The influence of socio-economic factors on the relationship between proximity to amenities and happiness in Groningen

Bachelor's Thesis
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Abstract:
Geographical factors can have an effect on an individual's happiness with spatial inequalities being one of them. Spatial inequalities as a result of the proximity and accessibility of amenities there can have an effect on happiness. This thesis tries to answer the question "*To what extent do socio-economic factors affect individual happiness with respect to proximity to amenities in Groningen?"*. By bringing socio-economic factors into the analysis of proximity to amenities and happiness this research uses quantitative methods of statistical analysis through the use of multiple linear regression. The main results indicate that there is no statistical significance of the relationship between socio-economic factors and happiness and proximity, however if the model could be made significant by controlling for all the possible variables and increasing the sample size, whether or not a student in Groningen is employed might have an effect on their happiness. Therefore, even if the results indicated that occupation might increase happiness of individuals and that proximity to amenities does influence happiness, nothing can be definitively concluded based on insignificant results. Further qualitative research could be conducted to support the quantitative results to provide deeper insight into "why" individuals rate their happiness in relation to their proximity.

Table of Contents

1. Introduction

In this chapter, the theme of this thesis is introduced and a research problem is created. The research problem is then followed by the research question which this thesis tries to answer.

1.1 Background

Geographical location can affect an individual's happiness or discontent indirectly or directly. Understanding how place may affect happiness has huge implications for potentially increasing individual-level happiness. In a research paper by Ballas (2013) it is stated that there is huge potential for both behavioural and social scientists to incorporate the spatial dimension in analysing characteristics of cities or regions that may affect subjective happiness. The theme of this paper involves happiness and also brings in the spatial dimension by analysing how the proximity to amenities may affect happiness.

Current theoretical work on the theme of subjective happiness discusses the links between and geographical ‘contextual’ circumstances or characteristics and the importance of such characteristics in different countries (Ballas & Dorling, 2013). The geographical factors influencing happiness identified in this study include climate, the physical environment (Brereton, Clinch & Ferreira, 2008; Ferrer-i-Carbonelli & Gowdy, 2007; Mitchell & Popham, 2008) in addition to social and spatial inequalities (Alesina, Di Tella, & MacCulloch, 2004; Ballas, Dorling, & Shaw, 2007; Dorling & Bardford, 2009;Frank, 2007; Wilkinson, 2005; Wilkinson & Pickett, 2009). Spatial inequalities could include the location of amenities and the inequalities that the spatial accessibility of those amenities brings.

Amenities play a role in where people choose to locate when moving, and they also play an important role in making areas more attractive. Therefore amenities can influence an individual’s perception of their quality of life. This means that the accessibility of amenities is important as well as their perceived use of them. By creating accessible amenities nearby to support the ease of mobility and activity, a happy place can be achieved (Montgomery, 2014). According to a study by Putri (2015), the socio-economic background and subjective preference of individuals has an effect on the degree of influence on the relationship between proximity to amenities and happiness. This is because these factors determine the need for amenities as well as shaping the daily activities of individuals. It also suggests as a future research recommendation to put more control variables from both social and economic aspects that would help determine the

need for amenities and happiness itself. Therefore understanding how socio-economic factors affect happiness in relation to proximity to amenities is relevant to expand knowledge on the effects, as well as allowing cities or regions to better plan the spatial placement of amenities with regards to socio-economic status of its inhabitants.

1.2 Research problem

The aim of this research is to investigate how socio-economic factors simultaneously affect the relationship between happiness and proximity to amenities in the city of Groningen. This research will add to existing literature by adding the dimension of socio-economic status into the relationship between happiness and proximity to amenities. Therefore, this study tries to understand how the relationship between happiness and proximity is influenced by an individual's socio-economic status, hence the study tries to understand how the interaction between happiness and proximity to amenities is affected by socio-economic factors using quantitative methods. This study is done in the city of Groningen with a population of around 230,000 of which around 25% are students, making it the youngest city in the Netherlands while having the highest percentage of students of cities in the Netherlands (Groningen.nl, n.d.). Amenities should play an important role in the happiness of its youthful population. This is because the happiness of younger adults is more strongly related to the accessibility of amenities which add to the quality of a city's cultural and place characteristics, whereas the happiness of older adults is more related to the quality of services (Hogan et al., 2016).

Main Research question:
To what extent do socio-economic factors affect individual happiness with respect to proximity to amenities in Groningen?

This research question will be answered using the following sub-questions:

a) What is investigated in academic literature about socio-economic factors individually affecting proximity to amenities and happiness?
b) To what extent does proximity to amenities affect the happiness of students in Groningen?
c) How do socio-economic factors simultaneously affect the relationship between proximity to amenities and happiness of students in Groningen?

1.3 Structure of the Thesis

This thesis is made up of 5 main chapters. Chapter 1 (Introduction) explains the background of the thesis where the topic of the thesis is brought up. The research problem is then introduced which includes the aim of the research, the main research question and the sub questions of the research. Chapter 2 (Theoretical framework) which includes definitions of the main concepts used in the thesis. This is followed by a literature review explaining the existing literature on the topic of this thesis, which then results in a conceptual model and hypotheses for the quantitative analysis. Chapter 3 (Methodology) explains the data collection strategy and the data analysis strategy. This chapter also includes ethical considerations of conducting a survey and a reflection on the data collection after it was conducted. Chapter 4 (Results and Discussion) presents and explains the outcome of statistical testing on the survey results followed by a discussion linking those results to the theoretical framework and research questions. Chapter 5 (Conclusion) finally answers the research questions of this thesis with conclusions drawn based on the research conducted. To finish off this chapter, there are future research recommendations and a reflection on the overall research process. After the concluding chapter, there is a reference list of all the sources used in the writing of this thesis. This is followed by appendices, including the template of the survey and additional SPSS outputs.

2. Theoretical framework

This chapter of the thesis introduces the concepts used and defines them. Along with this there is a discussion of the relevant literature on the theme of geographies of happiness and amenities. This is then logically followed by a conceptual model and subsequent hypotheses for the quantitative analysis.

2.1 Literature review

The concept of subjective happiness is regarded as an individual's overall sense of life satisfaction or quality of life depending on economic and non-economic factors (Koeppen et al., 2021). Many studies use the term subjective well-being synonymously with happiness as they claim it makes what they are focusing on more precise (Chekola, 2007). This research will use the term subjective happiness over well-being.

