survey

The survey was constructed in English as the target group of this research were Dutch and international students who live in the city of Groningen. In this thesis, all questions are formed as a fixed response question. There are several benefits of using fixed response questions. First, fixed alternatives act as guidance for the respondents. The respondents remain focused, because it is easier to fill out the survey. Fatiguing the respondents results in declining attention. This could influence the outcomes and the validity of the results (Chang, 1994). The use of only fixed-response questions resulted in the survey taking about five till seven minutes to fill out. The second benefit is that fixed responses are easier to analyze and examine (Fink and Kosecoff, 1998).

Several ethical issues are taken into account in order to prevent the respondents from being harmed. The ethical issues in this thesis are related to the way of data collection, the positionality of the researcher and the personal data that is given. To prevent ethical issues, measures a taken. It was explicitly noted on the front of the survey that all provided answers are handled anonymously and confidentially and only will be used for its scientific purposes.

The researcher himself, as being a student at the University of Groningen, is part of the target group. According to Clifford et al. (2016), the potential risk of being part of the target group could be the prejudice of the researcher in the construction process of the survey. This is prevented by consulting fellow students, formulating the questions according to the available literature and performing a pre-test survey to find any flaws. Due to pre-testing, questions were reformulated to avoid any confusion among the respondents. According to McLafferty (2010), consultancy and pre-testing are crucial steps to create a successful survey.

The survey questionnaire which the students filled out can be found in appendix A. The survey was divided into four sections. The first section included the choice-based conjoint experiment, the second and third section involved the multi-attribute selection experiment and in the fourth section the socio-demographic and housing characteristics of the respondents are questioned. The construction of these sections is explained in the next paragraphs.

5.2 Constructing the choice-based conjoint experiment.

The first section of the survey included the choice-based conjoint experiment. The construction of this experiment takes a few steps. It involves making decisions about the selection of the attributes, determination of the attribute levels, the choice of the experimental design and the format how it is presented to respondents. These steps will be set apart in the next paragraphs.

Selecting attributes

The first step of the construction of the conjoint experiment is to select the attributes that have the most effect on housing choice behavior of students. These attributes are also the

independent variables in the utility function. There are many attributes that influence housing preferences of students, but there is a limit number of attributes that can be included in the experiment. There is much debate in the literature how many attributes can be included in a conjoint experiment (Molin, 2011). Eggers &Sattler (2009) argue that the most efficient result can be reached with five or six attributes.

In this thesis, five attributes were selected based on the literature study performed in the theoretical framework and the consultancy of students who are living in Groningen. The attributes have been selected, by considering the following criteria of Louviere and Timmerman (1990). (1) To keep the experiment tractable, only retain attributes that are salient to the target group and remove other possible idiosyncratic attributes; (2) to make the set of attributes non-redundant and small, combine retain and reform attributes that are alike; (3) the attributes should be clearly defined and demarcated; (4) select attributes that have societal and academic relevance.

The selected attributes and the description are shown in table 1.

table 1: Attributes conjoint experiment

Variables	*Descriptions*
Monthly Rent	Monthly rent in Euros including all services and costs
Size	Personal room space in m²
Housemates	The number of housemates to share the amenities with.
Cycling time to city center	Cycling time to the city center (Grote Markt) in minutes.
Cycling time to study location	Cycling time to your main study location/faculty in minutes.

Attribute levels:

The second step is to determine the number of attribute levels and the values of the attribute levels. The number of levels per attribute limit themselves between two and four (Molin, 2011). How many attribute levels are preferred depends on the selected attributes. In this research, three attribute levels are analyzed, because it is expected that the utility increases or decreases with increasing attribute values, but that one attribute level is indifferent to the other levels. This enables a curved utility function model to be estimated (Molin, 2011).

The values of the different attribute levels are chosen on the basis that it represents the current housing situation in Groningen. According to Molin (2011), the experiment is more valid when levels are used that are present in the real world. Data of CBS (2016) and Kences (2017) is used to select the attribute level ranges in this research. In table 2, the analyzed attribute levels are shown.

table 2: attribute levels conjoint experiment

Attribute	*Attribute levels*
Monthly rent including all costs	€310. €375, €440
Size of the room	12m², 18m², 24m²
Number of housemates	1, 3, 6 housemates
Cycling time to city center	3, 10, 17 minutes by bike
Cycling time to study location	3, 10, 17 minutes by bike

Experimental design.

The third step of constructing the conjoint experiment is to combine the attribute levels and attribute levels into housing profiles. To present a full factorial design to the respondents, which include all possible housing profiles, is not manageable. A full factorial design would include, 3^5 =243 housing profiles, which is too many to present to an individual respondent. Instead an orthogonal fractional factorial design is presented. This design represents only presents a limited number of housing profiles.

An orthogonal design varies attribute levels systematically and independently between the different housing profiles. In the orthogonal design there is no significant correlation between attribute levels across all housing profiles. This enables to obtain unbiased utility estimations. In an orthogonal design every attribute level occurs with the same number in the design (Nijenstein et al., 2015).

The downside of the fractional design is that only main effects can be included and no interaction effects. An assumption of the fractional factorial design is that the interaction effects among the different attributes are not statistically significant (Molin, 1999). In this research the fractional factorial design is still preferred, because to analyze all 243 housing profiles is not manageable for an individual respondent. In addition, several studies found out that an experiment with interaction effects does not significantly improve the results of student housing preferences compared to an experiment with only main effects (Steenkamp, 1985).

The design is constructed with the help of software package IBM SPSS Statistics 23. The experiment included 24 housing profiles, which is more than the required minimum of 11 profiles when including 5 attributes with three levels (Hair et al., 2010). In the orthogonal design it can occur that particular housing profiles are projected to be significantly more preferred than others, because an orthogonal design varies systematically and independently between attribute and attribute levels. A housing profile can be for example be constructed by the lowest rent, greatest room size and shortest cycling distances. This housing profile would be preferred in each choice set. Hence, the allocation of attribute and attribute levels is adapted in a way that a minimum of dominant housing profiles is included in the design.

