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New Ecological Paradigm as a research approach in the Czech Republic: An analysis of environmental attitudes of Czechs

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Abstrakt

Tato práce se zaměřuje na Nové Ekologické Paradigma (NEP) a na doprovodný měřicí nástroj - škálu Nového Ekologického Paradigma. Práce představuje Nové Ekologické Paradigma jako opak k Dominantnímu Sociálnímu Paradigmatu. Práce poskytuje historický kontext, který vedl k vytvoření revidované verze NEP škály. Provedli jsme sekundární analýzu dat z výzkumu na téma ochota podporovat evropské politiky na zmírnění dopadů klimatických změn provedeného v roce 2015 týmem Ščasný a spol. V práci jsme prozkoumali, jak lidé z České Republiky, Velké Británie a Polska přijímají Nové Ekologické Paradigma a zjistili jsme, že Češi mají vyšší environmentální uvědomění než lidé z Velké Británie a Polska. Dále jsme pak v práci využili Cronbach analýzu spolu s faktorovou analýzou, abychom odhalili, že v našich případech je NEP škála vnitřně konzistentní, ale data přesto utvářejí více než jednu dimensi. Regresní analýzou jsme objevili, že nejenom věk a pohlaví jsou statisticky významnými sociodemografickými prediktory pro NEP výsledky. Proměnné jako příjem, vzdělání, velikost bydliště nebo současné povolání jsou také relevantní proměnné pro předpověď NEP výsledků. Regresní analýzou jsme také ověřili, že přímý vztah mezi obecnými postoji vůči životnímu prostředí a faktickým environmentálně orientovaným chováním je slabý. Pro předpověď faktického environmentálně orientovaného chování je potřeba využít i jiných indikátorů než jenom obecných postojů měřených NEP škálou.

Abstract

This thesis focus on the New Ecological Paradigm (NEP) and its measurement instrument New Ecological Paradigm scale. Thesis introduces the New Ecological Paradigm as opposite type of thinking to the Human Exemptionalism Paradigm and provides historical context of the creation of the New Ecological Paradigm scale. We carried out a secondary analysis of the data from survey about the European climate change policy acceptance conducted by Ščasný et al in year 2015. Thesis then examined the extent to which people from the Czech Republic, the Great Britain and the Poland endorse the New Ecological Paradigm and found out that the Czechs have the higher environmental concern than people from the Great Britain and the Poland. Furthermore, this thesis use Cronbach`s and factor analysis to discover, that the New ecological paradigm scale is internally consistent yet multidimensional instrument in case of the three surveyed countries. Regression analysis discovered that not only gender and age are significant socio-demographic predictors for the NEP results as income, education, size of municipality and current occupation are also relevant across the three surveyed countries. Lastly, regression analysis verified that the direct correlation between the general environmental values measured by the NEP scale and environmental behavior is weak and therefore some other indicators are needed for predicting the environmentally significant behavior.

Klíčová slova

NEP, NEP škála, Výzkum hodnot, Životní prostředí, změna paradigma, Faktorová analýza, Regresní analýza, Dimensionalita. Mezinárodní výzkum. Sekundární analýza

Keywords

NEP, NEP scale, Attitudinal research, Environment, Paradigm shift, Factor analysis, Regression analysis, Dimensionality, International research. Secondary analysis

Rozsah práce: 98 702

Prohlášení

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V Praze dne … **17.05.2017** Jiří Vaněk

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Zdůvodnění výběru téme práce

State of nature and quality of the environment a key services contributing to human well-being. The question is how to measure environmental attitudes and concerns and whether the measured indicators are associated with personal characteristics of individuals or with certain environmentally-significant behavior. This thesis focuses on a research approach widely used in environmental sociology and psychology to investigate one of these indicators. Specifically, this thesis deals with New Ecological Paradigm and related measurement scale (the NEP Scale). By analyzing association between socio-demographic characteristics of individuals or environmentally significant behaviors being performed by people on one side, and an ecological worldview measured with the NEP Scale in the Czech Republic, this thesis will contribute to the debate about advantages and disadvantages of using the NEP Scale in environmental sociology research.