One of the leading global studies on happiness, the “World Happiness Report” has studied happiness around the world using the concept of subjective well-being. In the most recent report, three main indicators are used when measuring subjective well-being (Helliwell et al., 2021). These indicators are life evaluations, positive emotions and negative emotions. As explained in the report, life evaluations form a stable measure of the quality of people’s lives while also providing a more informative measure capable of being used to capture international comparisons of well-being. Positive and negative emotions pay attention to the daily emotions of people. Life evaluations reflect circumstances of life as a whole better than emotions, however daily emotions are significant supports for life evaluations (Helliwell et al., 2021). Quantitative studies on happiness often use a measurement of subjective well-being captured by survey questions such as “Taking all things together would you say you are *very happy, quite happy,* or *not very happy*” (Dolan et al., 2007, Frey and Stutzer, 2002, Layard, 2005).

Ballas (2013) argues that amenities could be a suitable objective indicator of quality of life in cities. Amenities are “site- or region- specific goods and services, of either the private or public variety, that make some locations particularly attractive for living and working (Mulligan and Carruthers, 2011). Robinson, Murray-Rust, Rieser, Milicic, and Rounsevell (2012) studied the effect which indicators such as access to green space, public transport and access to shops have on well-being. They found that the clustering of industrial development has a positive impact on well-being. This suggests that amenities do impact well-being and happiness.

Brereton, Clinch and Ferreira (2008) used proximity measures to examine whether the influence of spatial amenities on life satisfaction is a function of distance. Their findings shows that proximity to landfill has a negative effect on well-being, proximity to coast has a large positive effect, and the effect that proximity to major transport routes has on well-being varies depending on the specific type of transport amenity.

Proximity is the nearness or closeness to something. In this paper, proximity is used similar to the concept of distance, as the proximity to amenities is essentially the distance to amenities. The concept of spatial accessibility is related to proximity, as it is normally measured using the “distance” or “proximity” level (Putri, 2015). This spatial accessibility is based on the measurement of distance between an amenity and populations.

Studies measuring socioeconomic factors state that the most often used measurements are: educational attainment, income, occupation, home and goods ownership, and area-based deprivation indices (Graham, 2000). Area-bases deprivation indices are linked to spatial inequalities which take into account the accessibility of amenities. In a regression analysis by Azizi (2017), demographic factors such as marital status, gender,and happy parents affect happiness. As explained in the same study, previous studies on the same topic indicate that marital status does influence happiness, while other studies showed no effect of marital status on happiness. They also found that the socioeconomic factors of income, occupation and education affect happiness, arguing that income especially has a long-term effect on happiness Azizi (2017). This is because individuals with low income inherently face more difficulties in their day-to-day lives and fulfilling their basic needs, which in turn could cause mental, emotional or even physical problems. Income could also determine the access a person has to a higher education, and a higher education could lead to a higher income, a better job and thus influencing social position and increasing happiness. The study also found that individuals with a higher education grade are happier than others although there are also studies which conflict with this result.

As explained by Ballas and Dorling (2013), the position which a person has in society and the overall level of status inequalities, influences their subjective experience, which includes both happiness and unhappiness. There is also a moderate positive correlation between subjective well-being and real income per capita in a country, however in the wealthiest countries, aggregate happiness is not significantly affected by further increases in overall income per capita (Frey and Stutzer, 2002).

2.2 Conceptual model

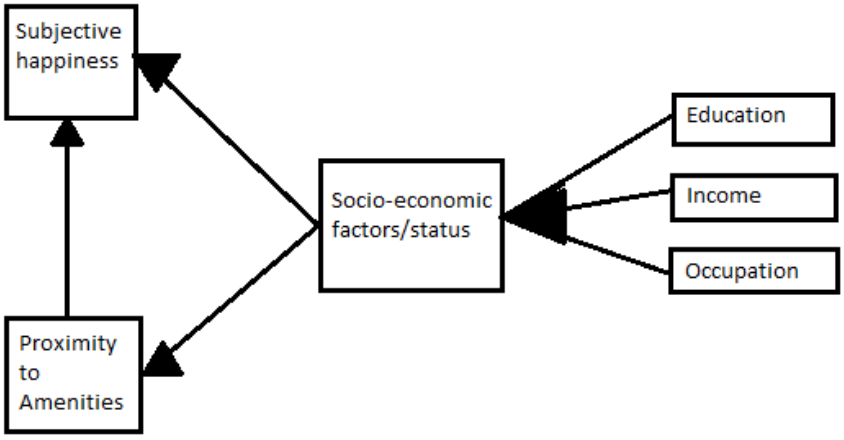


Figure 1: Conceptual model

Figure 1 is a conceptual model of the important concepts related to this research provided through academic literature. The model will be used in this research, as it shows the relationships between the factors important for this paper. It is used to understand the dynamic between all the variables in the research and to explain the theory behind in a simple visualisation.

2.3 Hypotheses

The hypothesis of this research is: there is a relationship between socio-economic factors affecting the relationship between happiness and proximity to amenities.
Null hypothesis: There is no relationship between socio-economic factors, happiness and proximity to amenities.

3. Methodology

This chapter of the thesis explains both the data collection and data analysis strategies, with an explanation of how the data is sampled and which type of statistical analysis is conducted on the gathered data. This also includes ethical considerations of conducting a survey as well as a reflection on the aftermath of data collection.

3.1 Data collection strategy

To answer subquestion (b) and (c), a survey is conducted to collect quantitative data that is then used for statistical analysis to test the hypothesis of this research. In order to recruit participants for the survey, the sampling strategy which is executed, is a combination of snowball and quota sampling. Initially the survey is distributed to inhabitants of Groningen through the use of social media messaging applications such as whatsapp or Facebook. This means that the survey is first sent to anyone who is possible to contact through social media and lives in Groningen, and each participant is also asked to share the survey forward to anyone who also lives in Groningen. This “snowballing” is what social scientists refer to as when a contact helps you recruit another contact, who can then also put you in contact with someone else (Clifford et al., 2012). This will help in getting as many respondents as possible through the convenience of sending the survey to anyone who simply lives in Groningen. After the amount of responses to the snowball method slows down, quota sampling is done to make sure that the sampling technique will be probabilistic. Quota sampling tries to replicate the general structure of the population being studied in order to maximise the chances of the sample being representative of the target population (Clifford et al., 2012). Secondary data on the demographics of Groningen is then used for quota sampling to determine the percentage of people in predetermined age categories. By doing this, the quota will be set for how many survey results will be needed for each age category to make the sample representative of the population of Groningen.