This adaptation was done by rotating the attribute levels in different housing profiles. In this way respondents do not have to evaluate unrealistic housing profiles. Which results in more useful information that can be extracted from the experiment (Nijenstein et al., 2015)

Formatting

The twenty-four housing profiles were presented to the respondents in eight choice sets of three housing profiles. According to (Hensher et al., 2005), respondents can easily evaluate 9 choice sets without increasing the cognitive burden too much. The housing profiles were randomly placed 22 times in the choice sets to limit possible order effects. Each choice-set also consisted of a no-choice option, to simulate the real-life situation of not choosing any of the presented profiles.

The alternatives were presented in text only. When attributes are presented with pictures or drawings measurement errors created by irrelevant details (such as color) can occur (Singelenberg, Goetgeluk & Janssen, 2011). An example of a choice set is shown in figure 2.

Example question	Alternative 1	Alternative 2	Alternative 3	
Monthly rent	€ 440	€ 375	€ 310	Do not prefer any of these alternatives
Size of the room	18m²	24m²	18m²	
Shared amenities	1 housemate	6 housemate	6 housemates	
Cycling time to city center	10 minutes	10 minutes	3 minutes	
Cycling time to study location	10 minutes	3 minutes	10 minutes	
Please indicate your choice here	○	●	○	○

Figure 2: Conjoint choice set used in the survey

5.3 Constructing the Multi-attribute utility experiment.

The construction of the MAU experiment is similar as the choice-based conjoint experiment. The first two steps are alike. Both experiment use salient attributes and attribute levels. The difference between the two methods is that the MAU experiment can examine a larger number of attributes, because it is a compositional method (Janssen et al., 2011). In the MAU experiment there are in total nine different attributes tested. The same five attributes as in the choice-based conjoint experiment and four other attributes. These added attributes and attribute levels were selected based on previous literature, the consultancy of students in Groningen. The four added attributes and their levels can be found in table 3.

table 3: added attributes and attribute levels MAU experiment

Attributes	*Description*	*levels*
Presence of outdoor space	Presence of garden or balcony or none	Garden, balcony, no outdoor space
Presence of common area	Presence of living room or other common area	Yes, No
Walking time to the nearest supermarket	Walking time in minutes	3, 7 and 11 minutes
Walking time to the nearest public transport point	Walking time to nearest bus stop	3, 7 and 11 minutes

Experimental design.

In the MAU experiment the respondents evaluate the attributes compositionally. This implicates that every attribute and attribute levels is evaluated separately. The survey included the following tasks. The respondents were asked to indicate their level of attractiveness to every attribute level on a scale with two anchors, from 0 (Extremely unattractive) to 100 (extremely attractive). The second task for the respondents is to indicate their importance to each of the attributes. The scale with two anchors is, from 0 (not important at all) to 100 (extremely important). The MAU experiment can be found in section 2 and 3 of the survey questionnaire in appendix A.

5.4 Descriptive statistics

To get the characteristics of the respondents, section 4 of the survey included questions about the socio-demographic background and the current housing situation of the respondents. The data is analyzed with software package STATA (StataCorp, 2017). The log file can be found in appendix B. With the results of these question the representativeness of the dataset can be observed.

In total 440 students filled out the survey. 73 surveys were left out of the study, because they were not filled out completely or the respondent indicated to not live in Groningen and has no intention to move to Groningen in the upcoming 2 years. In total, 367 surveys are included in the analysis.

Table 4 shows the descriptive statistics of the survey questionnaires that will be used for the analyses. Around 33 per cent of the respondents indicated they identified themselves as an international student. The international students come from all over the world, respondents with 26 different nationalities filled out the survey. Most of them were from German origin, followed by students from the United Kingdom and China.

Table 4 shows the descriptive statistics for age, gender, institute and whether the respondent lives in Groningen. In line with the study of Kences (2017), the mean age of international students is higher, there are more male international students and international students often study at the WO institute. Furthermore, all international students indicated to live in the city of Groningen, where only 72.34% of the Dutch respondents indicated to live in Groningen.

Table 4: Descriptive statistics.

		All students	Dutch Students	International students
Age in years	Mean	21.57	21.30	22.09
	SD	2.57	2.38	2.87
Gender	Male	46%	43%	57%
	Female	54%	57%	43%
Institute	University of Groningen	59%	57%	64%
	Hanze university	41%	43%	36%
Live in Groningen	Yes	83%	75%	100%
	No	17%	25%	0%

Note: All students: N = 367. Dutch students: N = 245. International students: N = 122

Subsequently, the respondents, who indicated to currently live in Groningen, is asked how their current housing situation is. About 84% of these students live in a (student) room with

shared amenities and 13% live in a private apartment or studio room. International students found to live relatively more often in a (student) room with shared amenities than Dutch students.

Table 5: Current housing situation. N = 308

Current housing situation	*All students*	*Dutch students*	*International students*
(Student) room with shared amenities	84%	79%	93%
Private apartment/studio	13%	17%	7%
Parental house	3%	4%	0%

Note: All students: N = 305. Dutch students: N = 183. International students: N = 122

In addition to the respondents who live in the city of Groningen and live in a student room with shared amenities were asked some additional questions about their current housing situation. Table 6 shows the descriptive statistics that will be used in the analyses. International students are found to live in smaller rooms and pay a higher monthly rent and share their house with more people than Dutch students. The most salient difference between Dutch and International students is that international students pay on average €4 monthly rent per square meter more than Dutch students. This is supported by the research of Kences (2017). It is found that international students often pay more because often the rooms are pre-furnished by the landlord. Furthermore, it is argued that international students have less searching time because the room has to be available on the day that they arrive and have less knowledge of the local housing market.

Table 6: descriptive statistics current housing situation.

		Dutch Students	International students	All students
Monthly rent in Euros	Mean	349.77	397.32	370.68
	SD	54.56	61.57	62.29
Size in square meters	Mean	17.20	16.26	16.79
	SD	4.53	4.27	4.43
Monthly rent per m2	Mean	21.38	25.55	23.21
	SD	5.43	5.68	5.91
Number of housemates	Mean	3.21	4.53	3.79
	SD	2.11	3.69	2.97
Cycling time to city center (Grote Markt) in minutes	mean	6.81	8.83	7.70
	SD	4.70	4.92	4.89
Cycling time to main study Location in minutes	mean	10.59	10.54	10.57
	SD	6.24	5.93	6.10

Note: All students: N = 256. Dutch students: N = 145. International students: N = 111

6. Results

6.1 Choice-based conjoint analysis.

With the use the Mlogit package of statistical software program R Studio 1.1.383 (2018), the preferences for each included housing attribute level was estimated within the multinomial logit model. The log file can be found in appendix C.

