Urban-rural differences in environmental concern among teenagers living in the United States and Russia

Master Thesis 'Grootstedelijke Vraagstukken & Beleid'

Erasmus University Rotterdam

Name: Nina van Maanen

Student number: 548783

Supervisor: R. Keizer

Second reader: P. Dykstra

Word count: 8755

Date: 21.06.2020

Abstract

This paper examines the relationship between the residential living area of teenagers in the United States and Russia and their environmental concern. Two contrasting hypotheses were proposed. The first hypothesis suggested that teenagers living in an urban area would show more concern for the environment and the second hypothesis suggested that teenagers living in a rural area would show more environmental concern. Additionally, the association between living area and teenagers' concern for the environment was hypothesized to be stronger in Russia than in the United States. The hypotheses were tested by conducting a multiple regression analysis using the 2015 dataset from the 'Programme for International Student Assessment' (PISA). The sample used for the analysis consisted of 7,723 teenagers. The results of the analysis suggest that teenagers living in an urban area have significantly more concern for the environment than teenagers living in a rural area, however the size of this effect is not very substantial. The results showed no evidence that suggests that the association between living area and environmental concern is stronger in Russia than in the United States.

Keywords: *Environmental concern, Urban, Rural, United States, Russia, Teenagers*

1. Introduction

The environment and the possible deterioration of it are topics that have become increasingly prevalent in the societal and political debate the last several years. What is remarkable is that this debate is not only an issue that garners the interest of adults, but of the younger generations as well. In September of last year, the biggest global protest for the environment ever took place in different countries all over the world (Singh, Oliver, Haroon & Zhou, 2019). Notable about this protest was that the majority of the protesters were teenagers and children who were striking from school. With 17-year-old Greta Thunberg being one of the most prominent advocates to protest the environmental deterioration caused by climate change, it has become clear that teenagers seem to take great passion in protecting the environment.

However, society also seems divided on certain environmental issues and how policy makers should handle them. Certain choices political leaders have made to protect the environment have been met with criticism from particular groups in society. When the Dutch government wanted to reduce nitrogen emission by creating certain restrictions for the agricultural sector this created great outrage among farmers, leading to several protests

(Smouter & Ketelaar, 2019). A similar argument concerning environmental issues and the agricultural sector also occurred recently in the United States. When President Trump finalized a rule to strip away environmental protections for streams, wetlands and groundwater this caused outrage among many U.S. citizens, however it was seen as a great victory for farmers (Davenport, 2020). These protests could be interpreted as people associated with agricultural sector and living in rural areas not wanting to take the necessary measures to prevent further deterioration of the environment. Meanwhile, little to no protests regarding laws to protect the environment have taken place in urban areas. On the contrary, cities seem to have mostly been the epicentre of protests that demand more action from the government for environmental protection. The global environment protest that took place last year was concentrated in big cities like Sydney, Manila, Dhaka, London and New York (Singh, Oliver, Haroon & Zhou, 2019).

On the surface these different kinds of protests taking place in different locations seem to indicate an urban-rural divide in society regarding the environment and their concern for the state of the environment. However, this urban-rural divide does not necessarily mean that people from rural areas have less concern for the environment. It could merely show that there are diverging opinions on how the government should regulate the environment, with rural residents being dissatisfied with the current regulations taking place (Bonnie, Diamond & Rowe, 2020). Looking into whether an urban-rural divide in environmental concern actually exists or if these groups just have differing opinions on government regulations is especially interesting to do among the younger generation. Previous research regarding the environmental concern of urban and rural residents has largely been conducted among adults. If there really is an urban-rural gap in environmental concern it is important to know if it also exists among teenagers. As mentioned earlier, teenagers seem to be very passionate about the environment and take great interest in it. Therefore, a residential divide regarding the environment could lead to tensions in society. With the debate regarding the environment likely becoming even more prominent in the future, it could be very useful to know whether teenagers also show a gap in their concern for the environment, and if this holds any relation to their residential environment. This could provide new insights in how environmental concern develops itself among different generations, which could prove to be useful in future policy making regarding the environment.

The scientific debate regarding the difference between living in an urban or rural area has mainly been focussed on the matters of physical health and mental health. While these are matters of great importance, there is still a lot that is unclear about how living in an urban or

rural area is associated with people's attitudes regarding certain societal issues, like the environment. Previous studies seem to disagree when it comes to the urban-rural difference in environmental concern. On the one hand, previous research studies found that people living in urban areas will show more concern for the environment because they are more exposed to the deterioration of the environment that is caused by climate change e.g., Bogner & Wiseman (1997) and Achillas, Vlachokostas, Moussiopoulos & Banias (2011). On the other hand, previous research studies also found that people living in rural areas show more environmental concern because they need to preserve natural resources to keep making a living e.g., Freudenburg (1991), Palmer et al. (1998) and Hinds & Sparks (2008). These contradicting arguments make it hard to determine whether there is an urban-rural gap in environmental concern and which residential group holds more concern for the environment if such a gap does indeed exist. This study aims to test how environmental concern and living in an urban or rural area are actually related to each other.

When looking into the possibility of a gap in urban-rural concern for the environment, it is also interesting to explore whether this gap is the same in every country. There still little clarity on how national context plays into this a possible divide in urban-rural environmental concern. There is reason to believe that modernization has caused a decrease in the societal and physical gap between living in an urban or rural area. It is expected that this could also decrease the possible urban-rural environmental concern gap in countries that are more modernized (Boeve-de Pauw & van Petegem, 2010). However, the possibly moderating effect of modernization has not been examined much further. It is important when exploring the possible urban-rural gap in environmental concern to know whether such a gap is a universal phenomenon or whether it is just specific to certain countries.

Altogether, the central research questions this study is determined to answer are: *'To what extent is there a difference between living in an urban or rural area and the level of environmental concern among teenagers in the United States and Russia?'* and *'How does the possible relationship between living area and environmental concern vary among teenagers living in the United States and Russia?'*.

The reason that the United States and Russia have been chosen as countries in this research study is because both these countries contain multiple cities that have a population over a million, while also still containing rural areas and small villages. The two countries do, however, seem to differ in the extent that they are modernized (WorldBank, 2018). Like mentioned earlier, modernization often decreases the societal gap between urban and rural residents in a country. Having two large countries that contain both urban and rural areas, but

have different levels of modernization could therefore make for an interesting comparison when analysing a possible variation in the urban-rural gap in environmental concern.