3.2 Usage of the data collection instrument

The survey (Appendix 1) is used to answer the research questions by gathering data on all relevant aspects of this research so that quantitative statistical analysis can be conducted. Therefore, the survey asks respondents demographic questions such as their age, income, occupation, level of education and marital status. From these, the latter four will result in the socio-economic status of the respondents while the age will be useful in the sampling strategy. To answer subquestion (b), respondents are asked questions regarding how far on average they live from different types of amenities, how happy they are with whatever distance they respond with, and how happy they are in general. With these questions, it's possible to identify both the distance respondents are from amenities (proximity) and how happy they are. Once socio-economic factors of respondents are identified along with their proximity to amenities and happiness, statistical analysis with SPSS is conducted on the data to help answer subquestion

(c). Before the data collection instrument is sent to a wide number of respondents, a pilot survey is first sent to one person for the purpose of receiving feedback on the quality of the survey.

3.3 Data analysis strategy

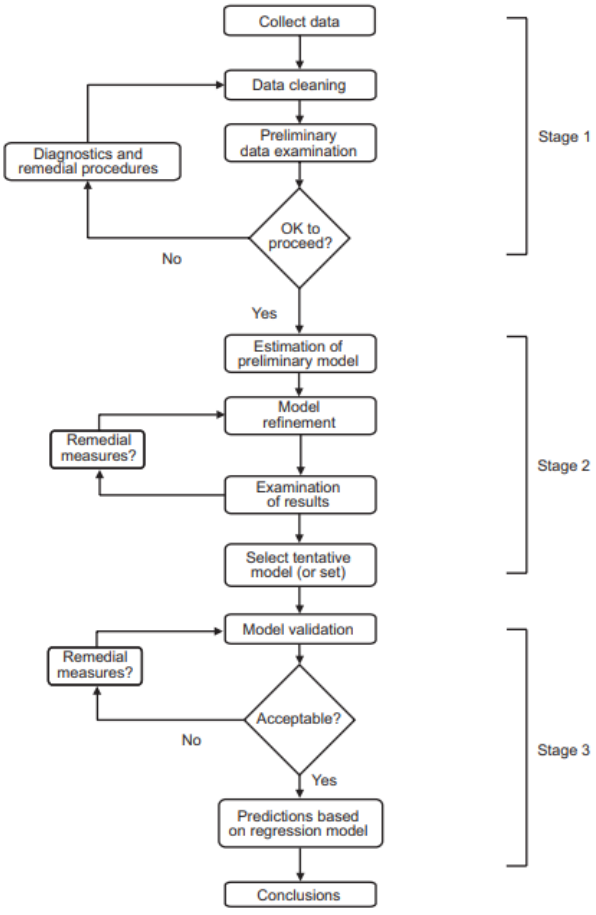
In order to analyse the primary data gathered through the survey, statistical analysis with SPSS is vital. As multiple linear regression deals with how two or more independent variables affect a single continuous dependent variable ((Burt et al., 2009), multiple linear regression analysis is conducted to see how the socio-economic status and proximity to amenities affect individual happiness. This means that the dependent variable is individual happiness asked through the survey question “how happy are you in general?”. The independent variables are proximity to amenities asked through “distance to amenities” questions in the survey, and socio-economic status asked through demographic questions in the survey.

The equation for multiple linear regression is as follows (Burt et al., 2009):

$$Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i$$

Y_i = Happiness (Dependent variable)
X_{1i} through ε_i = proximity to amenities, socio-economic status (Independent or predictor variables)
a = value of Y when all independent variables equal to 0

Linear regression is conducted according to the design in Figure 2 as proposed by Burt et al. (2009) to ensure transparent data preparation as well as the possibility of a safe stepback if there is a problem with validity of results. This means that before data analysis begins, there is cleaning of the data to make sure it is as representative as possible, and that the variables are coded properly for the tests. For multiple linear regression, this also means



checking the assumptions of whether or not the data can be used for multiple regression.

(**Figure 2:** Stages in Building a Regression Model (Burt et al., 2009)

These assumption include using SPSS and checking for independence of observations with the Durbin-Watson statistic, checking for a linear relationship with scatterplots, checking for homoscedasticity with residuals, checking for the lack of multicollinearity, and finally making sure there are no significant outliers and that the residuals are approximately normally distributed (Laerd statistics, 2018).

3.4 Ethical considerations

Other than abiding by core ethical and moral principles, when conducting a survey, the most important ethical considerations would be informed consent and confidentiality. This means being transparent with potential respondents that the data will be used for research purposes while upkeeping confidentiality and privacy. The “Welcome” part of the survey (Appendix 1) reflects these ethical considerations.

3.5 Reflection on data collection

The quantitative method of conducting a survey and performing multiple linear regression was chosen as it would best reflect the nature of the research questions in the research paper where multiple variables are tested against one, which in this case is happiness. Choosing this method of conducting a survey during COVID-19 meant that the most effective method of spreading the survey was through online means. This presented some initial problems with data quality.

Regarding the quality of the data collected, during the data collection process while conducting snowball sampling, there were problems in getting individuals in older age groups to participate. As the data collection strategy also involved quota sampling, there was a need for individuals from many different preset age categories as seen in Question 2 of the survey (Appendix 1). The purpose of asking the age of participants in categories as seen in the question, was so that it would be possible to match the percentage of responses in each age group with that of the population of Groningen. After spreading the survey and asking participants to also send it to people who live in Groningen, out of the 71 total responses, only 3 were from age groups higher than 20-29. For quota sampling to be possible, there was a need for at least some responses in

all the age categories. As a result of it not being possible to conduct quota sampling with the collected data, to make the data more representative, the focus from inhabitants of Groningen changed into students of Groningen. This change of focus in the data analysis is also supported by the responses gathered to question 7 in the survey (Appendix 1), where out of the 71 responses, 4 were not in the categories of student or student and employed. The quality of the data collected when the cases were filtered out to be only students of Groningen was good, as the assumptions for multiple linear regression were fulfilled. For example the Durbin-Watson statistic and VIF values were within required values.

4. Results and Discussion

In this chapter, the responses of the respondents are first analysed and the outputs from SPSS are presented and then discussed in relation to the literature and research questions.

4.1 Analysis of Respondents

The following figures give insight into the answers respondents of the survey gave to specific questions of the survey. This is an attempt to give further insight into answering the subquestions, specifically on the extent to which proximity to amenities affects happiness.