The estimated part-worth utilities in table 7 show the contribution of each of the attribute levels to the overall utility of a housing profile. A higher positive utility estimation indicates a stronger preference to the particular attribute level and a lower negative utility estimation indicates a stronger aversion to the particular attribute level. The estimations of the third attribute levels were calculated by summing up the estimates of the first two estimates multiplied by -1. The third attribute is indicated between the parentheses in table 7.

Table 7: Results Multinomial logit model. N= 367

Attribute	*level*	*Part-worth Utility*	*Z-value*	*Sig.*	*Attribute importance*
Monthly rent	€310	0.81	19.25	***	23.96%
	€375	0.22	5.44	***	
	€440	-1.02			
Size	12m²	-0.99	-18.24	***	22.93%
	18m²	0.23	5.52	***	
	24m²	0.76			
Number of housemates	1	0.60	12.17	***	19.38%
	3	0.29	7.46	***	
	6	-0.89			
Cycling time to city center	3 min.	0.72	17.91	***	21.14%
	10 min	0.17	4.53	***	
	17 min	-0.89			
Cycling time to study location	3 min	0.44	11.22	***	12.59%
	10 min	0.09	2.70	*	
	17 min	-0.53			
None		-1.25	-17.31	***	
Log-likelihood		-3155.10			

*Note: Signification Codes: *** = p <0.001. ** = p< 0.01. *=p< 0.05*

The results of table 7 show that all attribute levels included in the model gave significant utility estimations, which indicates that all attribute levels contributed to the preferences for student housing to a significant value. The 'None' attribute is estimated at -1.25. The negative utility indicates that students rather chose a housing profile than the 'no preference' option from the choice sets.

The attributes varied as hypothesized, lower rent, larger sizes, a smaller number of housemates and a shorter cycling time to the city center and main study location were most preferred.

The part-worth utility of the monthly rent attribute levels varied the most, a monthly rent of €310 was the most preferred level (0.81 utility points) and a monthly rent €440 was the most disliked attribute level (-1.02 utility points). A room with a size of 12 m² is strongly disliked (-0.99 utility points). Furthermore, the students experience a greater difference of preference between rooms with a size of 12 m² and 18 m² than rooms with a size of 18 and 24 m². The increase in utility between 12 m² and 18 m² is much larger (+1.22 utility points) than the utility increase for from 18 m² to 24 m² (+0.53 utility points). The same holds for an increase of the number of housemates from 1 to 3 then from 3 and 6. The decrease in utility points between 3 and 6 housemates is much larger (-1.18 utility points) than the utility decrease from 1 to 3 (-0.30 utility points).

The estimated utilities of the attribute cycling time to main study location showed the least differences in utility points between all three levels. This indicates that this attribute levels could easily be exchanged for another.

Relative attribute importance

The relative importance of each attribute is shown in the last column of table 7. It is estimated that monthly rent is the most important attribute, closely followed by the size of the room. This is followed by the attributes cycling time to the city center, number of housemates, and at last the cycling time to the main study location. The results correspond with the results of Nijenstein et al. (2012) and Verhetsel et al. (2016), where the attributes 'rent' and 'size' found relatively most important. Furthermore, cycling time to the main study location is considered the least important attribute. A possible explanation is that the study locations of all students are spread out over the city. The cycling time for students in Groningen can vary per day.

Conjoint experiment on origin.

In table 8 the estimates of the choice-based conjoint experiment are shown for the two sub-group based on origin: Dutch and international students.

Table 8: results multinomial logit model

		Dutch students (N = 243)			*International students (N = 124)*		
Attribute level		*Utility*	*Z-value*	*Sig.*	*Utility*	*Z-value*	*sig.*
Monthly rent	€310	0.78	15.24	***	0.88	11.59	***
	€375	0.25	5.06	***	0.18	2.58	**
	€440	(-1.03)			(-1.07)		
Size	12m²	-1.15	-17.02	***	-0.70	-7.38	***
	18m²	0.25	5.04	***	0.20	2.72	**
	24m²	(0.90)			(0.50)		
Number of housemates	1	0.58	9.67	***	0.63	7.18	***
	3	0.29	5.99	***	0.31	4.51	***
	6	(-0.87)			(-0.94)		
Cycling time to city center	3 min.	0.70	14.17	***	0.78	10.76	***
	10 min	0.17	3.78	***	0.16	2.39	*
	17 min	(-0.87)			(-0.93)		
Cycling time to study location	3 min	0.40	8.62	***	0.53	7.72	***
	10 min	0.09	1.90	*	0.10	1.47	*
	17 min	(-0.49)			(-0.63)		
None		-1.25	-14.25	***	-1.25	-9.60	***
Log-likelihood		-2098.70			-1024.40		

Note: All students: N = 367. Dutch students: N = 245. International students: N = 122
*Note: Signification Codes: *** = p <0.001. ** = p< 0.01. *=p< 0.05*

International students indicated that their greatest preference is to a monthly rent of €310 (0.88 utility points) and aversion is to the monthly rent of €440 (-1.07 utility points). Dutch students show the greatest preference to a room with a size of 24 m² (-1.07 utility points) and the greatest aversion against a room with a size of 12 m² (-1.15 utility points). The increase in the size of the room from 12 m² to 18 m² has the greatest gain in utility points for Dutch students (+1.40 utility points). The greatest gain for international students is the decrease of the monthly rent from €440 to €375 (+1.25 utility points). These results indicate that Dutch students are more size conscious and international students more price conscious.

International students are also more concerned to the relative location to the main study location. The show a greater aversion against a longer cycling time and a greater preference to a shorter cycling time than Dutch students. The attributes number of housemates and cycling time to city center shows fewer differences between Dutch and international students. International students are slightly more conscious about these two attributes.

In figure 3, the relative importance of the attributes for Dutch and international students are presented. Where Dutch students indicate the size of the room as most important attribute.