This study is unique in the fact that most previous studies comparing the environmental concern of urban and rural residents have focussed on adults, while this research will be focussed on teenagers. The insights gathered from previous research on the relationship between adults living in an urban or rural area and environmental concern are not necessarily also true for teenagers. By focussing on teenagers there is less chance of a reverse effect occurring, where one's environmental concern determines where they live. For example, it could be the case that people who have more environmental concern are more drawn to live in an urban area. Teenagers are often still dependent on where their parents choose to live and will therefore be less likely than adults to have their living area be influenced by their environmental concern. However, because teenagers can have a small influence on where their parents choose to live, therefore the risk of a reverse effect occurring is not completely removed in this research (Beatty & Talpade, 1994).

2. Theory

In this section of the thesis the definition of *environmental concern* in this study will first be explained. Subsequently, urban-rural differences in environmental concern will be discussed. As mentioned in the introduction, existing theories on the relation between urban-rural differences and concern for the environment predict contradicting associations. For both teenagers living in urban areas and teenagers living in rural areas arguments could be made that they will show more concern for the environment. In this section I will elaborate on both arguments by making use of theories and mechanisms that can be found in the existing literature. Furthermore, cross-national differences between the United States and Russia in the theorized effect of urban-rural differences in teenagers concern for the environment will be discussed.

2.1 Environmental concern

Environmental concern is generally regarded as one's attitude towards the environment and the possible degradation of it (Fransson & Gärling, 1999). The way environmental concern is operationalized in this study is by measuring the teenagers' self-reported environmental knowledge. Environmental knowledge represents the knowledge someone has about the environment and how certain actions impact the environment. Previous research has shown

that environmental concern has a direct and positive impact on one's environmental knowledge. People are more motivated to find information on environmental issues if they show more concern for these issues, which leads to them gaining more environmental knowledge (Pagiaslis & Krontalis, 2014). As such, although this study is limited by the fact that it isn't able to measure environmental concerns directly, environmental knowledge is a reasonably good proxy for measuring teenagers' environmental concern.

2.2 Theories on higher environmental concern among urban teenagers

There are multiple reasons to assume teenagers living in an urban area would show a greater level of concern for the environment compared to teenagers living in rural areas. The main argument is drawn from the environmental deprivation theory. This theory explains that people who experience more exposure to environmental and ecological degradation will be more aware of the problems environmental deterioration can cause. This leads to them having more pro-environmental attitudes (Bogner & Wiseman, 1997). Teenagers living in cities often experience more environment related problems, such as environmental decay, congestion, fresh water shortages, energy demands and air, waste and noise pollution (Achillas, Vlachokostas, Moussiopoulos & Banias, 2011). These environmental issues are more salient to teenagers living in urban areas, which leads to greater environmental concern.

Another reason for teenagers living in urban areas to show more concern for the environment than teenagers from rural areas, is that they are less dependent on the extraction of environmental resources for economic reasons according to the nature exploitation theory. People in rural areas are more likely to have nature-exploitive occupations compared to people living in urban areas. Urban residents will therefore be less likely to value the economic growth of the exploitation of nature over environmental protection, unlike people living in rural areas (Huddart-Kennedy, Beckley, McFarlane & Nadeau, 2009). An example of this theory could be seen in the real-life situation that was explained in the introduction. When the Dutch government wanted to implement certain agricultural restrictions to improve the environment, farmers protested this because these environmental measures would be made at their financial expense, while this was of no concern to urban residents (Smouter & Ketelaar, 2019). So, it seems there is a distinction between the experiences of teenagers living in urban areas and living in rural areas. Teenagers in urban areas will mainly experience the deterioration of nature leading to more pro-environmentalist attitudes in comparison to teenagers from rural areas. In addition, the former are less likely to value the economic growth of the exploitation of nature over environmental protection, as their families are most

likely less reliant on them, which also makes them more likely to hold more pro-environmentalist attitudes.

The last reason to assume that teenagers living in urban areas will show more concern for the environment than teenagers living in rural areas, is that urban residents are often more liberal and politically left-leaning (Scala & Johnson, 2017). Cities often present as hubs for creativity and tolerance. This makes them more attractive as living spaces to people who appreciate the creative, tolerant and forward-thinking atmosphere in cities (Florida, 2003). This is in contrast to people living in rural areas that tend to hold more conservative views and are more politically right-leaning (Scala & Johnson, 2017). In the United States urban residents are more likely to vote for the Democratic party, while rural residents are more likely to vote for the Republican Party (Scala & Johnson, 2017). In Russia people living in urban areas also showed more support for progressive and liberal political parties than people living in rural areas (Berezkin, Myagkov & Ordeshook, 1999). These political stances can often be linked to the level of concern people show for the environment. More conservative or republican leaning people tend to be less in favour of environmental reforms because they often require innovations, costs that can be bad for businesses and involvement from the government (Liere, 1980). Teenagers who live in urban areas will be more likely to uphold liberal or democratic views, which causes them to show more concern for the environment than teenagers living in rural areas. Teenagers living in urban areas being more exposed to environmental degradation, being less reliant on using natural resources for economic gain and being more likely to have liberal political views leads to the following hypothesis: *H1: Teenagers living in urban areas will show more concern for the environment than teenagers living in rural areas.*

2.3 Theories on higher environmental concern among rural teenagers

However, there is also reason to believe that teenagers living in rural areas could show greater concern for the environment. The nature exploitation theory can also be used for this argument. The theory explains that people living in rural areas are more likely to have jobs that rely on the use of nature to make money. This could cause people in rural areas to be more aware of the environment and take better care of it because they know that they need to preserve nature if they also want preserve their jobs (Freudenburg, 1991). Young adolescents are often already concerned with their future jobs and income (Gillies, 1989). Therefore, if teenagers from rural areas want to keep living in the same area when they grow up, their job

security will be more dependent on natural preservation than teenagers who live in urban areas.

Teenagers from rural areas could also show more concern for the environment because they have a greater connection with nature compared to teenagers in urban areas. People who spend a lot of time outdoors and have had a lot of experiences in nature, especially as a child, tend to show more pro-environmental attitudes because they want to preserve this nature (Palmer et al., 1998). It has also been argued that people who grow up around nature and have positive experiences in nature create an affective bond with nature and see nature as part of their own identity. They will view nature as an essential part of themselves and will therefore want to protect it. Children growing up in rural areas are more exposed to nature and will therefore show greater concern for the environment (Hinds & Sparks, 2008).