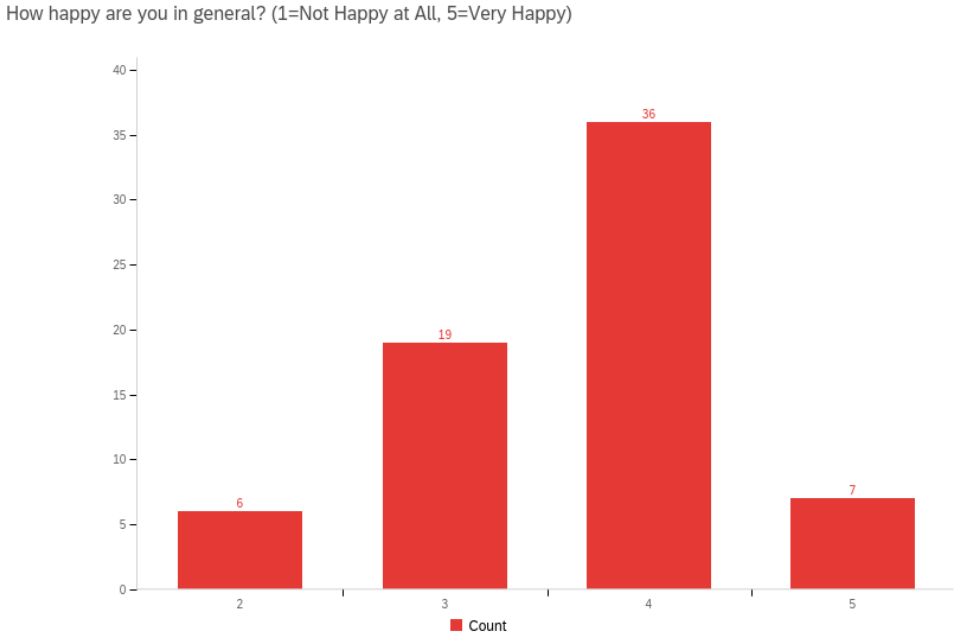


Figure 3: Happiness of respondents (made by author)

Figure 3 presents the answers respondents gave to the question “How happy are you in general?”, where a majority 36 out of the 68 respondents rate their happiness as 4/5. This would indicate that in this sample, on average students in the city of Groningen are closer to being “very happy” than “not happy at all”.

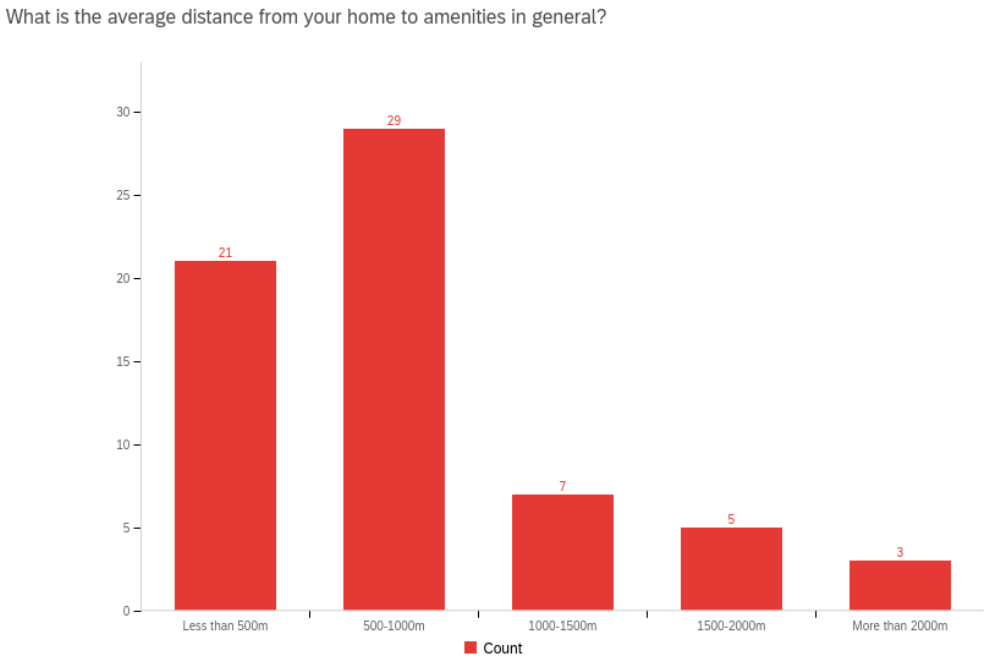


Figure 4: Average distance from home to amenities of respondents (made by author)

Figure 4 depicts the answers respondents gave to the questions “What is the average distance from your home to amenities in general?” where 50 out of 65 respondents stated that they live within 1000m of amenities. This indicates that in this sample, most students in Groningen live very close to amenities, which is a reflection of the layout and structure of Groningen.

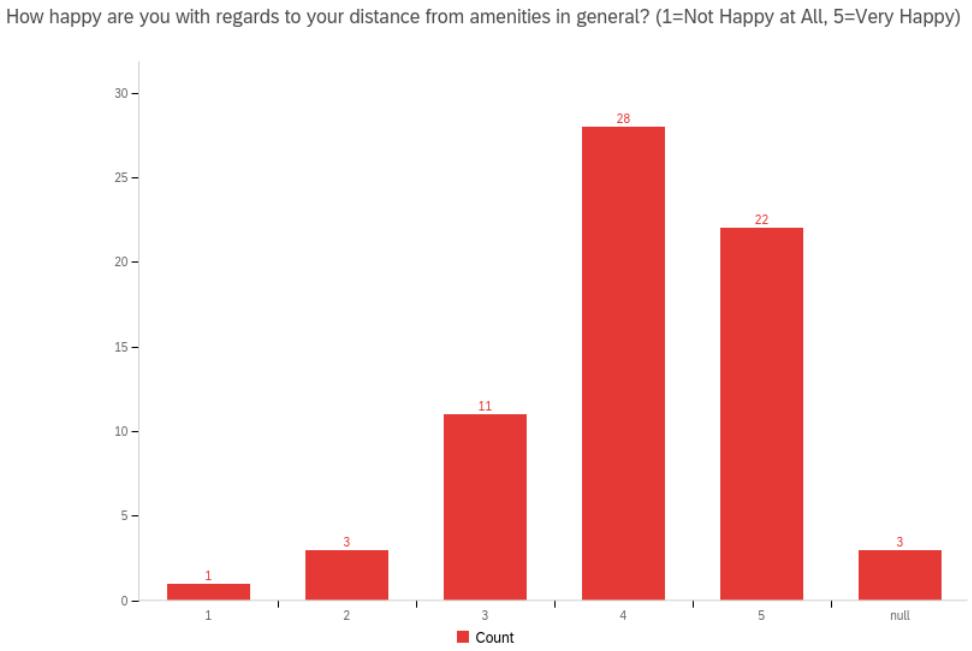


Figure 5: Happiness with regards to distance to amenities (made by author)

Figure 5 depicts the answers respondents of the survey gave to the question “how happy are you with regards to your distance from amenities in general?” where again 50 out of the 65 respondents answered 4 or 5. This would indicate that students in this sample are very happy with how far they are from amenities. This once again could be the result of the layout and structure of the city of Groningen. Most residents already live within 1000m of amenities which results in them also being very happy with that proximity.