International show the greatest relative importance to the monthly rent. Furthermore, international students show a greater relative importance than Dutch students to all attributes except the size of the room.

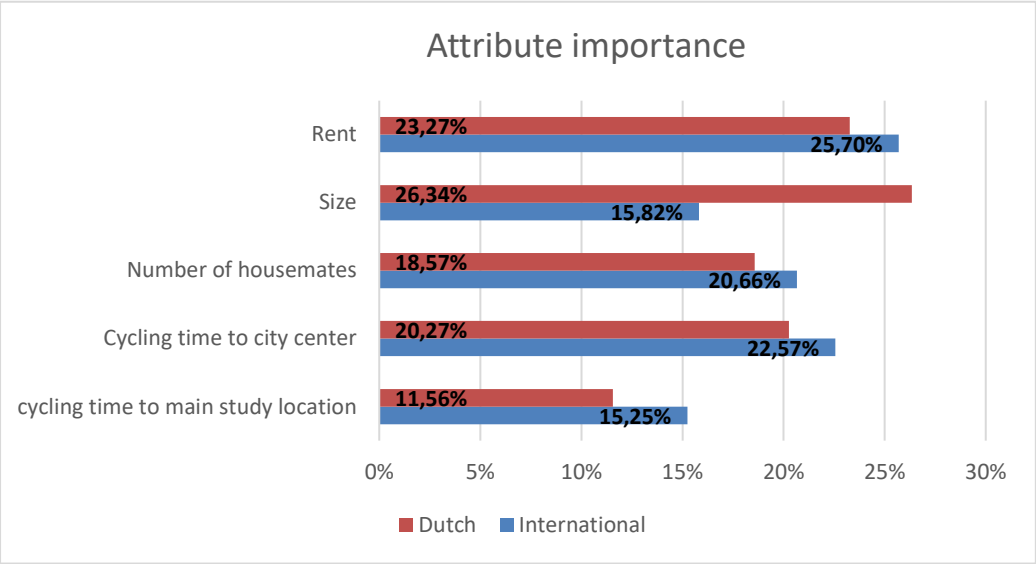

Figure 3: Relative attribute importance

6.2 Multi attribute utility analysis

The analysis of the Multi-attribute utility experiment takes three steps. The mean attractiveness scores per attribute level, the mean weight of each attribute and the aggregate results.

Attractiveness scores

The respondents indicated their scores of attractiveness for all attribute levels. They valued each attribute level from 0 (extremely unattractive) to 100 (extremely attractive). The results are shown in table 9.

The attributes varied as hypothesized. Lower rent, larger size, shorter walking and cycling times and the presence of an outdoor space and common area were more preferred. The number of housemates was an exception. The difference in utility between 1 housemate and 3 housemates is rather small. International students indicated to value a house with 3 housemates slightly over a house with 1 housemate. This seems to suggest that students also take other aspects into consideration besides the number of housemates. For example, the sociability of housemates. Furthermore, students preferred a balcony slightly above a garden. A possible explanation, is that a garden requires in general more maintenance than a balcony.

The attribute levels that are valued to be most attractive are cycling time to the city center of 3 minutes and walking time to the supermarket of 3 minutes and the least attractive were no presence of outdoor space, a room with a size of 12 m² and a cycling time to the city center.

Dutch students have greater preference for a room with a size of 24m² and a greater aversion for a room with a size 12 m². International students have a greater preference for common area presence. Furthermore, international have greater aversion against a longer cycling time to city center and study location. Also, international students are more attracted to the presence of common area and Dutch students more attracted to the presence of outdoor space.

Table 9: Attractiveness scores.

		All students		*Dutch*		*International*	
Attribute	*Level*	*Mean score*	*Standard deviation*	*Mean score*	*Standard deviation*	*Mean score*	*Standard deviation*
Size							
	12m²	33.78	22.43	31.16	22.08	39.14	22.21
	18m²	70.27	17.05	69.41	17.92	71.86	14.81
	24m²	88.77	16.20	90.20	14.21	85.51	19.62
Monthly rent							
	€310	87.98	17.81	87.56	18.22	88.75	16.99
	€375	66.59	18.66	64.71	18.52	70.79	18.50
	€440	35.17	23.85	34.45	23.55	36.89	24.67
Number of housemates							
	1	69.98	28.98	70.34	28.17	69.01	30.98
	3	68.48	22.36	68.05	22.66	69.06	21.81
	6	35.41	27.72	36.12	28.51	33.31	25.68
Cycling time to city center							
	3 min.	93.19	13.84	93.66	11.03	92.07	18.63
	10 min	66.63	19.83	65.25	19.70	69.50	19.96
	17 min	30.38	24.39	31.43	23.87	27.52	24.97
Cycling time to study location							
	3 min	90.43	16.11	90.33	15.39	91.01	17.44
	10 min	69.27	19.14	69.21	18.45	69.04	20.49
	17 min	33.31	22.78	35.31	21.98	28.40	23.45
Presence of outdoor space							
	Garden	69.96	29.46	71.88	28.37	65.89	31.63
	Balcony	74.41	23.29	74.59	21.30	73.94	27.40
	None	25.04	24.01	25.19	24.56	24.17	22.49
Presence of common area							
	Yes	76.60	25.95	73.83	27.16	82.98	21.91
	No	39.98	28.22	44.29	27.72	29.82	26.21
Walking time nearest supermarket							
	3 min.	92.81	11.69	92.42	12.10	94.05	10.16
	7 min.	65.35	21.10	64.89	21.26	65.95	20.62
	11 min.	36.08	24.15	37.36	24.34	32.74	23.22
Walking time to nearest bus stop							
	3 min.	86.53	20.79	88.78	16.95	81.75	26.98
	7 min.	64.09	21.88	65.22	19.92	61.14	25.42
	11 min.	38.66	24.70	39.02	23.77	37.37	26.50

Note: All students: N = 367. Dutch students: N = 245. International students: N = 122

Relative weights.