Because teenagers from rural areas have more affection for nature they are also more aware of the risks that climate change poses for the natural environment. They will be better at recognizing the ways that their behaviour can affect the environment in a positive or negative way than teenagers living in urban areas who spend less time in nature (Müller, Kals & Pansa, 2009). The idea that teenagers in rural areas are more reliant on the preservation of nature, have greater affection for nature and are better at recognizing environmental risks leads to the second hypothesis: *H2: Teenagers living in rural areas will show more concern for the environment than teenagers living in urban areas.*

2.4 Urban-Rural differences in the United States and Russia

In countries that are more modernized it is expected that the difference in teenagers' concern for the environment between teenagers living in urban versus rural areas will be smaller. Modernization has decreased the gap between living in the city or the countryside and has led to mass communication, standardized education, increased mobility and increasing convergence of lifestyles between rural and urban residents (Boeve-de Pauw & Van Petegem, 2010). Modernization has also caused a decrease in the gap of adolescents' time spend in nature, because the difference in the environment of adolescents' natural environment is not as prominent anymore. This is probably caused by the availability of computer games and other forms of electronic entertainment. Where young people living in rural areas would previously spend their free time outdoors in nature, they are now likely to spend more time playing games or watching television (Müller, Kals & Pansa, 2009).

The United States is generally considered to be a more advanced, industrialized and modernized country than Russia. With Russia being a former communist country, their history still has an influence on the advancement of their current day industrial base and economy (Marquart-Pyatt, 2008). The United States also shows several indicators of being a more modernized country than the Russian Federation. The United States has a higher GDP per capita ($62,794 in the US, $11,288 in Russia), a higher population density (36 people per sq. km in the US, 9 per sq. km in Russia), a higher percentage of the population living in urban areas than Russia (82 percent in the US, 74 percent in Russia) and a lower percentage of the GDP coming from agriculture, forestry and fishing (0.916 percent in the US, 3.147 percent in Russia) (WorldBank, 2018). Because the United States shows indicators of being more modernized than Russia, this leads to the following hypothesis: *H3: The association between living area and teenagers' concern for the environment will be stronger in Russia than in the United States.*

2.5 The control variables

There are certain factors that could influence teenagers' environmental concern outside of their living area. To make the results of this study more reliable two of these factors will be included in the statistical analysis. The first control variable that will be included is gender. This variable could be a confounding variable for environmental concern because women often show slightly more concern for the environment than men. This effect seems to be mediated by women having a greater risk perception then men, therefore perceiving environmental change to be a bigger risk to their health and safety (Xiao & McCright, 2012). Gender is related to living area because most adolescent women tend to prefer living in urban area over adolescent men. The rural lifestyle is perceived to be more enjoyed by men than women, which is the reason that more adolescent women want to migrate to the city (Rye, 2006). Like mentioned in the introduction, most of the teenagers in this study have probably not been able to directly choose their living area, however they have possibly been able to have a small influence their parent's decision on where to live. Research has indeed shown that teenagers have an influence on the decision making within the family (Beatty & Talpade, 1994). Given that gender of the teenager might both influence the living area as well as people's environmental concerns, the teenagers' gender will be controlled for in this study.

A second possible control variable is the teenagers' level of education. In general, more educated people show a higher level of concern for the environment than less educated people (Liere & Dunlap, 1980). However, in this particular research study it is not possible to

control for educational attainment, as the overwhelming majority of students have had equal years of schooling: the teenagers included in this study are the same age and because curricular tracking starts late in both the U.S. and Russia, this implies that they are on similar educational levels (Ruhose & Schwerdt, 2016). Although the educational level of the teenagers cannot be controlled for, the educational level of the parents can. Previous research has shown that the environmental concern of teenagers is indirectly influenced by their parent's educational level because parents influence their children's educational trajectory. Furthermore, teenagers' environmental concern is also directly influenced by their parents' educational attainment, because higher educated parents communicate more regularly with their children about the environment. Higher educated parents are more likely to teach their children about environmental issues and how to behave in an environmentally friendly way from a young age than lower educated parents (Meeusen, 2014). Education is also linked to living area because higher educated people more often reside in urban areas. Not only because this is where there are jobs available for them but also because, like the more politically liberal and progressive people, they are attracted to the creative and tolerant atmosphere of cities (Florida, 2003). This leads to the possibility that there is an overrepresentation of higher educated people in the urban group compared to the rural group, making the urban group automatically more concerned for the environment because of this. This is why it is important to include the educational level of the parents as a control variable.

The reason that the educational level of the mother and father are used as separate variables in this model is because there are certain hypotheses that suggest mother and fathers influence their child in a specific way. Both parents could have a similar influence on their children but it's also possible that mothers have a stronger influence on their children because they tend to have a stronger relationship with their children than fathers. Additionally, it has been hypothesized that parental influence is also dependent on the gender of the child and that children are more influenced by the parent that has the same gender as them. However, it has also been argued that the opposite of this is true and that children are more influenced by the parent of the opposite gender (Meeusen, 2014). These varying hypotheses make it interesting to look at the relationship between the environmental concern of the child and the education of the mother and father separately.

3. Data and methods

This section will explain how the hypotheses that were formulated in the theory section will be analytically tested. It first includes a description of the dataset that was used. Afterwards, the way that the independent, dependent and control variables are operationalized is explained.

3.1 The PISA dataset

The data for this study are obtained from the 'Programme for International Student Assessment' (PISA) by the 'Organisation for Economic Co-operation and Development' (OECD). The dataset that is used is the version from 2015 and is publicly available online. PISA aims to assess the knowledge, skills and opinions in several different areas, including the environment, of 15-year-old students by conducting surveys. PISA conducts surveys internationally every three years among students, schools and optionally the parents and teachers of the students. For this study the 2015 dataset was chosen because this dataset is relatively recent and because in 2015 the primary focus of the survey was science, which meant that there were more questions that focussed on the environment and environmental deterioration (OECD, 2017).

In 2015 a total of 35 OECD countries and 37 partner countries participated in the surveys. The schools were selected by purposive sampling to makes sure the schools that participated were representative and met the criteria. Within these selected schools the students that were chosen to participate were selected by random sampling and were then able to indicate whether they wanted to participate or not. In the United States 177 schools participated in the surveys and among those schools the number of students that participated was 5,712. In Russia 210 schools participated in the surveys and among those schools the number of students that participated was 6,036 (OECD, 2017). The PISA dataset also includes 3,539 students from the states of Massachusetts and North Carolina that are not included in the country code of the United States. These students are also not included in the group of U.S. students that are used for this analysis because there would be an overrepresentation of students from these two states.

3.2 Operationalising the independent and dependent variables

The independent concept in this model is *living in an urban or rural area*. For the statistical analysis a dummy is created to divide students into the *urban* category or the *rural* category.