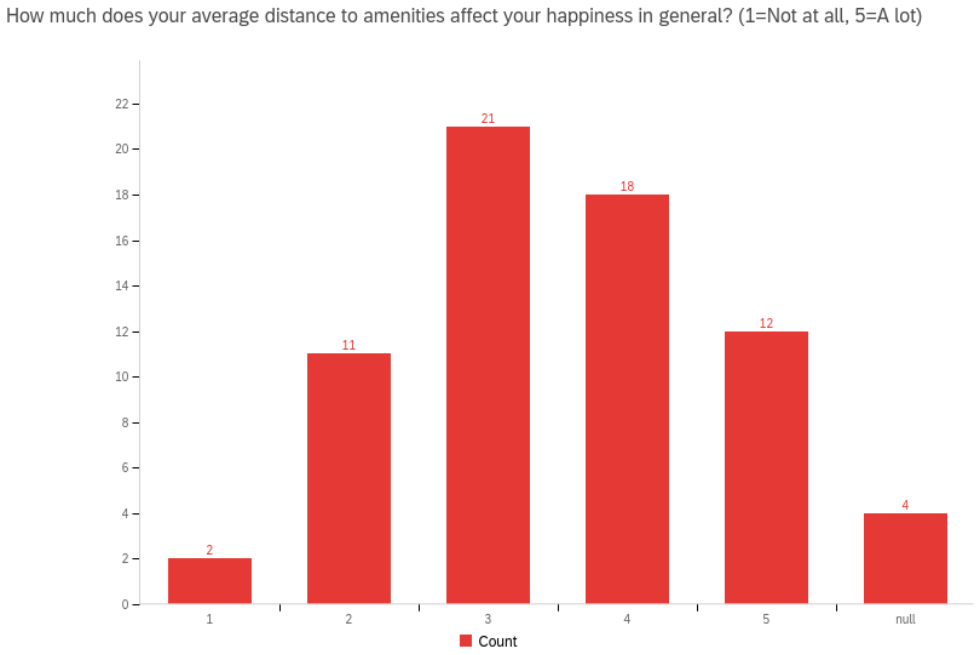


Figure 6: Effect of proximity on happiness (made by author)

Respondents were also asked the question “how much does your average distance to amenities affect your happiness in general?” Figure 6 visualised those responses, where 21 out of the 64 responses rated the effect as 3 out of 5. The second and third most frequent responses were 4 and 5, which would indicate that in this sample, on average students of Groningen think that the distance at which they live from amenities affect their happiness “a lot” compared to “not at all”.

The questions asked for figures 5 and 6 are an attempt to gain insight into the sub question (b) to give an answer to the extent to which proximity to amenities affects happiness of students of Groningen. Based on figures 5 and 6 and taking into consideration the majority 50/65 respondents living within 1000m of amenities, this sample indicates that students of Groningen are closer to being “very happy” living at that distance. The effect that their distance to amenities has on their happiness is weighed more to the side of “a lot” than “not at all” which would mean that respondents think that on average living within 1000m of amenities does influence their happiness in a positive way.

4.2 Results of multiple linear regression

Descriptive Statistics for continuous variable

Variable	Mean	Std. Deviation	Min	Max	N
Individual happiness (1=Not Happy at All, 5=Very Happy)	3,6418	,79203	2	5	67

Table 1: Descriptive statistics for continuous variable (made by author)

Descriptive Statistics for categorical variables

Variables	Frequency	Percent
Level of employment (Ref: Employed)	67	100
Employed	26	38,8
Not employed	41	61,2
Marital Status (Ref: Other)	65	
Other	6	9,,2
Single, never married	59	90,8
Level of Education (current or highest attained (Ref: High School)	67	100
High School	11	16,4
Bachelor\s degree	49	73,1
Master's degree	7	10.5
Level of annual household income (Ref: Very low income)	67	100
Very low income (less than €20.000)	26	38,8
Low income (€20.000-€30.000)	8	11,9

Middle income (€30.000-€40.000)	13	19,4
High income (€40.000-€60.000)	3	4.5
Very high income (more than €60.000)	7	10.4
Prefer not to say	10	14.9
Average distance from home to amenities (Ref: Less than 500m)	64	100
Less than 500m	21	32.8
500-1000m	29	45.3
1000-1500m	6	9.4
1500-2000m	5	7.8
More than 2000m	3	4.7

Table 2: Descriptive statistics for categorical variables (made by author)

Table 1 and 2 present the descriptive statistics of the gathered data for both continuous and categorical variables. The dependent variable used in the regression analysis found in table 1, is “Individual Happiness”. The question “How happy are you in general?” resulted in the variable being measured on a 5 point scale, where (1) is “Not Happy” and (5) is “Very Happy”. The categorical variables in table 2 have been measured and categorized as follows: level of employment is recorded into a dummy variable in which 1 represents “employed” and 0 represents students who are not employed, as this variable was used to narrow down the sample to focus on students of Groningen for data quality. Marital status is also recoded into a dummy variable where 1 represents “Other” and 0 represents “Single, never married” as these were the only two categories which received responses. Level of education is categorized into “high school”, “bachelor’s degree” and “master’s degree” based on the respondent's current or highest attained level of education. Level of annual household income is recoded and categorized into 6 categories from “very low income” to “very high income” and “prefer not to say”. The same recoding into categories is done with average distance from home to amenities, with the categories of “less than 500m”, “500-1000m”, “1000-1500m”, “1500-2000m” and “more than 2000m