As second task, the respondents were asked to assign an important rating to each of the attributes on a rating scale from 0 (not important at all) to 100 (extremely important). The important scores were transformed to weights, as previously explained. Table 10 shows the mean important scores and the associated weights.

table 10: Important rating and relative weight

Attribute	*All students*				*Dutch students*				*International students*			
	Important ratings		*Weights*		*Important ratings*		*Weights*		*Important ratings*		*Weights*	
	Mean	*St dev*	*Mean*	*St dev*	*Mean*	*St dev*	*Mean*	*St dev*	*Mean*	*St dev*	*Mean*	*St dev*
Size	76.95	17.46	0.139	0.042	79.70	15.58	0.143	0.037	71.12	19.86	0.129	0.051
Monthly rent	83.77	15.99	0.151	0.038	83.91	14.85	0.151	0.037	83.63	18.37	0.151	0.041
# housemates	67.80	23.37	0.119	0.041	68.48	23.33	0.121	0.041	66.04	23.52	0.116	0.041
C.t. to city center	68.04	21.15	0.119	0.035	65.64	20.91	0.115	0.033	73.50	20.82	0.130	0.037
C.t to study location	62.69	22.43	0.110	0.036	59.20	21.25	0.104	0.033	70.18	23.30	0.123	0.039
outdoor space	50.10	24.14	0.088	0.042	52.07	22.30	0.091	0.037	45.43	27.28	0.081	0.053
common area	50.45	28.07	0.087	0.045	50.40	26.90	0.085	0.043	52.74	30.68	0.089	0.048
W.t to supermarket	58.21	19.73	0.101	0.032	57.70	18.67	0.101	0.030	59.06	21.83	0.102	0.035
W.t. to bus stop	50.26	22.90	0.087	0.037	51.73	21.17	0.090	0.035	46.67	26.01	0.080	0.042

Note: All students: N = 367. Dutch students: N = 245. International students: N = 122

All attributes are rated relatively important, as the lowest indicated mean rating, for all students, is 50.10 for the presence of outdoor space. This indicates that no superfluous attributes were selected in the experiment.

The respondents indicate monthly rent, size and number of housemates as most important. Presence of a common area, walking time to the nearest bus stop and presence of outdoor space are indicated as least important. This in line with the current student housing studies of Nijenstijn et al. (2015) and Verhetsel et al., (2016), where these attributes are also found to be most important.

Table 10 shows that both Dutch as international students have indicated that the monthly rent is the most important attribute. The other attributes were rated differently. In line with the results of the choice-based conjoint experiment, Dutch students found the size of the room a more important attribute than international students and international students indicated that they attach more importance to the cycling time to the city center and study location. Furthermore, Dutch students attach more importance to the walking time to the nearest bus stop than international students. A possible explanation is that public transport is free for a large part of the Dutch students.

Aggregated utility scores.

Table 11 shows the mean single-attribute utilities for each of the attribute levels. The mean scores per attribute level of table 9 are combined with the assigned relative weight per attribute of table 10. The estimated values per attribute level represent the utility that is added to the overall multi-attribute utility, irrespective of all other attributes. For example, the presence of balcony would add in general 6.85 utility points to the overall multi-attribute utility, whereas a garden or no presence of outdoor space would add 6.54 and 1.94 utility points, respectively.

Table 11 shows that the attribute level that has the highest utility is a room with a monthly rent of €310 (13.31 utility points), followed by a room with a size of 24 m² (12.36 utility points) and a cycling time to the city center of 3 minutes (11.19 utility points). Furthermore, the impact of changing the level of an attribute on the overall utility can be estimated. The biggest gain in utility would be the increase in room size from 12 m² to 18 m² (+ 5.23 utility points), followed by the decline in monthly rent.

With the results, the overall utility of all possible housing profiles can be estimated. The total number of possible housing profile is 3^8 * 2 = 13,122. The profile with the lowest utility has an overall utility score of 32.02 and the profile with the highest utility has an overall utility score of 86.66. The overall utility score of all other profiles lies in between.

The attribute level with the highest utility for Dutch students is a monthly rent of €310 (13.24 utility points), followed by a room size of 24 m² (12.89 utility points) and a cycling time to the city center of 3 minutes (10.76 utility points). For international students the attributes with the highest utility score are a monthly rent of €310 (13.43 utility points), a cycling time to the city center of 3 minutes (12.04 utility points) and the cycling time to the main study location of 3 minutes (11.35 utility points). The biggest gain in utility points, for Dutch students, is the increase in room size from 12 m² to 18 m² (+ 5.47 utility points) and for international students the decline in cycling time to the city center from 17 to 10 minutes (+ 5.52 utility points). This confirms the hypotheses that Dutch students attach more importance to the size of the room and international students are more price conscious and attach more relative importance to a shorter cycling time to the main study location.

Table 11: aggregated utility scores.

Attribute	*Level*	*All students*		*Dutch*		*International*	
		Mean score	*Standard deviation*	*Mean score*	*Standard deviation*	*Mean score*	*Standard deviation*
Size							
	12m²	4.47	3.23	4.37	3.36	4.75	2.91
	18m²	9.70	3.98	9.84	3.45	9.37	5.00
	24m²	12.36	4.39	12.89	3.77	11.17	5.39
Monthly rent							
	€310	13.31	4.53	13.24	4.49	13.43	4.74
	€375	9.98	3.76	9.71	3.65	10.60	3.99
	€440	5.09	3.56	5.07	3.55	5.26	3.57
Number of housemates							
	1	8.40	4.95	8.61	4.93	7.97	5.02
	3	7.95	3.54	7.96	3.62	7.80	3.42
	6	3.93	3.47	3.98	3.53	3.67	3.21
Cycling time to city center							
	3 min.	11.19	3.89	10.76	3.61	12.04	4.44
	10 min	7.77	3.19	7.25	2.90	8.84	3.60
	17 min	3.33	2.75	3.32	2.49	3.32	3.24
Cycling time to study location							
	3 min	10.04	4.10	9.40	3.76	11.35	4.55
	10 min	7.56	3.37	7.09	3.10	8.67	3.73
	17 min	3.41	2.48	3.50	2.32	3.17	2.73
Presence of outdoor space							
	Garden	6.54	4.62	6.86	4.26	5.77	5.27
	Balcony	6.85	4.33	6.97	3.79	6.50	5.30
	None	1.94	2.16	2.03	2.19	1.60	1.93
Presence of common area							
	Yes	7.30	4.75	7.02	4.62	7.91	4.98
	No	2.86	2.46	3.06	2.38	2.45	2.46
Walking time nearest supermarket							
	3 min.	9.44	3.24	9.32	3.14	9.62	3.48
	7 min.	6.61	2.92	6.44	2.80	6.82	3.17
	11 min.	3.61	2.59	3.71	2.50	3.33	2.71
Walking time to nearest bus stop							
	3 min.	7.77	3.95	8.15	3.63	6.89	4.53
	7 min.	5.62	3.17	5.85	3.01	4.98	3.40
	11 min.	3.38	2.67	3.47	2.61	3.07	2.68