The specific question that will be used to operationalise this variable is *'Which of the following definitions best describes the community in which your school is located?'* from the school survey. This question is answered by the school principal who can choose from five answer options: a village, hamlet or rural area (fewer than 3,000 people), a small town (3,000 to about 15,000 people), a town (15,000 to about 100,000 people), a city (100,000 to about 1,000,000 people) and a large city (with over 1,000,000 people). Metropolitan areas are often considered to have a core urban area population of 50,000 or more and a rural area should not have a core urban area larger than a population of 10,000 (Jarman et al., 2009). Considering this definition, *teenagers living in an urban area* is operationalized as students who go to school in a city or a large city. These two answer categories are transformed into the *urban* value of the dummy that is created to measure the teenagers *living area*. Students who go to school in a village, hamlet or rural area and students who got to school in a small town are operationalized as *teenagers living in a rural area*. Although a small town can include towns with a core urban area that has a population larger than 10,000, this answer category is still included so there are enough respondents that can be classified as *teenagers living in a rural area*. These two answer categories are transformed into the *rural* value of the *living area* dummy. The teenagers that go to school in a town are left out of the model since they can neither be classified as *urban* nor *rural*.

The dependent concept in this model is *teenage concern for the environment*. As mentioned earlier, in this study *environmental concern* is operationalized as how knowledgeable a student is on certain environmental issues. The specific question that is used to operationalise this variable is *'How informed are you about the following environmental issues?'* from the student survey. The environmental issues that are questioned are: (a) greenhouse gasses, (b) genetically modified organisms, (c) nuclear waste, (d) clearing forests for other land use, (e) air pollution, (f) extinction of plants and animals and (g) water shortage. The questions are answered by a student who can choose from four answer options: (1) I have never heard of this, (2) I have heard about this but I would not be able to explain what it is really about, (3) I know something about this and could explain the general issue and (4) I am familiar with this and I would be able to explain this well. These four answer options are operationalized as an ordinal variable that measures *teenage concern for the environment* where the first answer option indicates the lowest level of concern and the last answer option indicates the highest level of concern. To get the overall level of concern for the environment, the mean of the answers to all seven issues are taken. This shows the average level of concern the teenagers have for these environmental issues. The respondents

only get a valid mean score if they answered at least five of the seven questions. To make sure all items are fit to create a single scale that measures *environmental concern* a factor and reliability analysis were conducted. The factor analysis and reliability analysis show that the seven items constitute a single dimension and form a very reliable scale together ($\alpha = .87$).

To analyse whether the link between living in an urban or rural area and environmental concern differs depending on the country, an interaction term is created. This is done by first creating a dummy that measures *country*, where the two values are the United States and Russia. *Country* is coded '0' for *Russia* and '1' for the *United States.* To create the interaction term the dummy that measures living area and the dummy that measures country are multiplied with each other to create a new variable that can be used to analyse a possible interaction effect. This interaction variable is coded '1' for *teenagers living in an urban area in the United States* and '0' for *all other teenagers*.

3.3 Operationalising the control variables

As discussed in the theory section, there are certain variables that could influence teenage concern about the environment. Two control variables are therefore included in this model to reduce the effect of certain possible confounding variables. The first control variable that is used is *gender*. The *gender* variable is operationalized as a dummy where the two possible values are *female* and *male*. *Male* is coded as '0' and *female* is coded as '1' for the *gender* variable.

The question that is used to operationalise *parental education* is *'What is the highest level of schooling completed by your mother?'* and *'What is the highest level of schooling completed by your father?'* from the student survey. The five answer options for the questions are: Upper secondary education providing access to university, Upper secondary education not providing access to university, Lower secondary education, Primary education or Did not complete primary education. The people who answered one of the two last answer options are combined into a single group for the analysis because the two separate groups would have been very small compared to the other groups. This leaves two ordinal variables with four categories where a higher numerical value indicates a higher level of completed schooling by the mother or father.

3.4 Analytical method

To first analyse the variables and their relationship to each other a descriptive and correlation analysis will be employed. The descriptive analysis will provide a better insight on the

statistical characteristics of the variables and the correlation analysis will show how these variables are related to each other.

The statistical analysis that is employed to test the hypotheses is a linear regression analysis. Hypothesis 1 and 2 are conflicting and predict that living in an urban area or rural area is positively versus negatively linked to the environmental concern of teenagers. First, these hypotheses are tested by conducting a simple regression where the *living area* dummy is the independent variable and *environmental concern* is the dependent variable (Model 1, Table 3). After this, the three control variables are also included in to exclude possible alternative explanations (Model 2, Table 3). To ensure that there is not too much similarity between the variables in the regression a multicollinearity test was employed. The VIF values for all variables lie between 1 and 10, which means there is no concern for multicollinearity.

Hypothesis 3 predicts that there is a cross-national variation in the association between *living in an urban or rural area* and *environmental concern*. This hypothesis is tested by adding the interaction term between the *living area* dummy and the *country* dummy to the multiple regression of the second model (Model 3, Table 3). The *country* dummy is also added in this model because both core variables of the interaction term have to be included in the regression for the interaction term to make sense. The reason that the interaction term is added in a later test is because the coefficients of the main relationship often change by adding in an interaction term.

4. Results

This section will show the results of the descriptive analysis, correlation analysis and the multivariate analysis that tests the three theoretical hypotheses. The results from these three analytical tests will also be explained.

4.1 Descriptive statistics

In table 1 below the descriptive statistics of all the variables are depicted. Respondents who had missing values for certain variables have been excluded from the dataset to ensure that all variables have the same number of respondents. The scale for environmental concern ranges from 1 to 4. A higher value on this scale indicates that someone is more knowledgeable about environmental issues, which -throughout this paper- I assume implies that he or she holds more concern for the environment. The mean environmental concern of the teenagers in this dataset is 2.92. This level of environmental concern is closest to answer category 3 which

indicates that on average these teenagers know something about the seven environmental issues and could generally explain it. The mean value for living area shows that 62 percent of the teenagers lives in an urban area and 38 percent lives in a rural area. Furthermore, 56 percent of the teenagers lives in Russia and 44 percent lives in the United States. In total, 25 percent of the teenagers lives in an urban area in the United States. Gender is divided almost equally with 51 percent of the teenagers being female and 49 percent being male. The average education level for both parents is noticeably high. The scale for education ranges from 1 to 4. A higher value on the educational scale indicates a higher level of completed education. Mothers have an average educational level of 3.45 and fathers of 3.38, indicating that most parents have completed a secondary education. This means that the sample of the parents is probably quite selective. The way this could influence the results of the analysis will be considered in the discussion.