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,490[a]	,240	,035	,76618	1,832

a. Predictors: (Constant), prox=More than 2000m, occ=employed, inc=High income (€40.000-€60.000), edu=Bachelor's degree, inc=Middle income (€30.000-€40.000), mar=other, prox=500-1000m, inc=Very high income (more than €60.000), inc=Low income (€20.000-€30.000), prox=1500-2000m, prox=1000-1500m, inc=Prefer not to say, edu=Master's degree

b. Dependent Variable: How happy are you in general? (1=Not Happy at All, 5=Very Happy) - Happiness

Table 3: Model Summary (made my author)

A multiple linear regression was calculated to predict individual happiness based on distance to amenities and several socio-economic factors. Table 3 presents the adjusted R square value, which means that when the dependent variable is accounting for the independent variables, the model captures only 3.5% of the total variance. It also presents one of the assumptions of multiple linear regression, the Durbin-Watson statistic which should be between 1.5 and 2.5 for the data to not be autocorrelated.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8,920	13	,686	1,169	,330[b]
	Residual	28,177	48	,587		
	Total	37,097	61			

a. Dependent Variable: How happy are you in general? (1=Not Happy at All, 5=Very Happy) - Happiness

b. Predictors: (Constant), prox=More than 2000m, occ=employed, inc=High income (€40.000-€60.000), edu=Bachelor's degree, inc=Middle income (€30.000-€40.000), mar=other, prox=500-1000m, inc=Very high income (more than €60.000), inc=Low income (€20.000-€30.000), prox=1500-2000m, prox=1000-1500m, inc=Prefer not to say, edu=Master's degree

Table 4: ANOVA (made by author)

Table 4 shows that the ANOVA test was insignificant as the (sig.) value is not under 0,05. This means that the null hypothesis for the ANOVA test cannot be rejected, thus there is no difference in mean values between the variables. As a result the model is insignificant. This also means that nothing can be definitively concluded about the data and that any conclusions drawn from it are only assumptions. Therefore the results of this test cannot be used to definitively answer subquestions (b) or (c) which will be discussed further on.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3,116	,344		9,049	,000
	Occupation (dummy; ref: Employed)	,533	,216	,335	2,464	,017
	Marital Status (dummy; ref: Other)	,532	,374	,203	1,422	,162
	Level of Education (current or highest attained) (ref: High School)					
	Bachelor's Degree	,306	,299	,173	1,023	,311
	Master's Degree	,130	,446	,050	,292	,772
	Level of annual household income (Ref: Very low income)					
	Low income (€20.000-€30.000)	-,566	,364	-,231	-1,553	,127
	Middle income (€30.000-€40.000)	,148	,288	,078	,514	,610
	High income (€40.000-€60.000)	,203	,494	,056	,411	,683
	Very high income (more than €60.000	,238	,366	,091	,650	,519
	Prefer not to say	,207	,339	,094	,611	,544
	Average distance from home to amenities (Ref: Less than 500m)					
	500-1000m	-,031	,235	-,020	-,132	,895
	1000-1500m	-,122	,389	-,047	-,313	,755
	1500-2000m	-,170	,465	-,054	-,365	,717
	More than 2000m	-,529	,522	-,147	-1,014	,316

a. Dependent Variable: How happy are you in general? (1=Not Happy at All, 5=Very Happy) - Happiness

Table 5: Coefficients of regression (made by author)

Table 5 presents the unstandardized coefficients. An important part to take into account from the previous table is that the overall regression was not significant. In table 5, occupation is the only

significant predictor of individual happiness, as participants's happiness increased 0,533 (on a scale of 1-5) if they were employed as opposed to those unemployed. The rest of the predictor variables were insignificant, hence nothing can be suggested about their interaction with individual happiness. Although the overall test was not significant, this relates to subquestion (c) as it implies that the socio-economic factor of employment might play a role in the happiness of students.

4.3 Discussion

The quantitative analysis of this paper was trying to answer the sub-questions of the research (b)“*To what extent does proximity to amenities affect the happiness of students in Groningen?*” and (c)“*How do socio-economic factors simultaneously affect the relationship between proximity to amenities and happiness of students in Groningen?*”. On the basis of these sub-questions, the hypothesis for the research was that there is a relationship between socio-economic factors affecting the relationship between happiness and proximity to amenities. On the basis of the SPSS outputs, this hypothesis cannot be confirmed. Therefore, either there is no relationship between socio-economic factors simultaneously affecting the relationship between happiness and proximity to amenities, or type II error of statistical testing is present. Type II error, where a null hypothesis is accepted but is actually false might be present due to the lack of power of the data, where more cases might improve the results. This lack of power in the data could be a result of a relatively low sample size when there are multiple independent variables in multiple linear regression. When controlling for such a large number of variables, the sample size should also be larger. This could play a role in the lack of significance of the regression. Since none of the values for significance of proximity are significant in Table 4, nothing can be concluded about subquestion (b). This is similar to what was said in the paper by Putri (2015), where after statistical testing there is no significant relationship between the proximity to amenities and happiness. This also differs from the study by Brereton, Clinch and Ferreira (2008), where proximity to different types of amenities does affect well-being negatively or positively depending on the type of amenity. Nonetheless, analysis of the answers respondents gave in figures 3, 4 and 5 give some insight into this sub question. Students of Groningen on average live within 1000m of amenities and rate their happiness in general as 3,58 out of 5 while also being very happy with the distance they live at. On average they also rate the effect that this distance has on their happiness as 3 or higher out of 5 which gives insight into the extent to which proximity to amenities affects happiness.

Although the hypothesis of this research was rejected, Table 5 suggests the socio-economic variable of occupation could affect happiness. Thus the answer to the sub-questions (c) is that the socio-economic variable of occupation suggests that students in Groningen who are employed are 0,533 more happy than students who are not employed. This is consistent with the study by Putri (2015) where the socio-economic background of individuals has an effect on the degree of influence on the relationship between proximity to amenities and happiness. Whether a student is employed or not reflects not only their occupation, but also might more broadly reflect their socio-economic status. Whether or not they are employed relates to their income as well. These socio-economic factors are therefore quite interconnected. This result is also very similar to results in the study by Putri (2015) as it found that socio-economic status and subjective preference have a much stronger influence on happiness compared to proximity. It also found that household composition, paid job status and ethnicity showed more significance than proximity to amenities. The variable of paid job status is quite similar to the variable occupation in this research. Therefore whether or not a student in Groningen is employed, can affect their subjective preference on how happy they are being a certain distance from amenities. This suggests that indeed the socio-economic factor of occupation affects happiness and might also influence distance to amenities which conforms with the conceptual model in figure 1. The results of the regression are also similar with the results of the study by Azizi (2017), as they found that income, occupation and education affect happiness. Whether or not a student in Groningen is employed could also influence their income status, and as explained by Ballas and Dorling (2013), since the position a person has in society and the level of status inequalities influence individual happiness, it could be argued that income and occupation indirectly also affect happiness as those factors contribute to a person's position in society.