Note: All students: N = 367. Dutch students: N = 245. International students: N = 122

7. Conclusion and discussion.

To get a better understanding of the housing choice process, the housing preferences of Dutch and international students were explored. This thesis has researched with the use of a questionnaire survey, including a choice-based conjoint experiment and a multi-attribute utility experiment, which attributes are considered influential in the housing choice-process. The research focused on the possible differences between Dutch and international students of Groningen.

The choice-based conjoint experiment and the Multi-attribute utility experiment resulted in similar outcomes. All attributes included in the experiments influence students housing preferences for housing choice decisions and all attributes levels varied as hypothesized. Lower monthly rent, a larger room size, a lower number of housemates, shorter cycling and walking times and presence of facilities were more preferred.

The student population of Groningen considers the monthly rent as the most important attribute in housing choice decisions, followed by the size of the room. This result was also found by other student housing preference studies (Nijenstein et al, 2015; Verhetsel et al., 2016). Thereafter, cycling time to the city center, number of housemates and cycling time to the main study location were the most important attributes. This result does not correspond with the findings of Nijenstein et al. (2015), where the attribute number of housemates was more important than the distances to campus and city center. The other analyzed attributes were valued as relatively less important.

The found differences between the Dutch and international student population are confirming the stated hypotheses. Dutch students attach more relative importance to the size of the room than international students. Furthermore, Dutch students are suggested to experience the largest gain in utility with the increase of the size of the room. International students attach relatively more importance to the attributes monthly rent and cycling time to the main study location than Dutch students.

7.1 Managerial implications

To reduce the shortages on the student housing market, the municipality of Groningen has planned to create around 4,000 new housing units till the year of 2021 (Gemeente Groningen, 2018). The results of this study could be used to decide which student housing alternative is most preferred to create under certain constraints and creates the most living satisfaction to students.

To create housing which represents student preferences best, it is advised to decide for what subgroup of students the housing should be created. In this study the differences are explored between Dutch and international students. When housing is initiated for Dutch students, extra intention has to be given to the size of the room. Dutch students attach relatively more importance to the size of the room than international students.

The municipality of Groningen stated that the housing of international students has the priority in the next four years. The municipality stated to work on the creation of multiple new accommodations for international students, to combat the quantitative shortage (Gemeente Groningen, 2018).

The results of this study show, when planning new housing for international students, extra attention has to be given to the height of the monthly rent and the relative distance to the main study location. International students are suggested to experience relatively a greater preference to a lower rent than Dutch students, but also suggested to experience less an aversion to smaller rooms. The advice to municipality of Groningen is to create housing that is relatively small and has a relative low rent, when the housing units are destined for international students. Furthermore, international students attach relatively more importance to live closer to their main study location than Dutch students. It advised to the municipality of Groningen to initiate housing for international students relatively close to the main study locations.

7.2 Limitations and further research.

Research regarding (international) student housing preferences is very scarce. This study adds further insights into the preferences for student housing. However, this study has some limitations that offer opportunities for future research.

In this thesis the case study focusses on students living in the city of Groningen. The city of Groningen has his own particular characteristics. The city of Groningen has no central campus were all classes are given, but the higher educational facilities are spread out over the city. That is one of the reasons why the results of this study may not hold for other cities. New housing preference studies should be performed in other cities to obtain more knowledge of housing preferences for other cities in the Netherlands.

Furthermore, in this thesis only the housing preferences of the whole international student population were estimated. According to Jansen (2011), the housing preferences between individuals with different socio-demographics could differ. It may be that the housing preferences differ between international students with a different nationality. Also housing preferences could differ between other socio-demographic factors such as age, gender, income and personal values. Further research is required whether there is a difference between students with different nationalities or other socio-demographic factors.

As been mentioned in the methodology chapter there are multiple ways to collect and study housing preferences of households. The choice of a particular method always has a few limitations. One of the limitations of the used methods, is that only a limited number of attributes are included in the experiments. There are possibly other attributes that influence the housing preferences of students, then the nine attributes which were included in the experiments. Despite the literature study and the pre-consultancy of students in Groningen, a number of respondents mentioned after the survey that they missed some attributes. They

suggested attributes such as condition of the house, sociability of the housemates and presence of a bicycle shed. In future research, other or more attributes could be studied.

Despite these limitations, the experiment contributes to the understanding of students' housing preferences. Moreover, this study has demonstrated the importance of researching the housing preferences of students with a different nationality. As such, the results are of potential interest to housing providers, higher educational institutes and municipalities. Student housing can be assigned to and built for particular groups of students according to their demographics. In this way, quantitative and qualitative shortages in student housing can be reduced.

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Appendices

Appendix A: survey questionnaire

Version example

Dear student,

You are hereby invited to fill in this survey about housing preferences. The survey is performed in the context of a master thesis project of the Real Estate Studies program of the University of Groningen. The aim of this research is to get more insight into the housing preferences of students in the city of Groningen. With the results of this research, it will be possible to stimulate better student housing policies and to create more suitable rooms for Dutch and international students in the future.

This survey will take about 5 minutes of your time. I kindly ask you to fill in the survey as complete and correct as possible on the given answer sheet. This survey is anonymous and will only be used for this research its purposes. If you have any further questions you can contact me through m.f.boogert@student.rug.nl or ask me directly.

With kind regards,

Marc Boogert

Section 1: select your preference.

Explanation

On the next pages, 8 choice sets with 3 hypothetical student room alternatives and a "no choice" option, are presented to you. The alternatives are described by 5 elements which are given below. In each case you choose the alternative room that you prefer the most.