Table 1. Descriptive Statistics (N=7723)

	Min.	**Max.**	**Mean**	**SD.**
Environmental concern	1.00	4.00	2.92	.65
Living area (0=Rural 1=Urban)	0	1	.62	.48
Country (0=Russia 1=U.S.)	0	1	.44	.50
Living area*Country (0=Other 1=Urban U.S.)	0	1	.25	.43
Gender (0=Male 1=Female)	0	1	.51	.50
Education mother	1	4	3.45	.85
Education father	1	4	3.38	.90

4.2 Correlation statistics

To analyse the extent to which the variables are linearly related to each other a Pearson correlation is employed. The correlation coefficients can range from -1, which indicates two perfectly negatively related variables, to +1, which indicates two perfectly positively related variables. A coefficient of 0 indicates that the variables have no linear relation to each other in any way. Table 2 shows the results of the Pearson correlation with the significance level.

Of the fifteen possible relationships between the variables there are ten relationships that are significant. Environmental concern has a significant relationship with all other variables in the model. Teenagers living in urban area report to have more environmental concern than teenagers living in a rural area (r=.035) and teenagers with a mother or father

that is higher educated also report to have more environmental concern compared to teenagers with lower educated parents (r=.077; r=.102). Environmental concern is negatively related to living in the United States. Teenagers living in the United States report to have an environmental concern that is lower than teenagers living in Russia (r=-.102). Being female is also negatively related to environmental concern. Girls report to have a lower level of environmental concern than boys (r=-.027). Teenagers that live in the United States report to be less likely to live in an urban area (r=-.117) and report to have a higher educated mother and father than teenagers living in Russia (r=.112; r=.130). The education of the mother is negatively related to gender. The education of the mother is reported to be lower if the respondent is female (r=-.033). Lastly, the education of the mother has strong, positive relationship with the education of the father (r=.498), indicating that higher educated mothers are more likely to have conceived a child with a higher educated father.

There are also five relationships that are not significant. Living in an urban area has no significant relationship with being female and the education of the mother and father. Being female is also not significantly related to living in the United States and the education of the father.

Table 2. Pearson correlation (N=7723)

	Concern environment	**Living area (urban)**	**Country (U.S.)**	**Gender (female)**	**Education mother**	**Education father**
Concern environment	1					
Living area (urban)	.035**	1				
Country (U.S.)	-.102***	-.117***	1			
Gender (female)	-.027*	.006	-.017	1		
Education mother	.077***	.006	.112***	-.033**	1	
Education father	.102***	.001	.130***	-.010	.498***	1

**** p<0.001, ** p<0.01, * p<0.05*

4.3 Multivariate regression statistics

Model 1 of table 3 shows that living in an urban area as a teenager has a significant positive relationship with environmental concern (B=.048, p<.01). These results confirm hypothesis 1 which stated that teenagers living in urban areas will show more concern for the environment than teenagers living in rural areas. These findings simultaneously provide evidence for the rejection of hypothesis 2 which stated that teenagers living in rural areas will show more concern for environment than teenagers living in urban areas. The results of the analysis show that environmental concern increases by 0.048 points when a hypothetical shift takes place from living in a rural area to living in an urban area as a teenager. This means that, teenagers living in a rural area on average have an environmental concern level of 2.892 and teenagers living in an urban area have an average environmental concern level of 2.94. The level of environmental concern of both groups is closest to answer category 3. As previously mentioned, this category indicates that the teenagers know something about environmental issues and could generally explain it. The increase in environmental concern for urban teenagers shows they are slightly closer to answer category 3 than rural teenagers, but not by much. The adjusted R-squared of model 1 is very small (R^2=.001), this indicates that the percentage of variation in environmental concern that is explained by the model is also very small. I'll return to this issue in the discussion section of this thesis.

Model 2 of table 3 shows that the significant positive relationship between living in an urban area as a teenager and theenvironmental concern remains significant when adding in the control variables, with the strength of the relationship only reducing by .001 coefficient (B=.047, p<.01). These results indicate that teenagers living in a rural area have an average environmental concern level of 2.612 and teenagers living in an urban area have an environmental concern level of 2.659. The educational level of both parents has a positive significant relationship with teenage environmental concern. The significant relationship between gender and environmental concern is negative. The environmental concern of the teenagers significantly decreases by 0.33 points if the teenager is a women (B=-.33, p<.05). This outcome goes against most literary theories which suggest that women have more concern for the environment than men. The highest completed level of education of both the mother (B=.026, p<.01) and the father (B=.061, p<.001) have a positive significant relationship with the environmental concern of their children, with the relationship coefficient of the father being bigger than that of the mother. This means that if the education level of the mother or father increases by a single category, the environmental concern level of their teenage children respectively increases by 0.026 and 0.061 points. The adjusted R-squared of

model 2 increases slightly compared to model 1 (R^2=.026), but the model still explains little of the variation of environmental concern.

Model 3 shows that the association between living area and environmental concerns does not significantly differ by country. Hypothesis 3, which stated that the association between living area and teenagers' concern for the environment would be stronger in Russia than in the United States, should therefore be rejected (B=-.003, p>.05). The results from the model suggest that the urban-rural difference in environmental concern is not significantly bigger or smaller in Russia or the United States. The adjusted R-squared of model 3 remains the same as in model 2 (R^2=.026).

Table 3. Regression analysis predicting environmental concern (N=7723)

	Model 1		**Model 2**		**Model 3**	
	B	S.E.	B	S.E.	B	S.E.
Constant	2.892***	.12	2.612***	.036	2.644***	.037
Living area (urban)	.048**	.015	.047**	.015	.030	.021
Gender (female)			-.033*	.015	-.035*	.015
Education mother			.026**	.010	.032**	.010
Education father			.061***	.009	.069***	.009
Country (U.S.)					-1.53***	.024
Living area*Country (urban U.S.)					-.003	.031
Adjusted R^2	.001		.026		.026	

*** *p<0.001, ** p<0.01, * p<0.05*

5. Discussion and conclusion

The main aim of this research was to investigate whether the environmental concern of teenagers is higher when living in an urban or rural area and whether there is a possible variation in this relation in the United States than in Russia. This section will provide a summary of this study, reflects on the results and explains how the results could be used for possible future policy and research.