5. Conclusions

In this final chapter, the research questions are answered based on all the conducted research, and future research recommendations are brought up along with a reflection on the research process.

5.1 Conclusion

This paper investigated the research question "*To what extent do socio-economic factors affect individual happiness with respect to proximity to amenities in Groningen?"* Using quantitative

methods by conducting a survey and using SPSS for quantitative analysis allowed for the testing of different factors influencing happiness of students of Groningen. The answer to the sub-question (a) "*What is investigated in academic literature about socio-economic factors individually affecting proximity to amenities and happiness?"* is reflected by figure 1 depicting how socio-economic factors can simultaneously affect an individual's proximity to amenities and their happiness. This relates to the research by Putri (2015) which indicated that socio-economic factors determine the need for amenities, which in turn relates to happiness with regards to proximity to those amenities. Socio-economic factors can directly also affect how happy a person is, meaning that the interaction between socio-economic factors is individual for both happiness and proximity. Azizi (2017) also explains that income, occupation and education affect happiness arguing that income influences the occupation and education of an individual and consequently their happiness.

Answering sub-question (b) "*To what extent does proximity to amenities affect the happiness of students in Groningen?*", as a result of an insignificant model, nothing can be concluded about the extent to which proximity to amenities affects the happiness of students in Groningen. Although the model was insignificant, more superficial analysis of the responses using figures 3, 4 and 5 indicates that a majority of students in Groningen live within 1000m of amenities in general and also rate the effect this proximity has on their happiness as 3 or higher out of 5. Therefore, proximity to amenities does affect the happiness of students of Groningen, but the exact extent to which this happens is unclear.

Answering sub-question (c) "*How do socio-economic factors simultaneously affect the relationship between proximity to amenities and happiness of students in Groningen?*", it can be suggested that students in Groningen who are employed are 0,533 (scale of 1-5) more happy than students who are not employed. The hypothesis relating to this sub-question "there is a relationship between socio-economic factors affecting the relationship between happiness and proximity to amenities" could not be confirmed due to significance of values.

To conclude, while nothing can be concluded through statistical significance, socio-economic factors can affect proximity to amenities and happiness of individuals simultaneously, with the socio-economic variable of occupation having a direct effect on the happiness of students of Groningen. Further research with a higher sample size, or more control variables is necessary

to further explain how and which socio-economic variables are the most impactful on happiness and proximity.

5.2 Future research recommendations

Based on this research conducted, doing research on the same topic using different methods may bring about different results. In the context of this thesis, using a mixed-method approach may have been beneficial in bringing more insight into “why” people are happy being a certain distance from amenities. This could be done by supporting quantitative results with qualitative research by interviewing respondents and asking them questions on why they are happy at living at certain distances. This would give a much more in depth and context specific answers which could also enlighten the reason why statistical testing on proximity to amenities and socio-economic factors in existing literature has been insignificant.

5.3 Reflection on the research process

The main weakness of this study was the result of the implications of COVID-19 on the research process. Restrictions as a result of the pandemic made it much harder to conduct quantitative data collection where primary data is gathered as approaching people becomes harder, especially in a probabilistic manner. During the research process the scope of the thesis changed from residents of Groningen into students of Groningen to help solve this issue with probabilistic primary data collection. This leads to the main strength of this study, where based on the circumstances of the research, the overall process could be adapted even after initial sampling methods became an issue.

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Appendices

Appendix 1: Survey

The data collection instrument can be accessed through this link:
https://rug.eu.qualtrics.com/jfe/form/SV_eS3UmbIr31w9Cvk

Welcome
This survey is conducted by a student from the University of Groningen for a Bachelor's Thesis. The topic of the research is to investigate how socio-economic factors affect individual happiness with respect to proximity to amenities in Groningen. Amenities are goods and services which make locations attractive to people for both living and working. In this survey amenities are split up into different types to see the average distance to each type of amenity, and how that may affect happiness. Socio economic questions are asked initially to determine how the socio-economic background of a person may affect their proximity to amenities and their happiness.

Participation in this is completely voluntary, and you can withdraw from the research at any time. The answers you provide to the questions of the survey will remain entirely anonymous. The survey data will be used for research purposes in writing a bachelor's thesis. Thank you in advance for your participation in the survey.

Q19 Do you live in the city of Groningen in the Netherlands?
O Yes
O No (if the answer is no, please do not go on with this survey)

Q2 What is your age?
O 0-19
O20-9
O30-39
O40-49
O50-59
O 60-69

O 70+

Q6 What is the level of your annual household income? (this is the combined income of your entire household, if you are financially dependent on your family then this can include the combined annual income of your family)
O Very low income (less than €20.000)
O Low income (€20.000-€30.000)
O Middle income (€30.000-€40.000)
O High income (€40.000-€60.000)
O Very high income (more than €60.000)
O Prefer not to say

Q7 What is your current occupation?
O Employed full-time
O Employed part-time
O Unemployed
O Student
O Student and employed
O Retired
O Prefer not to say

Q5 What is your highest attained, or current level of education?
O Elementary school
O Middle school
O High School
O Bachelor's degree
O Master's degre
O Doctoral degree (PhD)
O Prefer not to say

Q8 What is your marital status?
O Single, never married
O Married
O Divorced
O Widowed
O Other
O Prefer not to say

Q1 How happy are you in general? (1=Not Happy at All, 5=Very Happy)
Happiness: 1 2 3 4 5

Q3 What is the average distance from your home to recreational amenities? (gym/park/swimming pool)
O Less than 500m

O 500-1000m
O 1000-1500m
O 1500-2000m
O More than 2000m

Q16 How happy are you with living at that distance to recreational amenities? (1=Not Happy at All, 5=Very Happy)
Happiness: 1 2 3 4 5

Q21 How much does your average distance to recreational amenities affect your happiness in general? (1=Not at all, 5=A lot)
Effect on Happiness: 1 2 3 4 5

Q4 What is the average distance from your home to healthcare amenities? (hospital, pharmacy, dentist)
O Less than 500m
O 500-1000m
O 1000-1500m
O 1500-2000m
O More than 2000m