Element	Description	Included values
Monthly rent	Monthly rent including all costs	€310, €370 and €430
Roomsize	Personal room space in square meters	12m², 18m² and 24m²
Housemates	With how many housemates do you have share the facilities (toilet, bathroom, kitchen) with.	1 , 3 and 6 housemates
Cycling time city center	Cycling time to the "Grote Markt" in Groningen in minutes.	3, 10 and 17 minutes
Cycling time study location	Cycling time to your main study location / classrooms in minutes.	3, 10 and 17 minutes

Example question.

Below an example is given of how a choice set looks like. First, you observe the values of each element and then you select the preferred alternative. In this case, room alternative 2 is chosen.

Example question	Alternative 1	Alternative 2	Alternative 3	Do not prefer any of these alternatives
Monthly rent	€ 430	€ 370	€ 310	
Size of the room	18m²	24m²	18m²	
Shared amenities	1 housemate	6 housemate	6 housemates	
Cycling time to city center	10 minutes	10 minutes	3 minutes	
Cycling time to study location	10 minutes	3 minutes	10 minutes	
Please indicate your choice here	○	●	○	○

If you understand the task, please fill in the survey. If you have any questions about the task, do not hesitate to ask me these questions.

Start of section 1.

Question 1	Alternative 1	Alternative 2	Alternative 3	Do not prefer any of these alternatives
Monthly rent	€ 430	€ 370	€ 310	
Size of the room	18m²	24m²	18m²	
Shared amenities	1 housemate	6 housemates	6 housemates	
Cycling time to city center	10 minutes	10 minutes	3 minutes	
Cycling time to study location	10 minutes	3 minutes	10 minutes	
Please indicate your choice here	○	○	○	○

Question 2	Alternative 1	Alternative 2	Alternative 3	Do not prefer any of these alternatives
Monthly rent	€ 310	€ 430	€ 310	
Size of the room	18m²	24m²	18m²	
Shared amenities	1 housemate	6 housemates	3 housemates	
Cycling time to city center	10 minutes	17 minutes	17 minutes	
Cycling time to study location	17 minutes	10 minutes	3 minutes	
Please indicate your choice here	○	○	○	○

Please continue on the next page.

Question 3	Alternative 1	Alternative 2	Alternative 3	Do not prefer any of these alternatives
Monthly rent	€ 430	€ 310	€ 310	
Size of the room	12m²	12m²	12m²	
Shared amenities	1 housemate	6 housemates	3 housemates	
Cycling time to city center	3 minutes	17 minutes	10 minutes	
Cycling time to study location	3 minutes	17 minutes	10 minutes	
Please indicate your choice here	○	○	○	○

Question 4	Alternative 1	Alternative 2	Alternative 3	Do not prefer any of these alternatives
Monthly rent	€ 370	€ 310	€ 370	
Size of the room	12m²	24m²	12m²	
Shared amenities	1 housemate	6 housemates	3 housemates	
Cycling time to city center	3 minutes	17 minutes	3 minutes	
Cycling time to study location	10 minutes	3 minutes	3 minutes	
Please indicate your choice here	○	○	○	○

Question 5	Alternative 1	Alternative 2	Alternative 3	Do not prefer any of these alternatives
Monthly rent	€ 430	€ 370	€ 310	
Size of the room	18m²	24m²	12m²	
Shared amenities	6 housemates	3 housemates	1 housemate	
Cycling time to city center	10 minutes	17 minutes	3 minutes	
Cycling time to study location	17 minutes	10 minutes	3 minutes	
Please indicate your choice here	○	○	○	○

Question 6	Alternative 1	Alternative 2	Alternative 3	Do not prefer any of these alternatives
Monthly rent	€ 430	€ 370	€ 370	
Size of the room	18m²	24m²	12m²	
Shared amenities	1 housemate	6 housemates	3 housemates	
Cycling time to city center	17 minutes	3 minutes	10 minutes	
Cycling time to study location	3 minutes	17 minutes	10 minutes	
Please indicate your choice here	○	○	○	○

Question 7	Alternative 1	Alternative 2	Alternative 3	Do not prefer any of these alternatives
Monthly rent	€ 370	€ 310	€ 430	
Size of the room	12m²	24m²	24m²	
Shared amenities	1 housemate	6 housemates	1 housemate	
Cycling time to city center	17 minutes	17 minutes	3 minutes	
Cycling time to study location	17 minutes	17 minutes	17 minutes	
Please indicate your choice here	○	○	○	○

Question 8	Alternative 1	Alternative 2	Alternative 3	Do not prefer any of these alternatives
Monthly rent	€ 430	€ 370	€ 430	
Size of the room	18m²	18m²	24m²	
Shared amenities	3 housemates	3 housemates	3 housemates	
Cycling time to city center	3 minutes	10 minutes	10 minutes	
Cycling time to study location	10 minutes	17 minutes	3 minutes	
Please indicate your choice here	○	○	○	○

Section 2

In this section, it is the task to value different factor levels

from 0 “extremely unattractive” to 100 “extremely attractive”

in the situation where you are looking for a room now. Do this with considering your current living and financial situation.

---

1. Size of the room

12m² =>_____

18m² => _____

24m² => _____

---

2. Monthly Rent

€310 =>_____

€370 =>_____

€430 =>_____

---

3. Number of housemates

1 housemate =>_____

3 housemates =>_____

6 housemates =>_____

---

4. Cycling time to the City Center

3 minute=>_____

10 minutes =>_____

17 minutes =>_____

---

5. Cycling time to your main study location

3 minute=>_____

10 minutes =>_____

17 minutes =>_____

---

6. Presence of outdoor space

Garden =>_____

Balcony =>_____

No outdoor space =>_____

When considering your current financial housing situation, value each different factor level

from 0 “extremely unattractive” to 100 “extremely attractive”

in the situation where you are looking for a room now.