5.1 Summary and reflection

Previous research on environmental concern showed that there are conflicting theories in relation to living area. For both teenagers living in urban areas and teenagers living in rural areas there was reason to believe they would have a higher level of environmental concern than the opposing group. The first hypothesis stated that teenagers living in urban areas would have more environmental concern because they are more exposed to environmental degradation, less reliant to abuse natural resources for economic gain and more likely to have liberal political views. However, the second hypothesis stated that teenagers from rural areas would have more environmental concern because they are more reliant on the preservation of nature, have greater affection for nature and are better at recognizing environmental risks. Previous research also shaped the third hypothesis that the association between living area and teenagers' concern for the environment would be stronger in Russia than in the United States because the United states is a more modernized country.

By using the PISA dataset from 2015 for analysis this study aimed to test these three hypotheses. The results of the analysis indicated that teenagers living in urban areas have a higher level of environmental concern than teenagers living in rural areas and that the association between living area and teenagers' concern for the environment is not significantly stronger in Russia than the United States. Furthermore, the results also showed that being female is negatively related to environmental concern and that having higher educated parents is positively related to environmental concern. However, the results of this study should be interpreted with some caution as there are several limitations that could reduce the validity of the results.

First off, the operationalization of both the independent variable, *living area*, and the dependent variable, *environmental concern*, could be measured in a more precise manner. Living area was operationalized by using the population size of the area that the school the teenagers went to was located. Since it is possible for teenagers to go to school in a different town or city, especially for teenagers living in rural areas, there is a probability that some teenagers were not classified in the correct category. The operationalization of environmental concern is also not totally satisfactory because the PISA dataset did not contain any questions that directly measured environmental concern. Even though previous research has shown that environmental concern has a direct and positive impact on environmental knowledge, they are not perfectly correlated (Pagiaslis & Krontalis, 2014). As a consequence, the results of the analysis are probably not entirely accurate and the interpretation of them should be met with a certain amount of scepticism. For example, it is possible that the weak negative relation

between being female and environmental concern was only found because women report themselves to be less knowledgeable about the environment than men but are actually not less concerned about the environment. A better manner to operationalize *living area* and *environmental concern* will be discussed later in this section.

A second limitation of this study is that the explained variance of the model is very small. This means that there are probably many other factors that contribute to predicting the environmental concern of the teenagers that have not been included in the model. Most of the significant relationships in the model were also rather weak but did end up being significant because of the large number of respondents in the dataset. Possible other variables to include in the analysis could be income, social class or political ideologies. These variables have previously been shown to be related to environmental concern in but were not available in this dataset (Liere & Dunlap, 1980).

Lastly, the average educational level of the parents is very high. Since the educational level of parents is often strongly related to the future educational level of their children there is a possibility that the teenagers in the dataset are also not totally representative of the average teenager because they would go on to be higher educated than the average adult. As mentioned previously, higher educated people often show to have more environmental concern than people who are less educated (Liere & Dunlap, 1980). The overrepresentation in the dataset of higher educated people could therefore lead to an overall higher level of environmental concern that is not representative of the average population. This potential selection bias reduces the external validity of this study.

Despite the limitations of this study, the results still give an interesting insight into the relationship between living in an urban or rural area and environmental concern among teenagers. Previous research regarding a possible variation in environmental concern depending on one's living area focussed very little on teenagers and whether their living area was possibly related to environmental concern. Previous research also often found an urban-rural gap in environmental concern but these findings showed to be contradicting in which residential group had more and which group had less concern. The gap found in this study is small but it shows that there is significant evidence to suggest that teenagers living in an urban area have slightly more concern for the environment than teenagers living in rural areas, thereby also confirming that there is an urban-rural gap in the environmental concern of teenagers.

This study also provides insight on the interaction between living area and living in the United States or Russia. Living area was expected to have a stronger relationship with

environmental concern in Russia because the country is not as modernized as the United States but no evidence for this relationship was found. This could indicate that the theory predicting a stronger association between living area and environmental concern in less modernized countries does not hold up, but it could also indicate that the gap in modernization between the United States and Russia is not big enough to make a significant difference. The *country* variable did show that the variation in environmental concern seems to be bigger between these two countries than between the two residential groups. When adding the *country* variable in model 3 of the regression analysis, part of the effect of *living area* on *environmental concern* disappeared. These results indicate that the effect of *living area* can, to a certain extent, be explained by the variance between the two countries.

5.2 Future policy and research

This study could prove to be useful for policy makers and future research regarding the environmental concern of teenagers. There is evidence for policy makers to assume that environmental concern is higher among teenagers living in urban areas than teenagers living in rural areas. In the introduction of this study the possible issues of such a gap, like a societal divide, were discussed. Though the difference in environmental concern between the two residential groups is small, it could still cause some tension. Tension could also arise between different countries considering the more noticeable gap in environmental concern between the United States and Russia. Policy makers have to attempt to keep all these different groups satisfied with their policy regarding the environment and ensure that the small gap that currently exists does not increase over time. If the gap in environmental concern between different groups does increase over time, this could lead to increased social divides in society.

Future research should focus on a more accurate operationalization of *living area* and *environmental concern. Living area* could be measured in a more accurate way by asking the respondents the population size of place where they live rather than the population size of the place they go to school. *Environmental concern* could also be surveyed in a better way by directly asking the respondents their level of environmental concern. This could be done in a similar way as to how environmental knowledge was measured, by asking the respondents to give their level of concern regarding certain environmental issues on a scale from 1 to 4.

As previously mentioned, the results of the study indicate that the variance in environmental concern is bigger between the two countries than the two residential groups. Given these findings, it would be interesting to include more countries in the analysis. Not only to get further confirmation that the same urban-rural gap in environmental concern is

found in other countries, but also to provide insight on the differences in environmental concern between these countries. There is a possibility that modernization has no effect on the size of the urban-rural gap in environmental concern within countries but that it is related to the overall level of environmental concern in the country since Russian teenagers showed to have significantly more environmental concern than teenagers living in the United States. Countries that would therefore be useful to include in future research are countries that have a bigger difference in their level of modernization. The differences in the indicators of modernization for the Unites States and Russia were present but not very substantial. To really perceive the association between modernization and environmental concern it would be useful to look at countries that have a bigger difference in their modernization level indicators. Examples of this would be countries that have a bigger gap in their GDP per capita (e.g., Singapore [$64,581] vs. Cambodia [$1,510]), countries that have a bigger gap in the percentage of GDP coming from agriculture, forestry and fishing (e.g., South Africa [2.176 percent] vs. Chad [44.938 percent]) and countries that have a bigger gap in the percentage of the population living in urban areas (e.g., the Netherlands [91 percent] vs. Romania [54 percent]) (WorldBank, 2018).