Q12 How happy are you with living at that distance to healthcare amenities? (1=Not Happy at All, 5=Very Happy)
Happiness: 1 2 3 4 5

Q22 How much does your average distance to healthcare amenities affect your happiness in general? (1=Not at all, 5=A lot)
Effect on Happiness: 1 2 3 4 5

Q9 What is the average distance from your home to transport related amenities? (Train station, bus stops, parking spot)
O Less than 500m
O 500-1000m
O 1000-1500m
O 1500-2000m
O More than 2000m

Q17 How happy are you with living at that distance to transport amenities? (1=Not Happy at All, 5=Very Happy)
Happiness: 1 2 3 4 5

Q24 How much does your average distance to transport amenities affect your happiness in general? (1=Not at all, 5=A lot)
Effect on Happiness: 1 2 3 4 5

Q10 What is the average distance from your home to amenities related to daily supply? (baker, supermarket, butcher, etc.)
O Less than 500m
O 500-1000m
O 1000-1500m
O 1500-2000m
O More than 2000m

Q15 How happy are you with living at that distance to amenities related to daily supply? (1=Not Happy at All, 5=Very Happy)
Happiness: 1 2 3 4 5

Q23 How much does your average distance to "daily supply" amenities affect your happiness in general? (1=Not at all, 5=A lot)
Effect on Happiness: 1 2 3 4 5

Q20 What is the average distance from your home to amenities in general?
O Less than 500m
O 500-1000m
O 1000-1500m
O 1500-2000m
O More than 2000m

Q11 How happy are you with regards to your distance from amenities in general? (1=Not Happy at All, 5=Very Happy)
Happiness: 1 2 3 4 5

Q18 How much does your average distance to amenities affect your happiness in general? (1=Not at all, 5=A lot)
Effect on Happiness: 1 2 3 4 5

End of Survey
Your response has been recorded.
Thank you for your time spent taking this survey.

I also would like to kindly ask you to send this survey (using the same link) to anyone you know that lives in the city of Groningen including any family members that may live here. This will help me get as many responses as possible for the survey which will greatly help me in later data analysis. Thank you again for participating!

Appendix 2: Additional SPSS outputs

Appendix 2.1: Full coefficient table of regression including collinearity

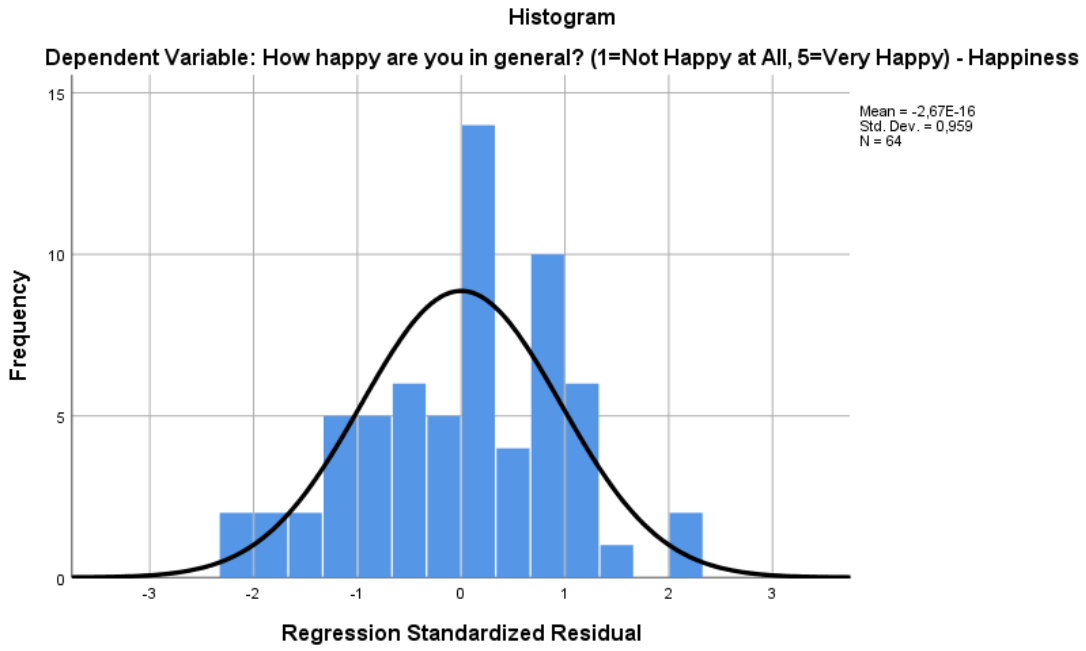
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3,116	,344		9,049	,000	2,423	3,808		
	Occupation (dummy; ref: Employed)	,533	,216	,335	2,464	,017	,098	,968	,853	1,172
	Marital Status (dummy; ref: Other)	,532	,374	,203	1,422	,162	-,220	1,284	,774	1,292
	Level of Education (current or highest attained) (ref: High School)									
	Bachelor's Degree	,306	,299	,173	1,023	,311	-,295	,907	,553	1,809
	Master's Degree	,130	,446	,050	,292	,772	-,767	1,027	,545	1,836
	Level of annual household income (Ref: Very low income)									
	Low income (€20.000-€30.000)	-,566	,364	-,231	-1,553	,127	-1,298	,167	,713	1,402
	Middle income (€30.000-€40.000)	,148	,288	,078	,514	,610	-,432	,728	,687	1,456
	High income (€40.000-€60.000)	,203	,494	,056	,411	,683	-,791	1,198	,841	1,189
	Very high income (more than €60.000	,238	,366	,091	,650	,519	-,498	,974	,809	1,236
	Prefer not to say	,207	,339	,094	,611	,544	-,474	,888	,665	1,503
	Average distance from home to amenities (Ref: Less than 500m)									

	500-1000m	-,031	,235	-,020	-,132	,895	-,503	,441	,694	1,440
	1000-1500m	-,122	,389	-,047	-,313	,755	-,905	,661	,715	1,399
	1500-2000m	-,170	,465	-,054	-,365	,717	-1,104	,765	,726	1,377
	More than 2000m	-,529	,522	-,147	-1,014	,316	-1,579	,521	,754	1,326

a. Dependent Variable: How happy are you in general? (1=Not Happy at All, 5=Very Happy) - Happiness

Appendix 2.2: Regression Residuals Histogram



Appendix 2.3: Regression Scatterplot