7.Presence of common area/living room

Yes =>_____

No =>_____

---

8. Walking time to nearest supermarket

3 minutes =>_____

7 minutes =>_____

11 minutes =>_____

---

9. Walking time to nearest bus or train station

3 minutes =>_____

7 minutes =>_____

11 minutes =>_____

Section 3:

When considering your current housing situation, value the different factors

from 0 “extremely unimportant” to 100 “extremely important”

in the situation where you are looking for a room

Factor	Points
Size of the room	
Monthly rent	
Housemates	
Cycling time to city center	
Cycling time to main study location	
Presence of outdoor space	
Presence of a Common area/Living room	
Walking time to the nearest supermarket	
Walking time to nearest bus or train station	

Please continue to the last page.

Section 4: Socio-demographic questions

The following questions are about your personal situation.

Section 2
The following questions are about your personal situation.

What is your nationality?
0 Dutch 0 Other, namely: ……..

What is your age?

What is your gender?
0 Male 0 Female 0 Other

At which higher educational institute are you currently studying?
0 University of Groningen
0 Hanze University of Applied Sciences
0 Other, namely……

Do you currently live in the city of Groningen?
0 Yes
0 No, but I am planning to move to Groningen in the next coming two years.(please, do not fill in the rest of the questions)
0 No and I am not planning to move to Groningen in the next coming 2 years. (please, do not fill in the rest of the questions)

What is your current postal code? (For example: 1234AB)

What is your current housing situation?
0 private room with shared amenities (toilet, bathroom, kitchen)
0 Studio room or apartment/house with private amenities (toilet, bathroom, kitchen)
0 at parental house (please do not fill in the rest of the questions)

What is your current monthly rent including all costs?

€

What is the current size of your room in square meters?

M²

With how many other people do you share the amenities (Toilet, Kitchen bathroom)?

What is your current average cycling time to the city center of Groningen (Grote Markt) in minutes?

minutes

What is your current average cycling time to your main study location in minutes?

minutes

Appendix B : Log file Stata for descriptive statistics

Use file use "X:\My Documents\Thesis\Descriptivestatistics.dta

summarize

tabstat age, s(mean sd) by (nationality)

tabstat gender, s(mean sd) by (nationality)

tabstat institute, s(mean sd) by (nationality)

tabstat livegroningen, s(mean sd) by (nationality)

tab housing

tabstat rent, s(mean sd min max) by (nationality), if housing == 1

tabstat size, s(mean sd min max) by (nationality), if housing == 1

tabstat rentsize, s(mean sd min max) by (nationality), if housing == 1

tabstat roommates, s(mean sd min max) by (nationality), if housing == 1

tabstat city, s(mean sd min max) by (nationality), if housing == 1

tabstat study, s(mean sd min max) by (nationality), if housing == 1

table nationality, contents(mean rent sd rent min rent max rent), if housing == 1

Appendix C: Log file R.

```
library(mlogit) # the estimation requires the mlogit library. Install this package first under Packages -> Insta

# import the dataset

conjointcombined <- read.csv("~/conjointcombined.csv")


# create effect coding for cheese layers

conjointcombined$rent_310 <- 0

conjointcombined$rent_370 <- 0


conjointcombined$rent_310[conjointcombined$rent==310] <- 1

conjointcombined$rent_370[conjointcombined$rent==370] <- 1


conjointcombined$rent_310[conjointcombined$rent==430] <- -1

conjointcombined$rent_370[conjointcombined$rent==430] <- -1


# create effect coding for size

conjointcombined$size_12 <- 0

conjointcombined$size_18 <- 0


conjointcombined$size_12[conjointcombined$size==12] <- 1

conjointcombined$size_18[conjointcombined$size==18] <- 1


conjointcombined$size_12[conjointcombined$size==24] <- -1

conjointcombined$size_18[conjointcombined$size==24] <- -1


# create effect coding for housemates

conjointcombined$housemates_1 <- 0
```

```
conjointcombined$housemates_3 <- 0

conjointcombined$housemates_1[conjointcombined$housemates==1] <- 1
conjointcombined$housemates_3[conjointcombined$housemates==3] <- 1

conjointcombined$housemates_1[conjointcombined$housemates==6] <- -1
conjointcombined$housemates_3[conjointcombined$housemates==6] <- -1

# create effect coding for city center
conjointcombined$cc_3 <- 0
conjointcombined$cc_10 <- 0

conjointcombined$cc_3[conjointcombined$cc==3] <- 1
conjointcombined$cc_10[conjointcombined$cc==10] <- 1

conjointcombined$cc_3[conjointcombined$cc==17] <- -1
conjointcombined$cc_10[conjointcombined$cc==17] <- -1

# create effect coding for distance to study location
conjointcombined$sl_3 <- 0
conjointcombined$sl_10 <- 0

conjointcombined$sl_3[conjointcombined$sl==3] <- 1
conjointcombined$sl_10[conjointcombined$sl==10] <- 1

conjointcombined$sl_3[conjointcombined$sl==17] <- -1
conjointcombined$sl_10[conjointcombined$sl==17] <- -1
```

```
# convert data to work with the mlogit format

conjointcombined <- mlogit.data(conjointcombined, choice="Selection_Dummy", shape="long",
alt.var ="Alternative_id")

# calculate models

# partworth model

ml1<- mlogit(Selection_Dummy ~ rent_310 + rent_370 + size_12 +

        size_18 + housemates_1 + housemates_3 + cc_3 + cc_10 +

        sl_3 + sl_10 +

        None | 0, conjointcombined)


# note: the "| 0" part means that no alternative-specific constants should be considered

summary(ml1)

# recover standard errors and ref.level std error

covMatrix <- vcov(ml1)

# this is the variance-covariance matrix

sqrt(diag(covMatrix))

# these are the standard errors you find in the summary output (the square-root of the diagonal
elements of the matrix)

# partworth model om te kijken of er een verschil is tussen mannen en vrouwen.

ml2<- mlogit(Selection_Dummy ~ rent_310 + rent_370 + size_12 +

        size_18 + housemates_1 + housemates_3 + cc_3 + cc_10 +

        sl_3 + sl_10 + I(international * rent_310) + I(international * rent_370) + I(international *
size_12) + I(international * size_18) + I(international * housemates_1)

        + I(international * housemates_3) + I(international * cc_3) + I(international * cc_10) +
I(international * sl_3) + I(international * sl_10) +

        None | 0, conjointcombined)


summary(ml2)
```