Future research should also focus on obtaining more insight on the underlying mechanisms that explain why teenagers in urban areas show more environmental concern. The existing literature provides many possible theories and mechanisms but there is little clarity on which of these mechanisms is most salient and whether they are applicable in the same way to teenagers as adults. The mechanisms that have been most discussed in this study are that urban teenagers experience the degradation of the environment more directly, are not as reliant on using natural resources for economic gain and are more politically liberal than rural teenagers. By asking survey questions that are related to these mechanisms and including them as variables in analysis it is possible to get some more insight on them. These possible questions should tap into how much they are directly exposed to issues of environmental degradation, how much they economically think they rely on nature and their political ideologies. These mechanisms could also be further explored by doing qualitative research and interviewing teenagers about their level environmental concern and where they think their concern for the environment stems from.

References

Achillas, C., Vlachokostas, C., Moussiopoulos, N., & Banias, G. (2011). Prioritize strategies to confront environmental deterioration in urban areas: Multicriteria assessment of public opinion and experts' views. *Cities*, *28*(5), 414-423.

Beatty, S. E., & Talpade, S. (1994). Adolescent influence in family decision making: a replication with extension. *Journal of consumer research*, *21*(2), 332-341.

Berezkin, A. V., Myagkov, M., & Ordeshook, P. C. (1999). The urban-rural divide in the Russian electorate and the effect of distance from urban centers. *Post-Soviet Geography and Economics*, *40*(6), 395-406.

Boeve-de Pauw, J., & Van Petegem, P. (2010). A cross-national perspective on youth environmental attitudes. *The Environmentalist*, *30*(2), 133-144.

Bogner, F. X., & Wiseman, M. (1997). Environmental perception of rural and urban pupils. *Journal of Environmental Psychology*, *17*(2), 111-122.

Bonnie, R., Diamond, E. P., & Rowe, E. (2020). Understanding Rural Attitudes Toward the Environment and Conservation in America.

Casaló, L. V., & Escario, J. J. (2016). Intergenerational association of environmental concern: Evidence of parents' and children's concern. *Journal of Environmental Psychology, 48*, 65-74.

Davenport, C. (2020, January 22). Trump Removes Pollution Controls on Streams and Wetlands. *The New York Times.* Retrieved from https://www-nytimes-com.eur.idm.oclc.org/2020/01/22/climate/trump-environment-water.html

Florida, R. (2003). Cities and the creative class. *City & community*, *2*(1), 3-19.

Fransson, N., & Gärling, T. (1999). Environmental concern: Conceptual definitions, measurement methods, and research findings. *Journal of environmental psychology*, *19*(4), 369-382.

Freudenburg, W. R. (1991). Rural-Urban differences in environmental concern: A closer look. *Sociological inquiry*, *61*(2), 167-198.

Gillies, P. (1989). A longitudinal study of the hopes and worries of adolescents. *Journal of Adolescence*, *12*(1), 69-81.

Hinds, J., & Sparks, P. (2008). Engaging with the natural environment: The role of affective connection and identity. *Journal of environmental psychology*, *28*(2), 109-120.

Huddart-Kennedy, E., Beckley, T. M., McFarlane, B. L., & Nadeau, S. (2009). Rural-urban differences in environmental concern in Canada. *Rural sociology*, *74*(3), 309-329.

Jarman, B. T., Cogbill, T. H., Mathiason, M. A., O'Heron, C. T., Foley, E. F., Martin, R. F., ... & Webb, T. P. (2009). Factors correlated with surgery resident choice to practice general surgery in a rural area. *Journal of surgical education*, *66*(6), 319-324.

Liere, K. D. V., & Dunlap, R. E. (1980). The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence. *Public opinion quarterly*, *44*(2), 181-197.

Marquart-Pyatt, S. T. (2008). Are there similar sources of environmental concern? Comparing industrialized countries. *Social Science Quarterly*, *89*(5), 1312-1335

Meeusen, C. (2014). The intergenerational transmission of environmental concern: The influence of parents and communication patterns within the family. *The Journal of Environmental Education*, *45*(2), 77-90.

Müller, M. M., Kals, E., & Pansa, R. (2009). Adolescents' emotional affinity toward nature: A cross-societal study. *Journal of Developmental Processes*, *4*(1), 59-69.

OECD (2017). Technical Report. OECD Publishing, Paris.

Pagiaslis, A., & Krontalis, A. K. (2014). Green consumption behaviour antecedents: Environmental concern, knowledge, and beliefs. *Psychology & Marketing*, *31*(5), 335-348.

Palmer, J. A., Suggate, J., Bajd, B., KP, P. H., Ho, R. K., Ofwono-Orecho, J. K. W., ... & Staden, C. V. (1998). An overview of significant influences and formative experiences on the development of adults' environmental awareness in nine countries. *Environmental education research*, *4*(4), 445-464.

Ruhose, J., & Schwerdt, G. (2016). Does early educational tracking increase migrant-native achievement gaps? Differences-in-differences evidence across countries. *Economics of Education Review*, *52*, 134-154.

Rye, J. F. (2006). Heading for the cities? Gender and lifestyle patterns in rural youths' residential preferences. *Norsk Geografisk Tidsskrift-Norwegian Journal of Geography*, *60*(3), 199-208.

Scala, D. J., & Johnson, K. M. (2017). Political polarization along the rural-urban continuum? The geography of the presidential vote, 2000–2016. *The ANNALS of the American Academy of Political and Social Science*, *672*(1), 162-184.

Singh, M., Oliver, M., Haroon, S., & Zhou, N. (2019, September 21). Global climate strike: Greta Thunberg and school students lead climate crisis protest – as it happened. *The Guardian.* Retrieved from https://www.theguardian.com/environment/live/2019/sep/20/climate-strike-global

change-protest-sydney-melbourne-london-new-york-nyc-school-student-protest greta-thunberg-rally-live-news-latest-updates

Smouter, K. & Ketelaar, T. (2019, December 18). [Farmers are radicalizing and risking approval]. *NRC Handelsblad.* Retrieved from https://www.nrc.nl/nieuws/2019/12/18/boer-radicaliseert-en-zet-bijval-op-spela3984346

World Bank, World Development Indicators. (2018). *Data for United States, Russian Federation* [Datafile]. Retrieved from https://data.worldbank.org/?locations=US-RU&most_recent_value_desc=true

Xiao, C., & McCright, A. M. (2012). Explaining gender differences in concern about environmental problems in the United States. *Society & Natural Resources*, *25*(11), 1067-1084.

Appendix A. Independent samples t-test

Table 1. Independent samples t-test comparing the average environmental concern between teenagers living in rural and urban areas (N=7723)

Country	Group	N	M	SD	*t*	*p*
USA	Rural	1503	2.84	.66	-.401	.688
	Urban	1917	2.85	.68		
Russia	Rural	1400	2.95	.64	-2.55	.011
	Urban	2903	3.00	.62		
USA and Russia	Rural	2903	2.89	.65	-3.10	.002
	Urban	4820	2.94	.65		

Appendix B. Syntax SPSS

```
GET
  FILE='C:\Users\ninav\OneDrive\Documenten\CY6_MS_CMB_STU_QQQ.sav'.
ALTER TYPE ALL(A=AMIN).
DATASET NAME Student WINDOW=FRONT.
SORT CASES BY CNT CNTSCHID.
SAVE OUTFILE='C:\Users\ninav\OneDrive\Documenten\STUDENT.SAV'.

GET
  FILE='C:\Users\ninav\OneDrive\Documenten\CY6_MS_CMB_SCH_QQQ.sav'.
ALTER TYPE ALL(A=AMIN).
DATASET NAME School WINDOW=FRONT.
SORT CASES BY CNT CNTSCHID.
SAVE OUTFILE='C:\Users\ninav\OneDrive\Documenten\SCHOOL.SAV'.

MATCH FILES
/ file='C:\Users\ninav\OneDrive\Documenten\STUDENT.SAV'
/ table='C:\Users\ninav\OneDrive\Documenten\SCHOOL.SAV'
/ by CNT CNTSCHID.
SAVE OUTFILE='C:\Users\ninav\OneDrive\Documenten\MergedData.SAV'.
```

```
GET
  FILE='C:\Users\ninav\OneDrive\Documenten\MergedData.SAV'.
DATASET NAME MergedData WINDOW=FRONT.

SET Small=0.0001 THREADS=AUTO TVars=Labels TNumbers=Both ONumbers=Both
DIGITGROUPING=No
TLook=None SUMMARY=None OVars=Both TFit=Both LEADZERO=No
ODISPLAY=tables TABLERENDER=light.

Freq CNTRYID.
Rename variables CNTRYID = country.
SELECT IF country=643 or country=840.
Freq country.
Recode country (643=0) (840=1) into USA.
VARIABLE LABELS USA 'USA'.
VALUE LABELS USA 0 'Russia' 1 'USA'.
Freq USA.

Freq SC001Q01TA.
Desc SC001Q01TA.
Rename variables SC001Q01TA = school_area.
RECODE school_area  (1 2=0) (4 5=1) (ELSE=SYSMIS) INTO urban.
VARIABLE LABELS urban 'urban'.
VALUE LABELS urban 0 'rural' 1 'urban'.
Freq urban.
Desc urban.

Freq ST092Q01TA ST092Q02TA ST092Q04TA ST092Q05TA ST092Q06NA
ST092Q08NA ST092Q09NA.
Desc ST092Q01TA ST092Q02TA ST092Q04TA ST092Q05TA ST092Q06NA
ST092Q08NA ST092Q09NA.
FACTOR
  /VARIABLES ST092Q01TA ST092Q02TA ST092Q04TA ST092Q05TA ST092Q06NA
ST092Q08NA ST092Q09NA
```

```
  /MISSING LISTWISE
  /ANALYSIS ST092Q01TA ST092Q02TA ST092Q04TA ST092Q05TA ST092Q06NA
ST092Q08NA ST092Q09NA
  /PRINT INITIAL EXTRACTION ROTATION
  /FORMAT SORT
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /METHOD=CORRELATION.
RELIABILITY /VARIABLES= ST092Q01TA, ST092Q02TA, ST092Q04TA,
ST092Q05TA, ST092Q06NA, ST092Q08NA, ST092Q09NA.
COMPUTE concern = mean.5 (ST092Q01TA, ST092Q02TA, ST092Q04TA, ST092Q05TA,
ST092Q06NA, ST092Q08NA, ST092Q09NA).
VARIABLE LABELS concern 'environmental concern students'.
Freq concern.

Freq ST004D01T.
Desc ST004D01T.
Recode ST004D01T (2=0) (1=1) into female.
VARIABLE LABELS female 'female'.
VALUE LABELS female 0 'male' 1 'female'.
Freq female.

Freq ST005Q01TA.
Freq ST007Q01TA.
Recode ST005Q01TA (4 5=1) (3=2) (2=3) (1=4) into educ_mother.
Recode ST007Q01TA (4 5=1) (3=2) (2=3) (1=4) into educ_father.
Variable labels educ_mother 'highest level of completed schooling mother'.
Variable labels educ_father 'highest level of completed schooling father'.
Value labels educ_mother 4 'upper secondary education providing access to university' 3
'upper secondary education not providing access to university'
2 'lower secondary education' 1 'primary education or did not complete primary education'.
```

```
Value labels educ_father 4 'upper secondary education providing access to university' 3
'upper secondary education not providing access to university'
2 'lower secondary education' 1 'primary education or did not complete primary education'.
Freq educ_mother educ_father.

Freq USA urban concern female educ_mother educ_father.
Desc USA urban concern female educ_mother educ_father.
Select if NMISS (USA, urban, concern, female, educ_mother, educ_father) = 0.
Freq USA urban concern female educ_mother educ_father.
Desc USA urban concern female educ_mother educ_father.

Compute urban_usa = urban*USA.
Freq urban_usa.
Desc urban_usa.

DESCRIPTIVES VARIABLES=concern urban USA  female urban_usa educ_mother
educ_father
  /STATISTICS=MEAN STDDEV VARIANCE RANGE MIN MAX SEMEAN.
Freq concern urban USA  female urban_usa educ_mother educ_father.

REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT concern
  /METHOD=ENTER urban
  /METHOD=ENTER urban_usa.
CORRELATIONS
  /VARIABLES= concern urban USA urban_usa female educ_mother educ_father
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

```
 T-TEST GROUPS=urban(0 1)
  /MISSING=ANALYSIS
  /VARIABLES=concern
  /CRITERIA=CI(.95).

SORT CASES  BY USA.
SPLIT FILE SEPARATE BY USA.
T-TEST GROUPS=urban(0 1)
  /MISSING=ANALYSIS
  /VARIABLES=concern
  /CRITERIA=CI(.95).
SPLIT FILE OFF.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT concern
  /METHOD=ENTER urban
  /METHOD=ENTER female educ_mother educ_father
  /METHOD=ENTER urban_usa USA.
```