Předpokládaný cíl práce

The theoretical part of the thesis describes concept of New Ecological Paradigm (NEP) and the related measurement scale. The empirical part is divided into two sections. The first part identifies whether the NEP scores differ depending upon various socio-demographic indicators, such as education, gender, income, or social status. The second part examines then whether the ecological

worldview as measured by the NEP Scale is associated with environmentally significant behavior. Both empirical parts of the thesis will use the datasets from quantitative research surveys that were conducted in three EU countries, including the Czech Republic.

Základní charakteristika tématu

New Ecological Paradigm (NEP) is a theoretical concept established in late 1970s as an answer to the dominant Human exemptionalism paradigm. The NEP no longer considers humans as a mankind staying aside from nature, but it rather focuses on humans as a part of nature and aims at human activities as drivers of global environmental changes. The New Ecological Paradigm Scale reflects this way of thinking and serves as a commonly used empirical tool to measure individuals' environmental attitudes and values. Current critics of usage of the NEP scale pointed out lower reliability and validity of the NEP scale, arguing that, in fact, the scale is not measuring what it aspires to measure. Despite the fact that the NEP scale has been widely used abroad, to date, the NEP scale has not been used so often in empirical research conducted in the Czech Republic.

Předpokládaná struktura práce

The first section of the thesis describes the theoretical and conceptual background of the measurement scale. It starts with first basic concepts to define the scale and continues to describe further revisions and refinmentsof the measurement concept in order to better encompass new environmental problems and issues. The second section describes in depth the structure of the measurement scale, while the third section focuses on criticism of the NEP Scale, including reflecting the question how does the NEP scale stand in the light of these criticism and what are possible alternatives to define and/or measure it.

Last part is divided into two empirical sections which answer the following research questions. Does the NEP score vary across various socio-demographic indicators? Are environmental attitudes, as measured with the NEP Scale, statistically associated with selected environmentally-significant behavior?

Základní literatura

1)Thomas, J. (2013) New ecological Paradigm survey 2008: Analysis of NEP Results. Wersus research ltd

2) Erdogan, N. (2009). Testing the new ecological paradigm scale: Turkish case

3) Dunlap, R.E. (2008) The new environmental paradigm scale: from marginality to worldwide use the journal of environmental education vol 40, issue 1

4) Dunlap, R. E., Van Liere, K. D., Mertig, A. G. Jones, R. E. (2000), New Trends in Measuring Environmental Attitudes: Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale. Journal of Social Issues, 56: 425–442.

5) Lalonde, R. Jackson, E. L. (2002). The New Environmental Paradigm Scale: Has it outlived its

usefulness? The Journal of Environmental Education

6) Hawcroft, L. J., & Milfont, T. L. (2010). The use (and abuse) of the new environmental paradigm scale over the last 30 years: A meta-analysis. Journal of Environmental Psychology, 30(2), 143–158. http://doi.org/10.1016/j.jenvp.2009.10.003

7) Olivos, P.Aragonés, J. Amerígo, M. (2011) the connectedness to nature scale and its relationship with environmental beliefs and identity.

8) Williams, J. (2007) Thinking as Natural: Another Look at Human Exemptionalism

9) Aumburgey,W.J., Thoman, B.D. Dimensionality of the New Ecological Paradigm: Issues of Factor Structure and Measurement. Environment and Behavior March 2012vol. 44 no. 2 235-256

10) Dunlap,R.E.(2010)The New Environmental Paradigm Scale: From Marginality to Worldwide Use

1. Content

2. Introduction

This thesis focuses on environmental values and attitudes of people from the Czech Republic the Great Britain the Poland. We conducted a secondary analysis of data from survey called *Public acceptability of climate change mitigation policies: a discrete choice experiment*, done by the Ščasný et al (2016). This survey is under the auspices of European project Cecilia 2050. A project which target is combining policy instruments to achieve Europe`s 2050 climate targets. Our focus lies on general environmental beliefs that are measured in this survey additionally to its primary target of measuring public acceptability of the climate change mitigation policies.

As ecological concern has grown among the public sphere since late 1970`s, there appeared an opportunity for new ecological thinking to take a stand against the dominant thinking. Riley Dunlap created a new empirical-theoretical concept called New Ecological Paradigm (NEP). This concept reserves itself against so called "Human Exemptionalism Paradigm" (Dunlap and Van Liere 1978:2). The NEP no longer considers human as a mankind staying aside from nature, but it rather focuses on humans as a part of nature and human activities as drivers of global environmental changes (Dunlap 2008:11).

New ecological paradigm is not only a new theoretical concept, but it is also accompanied by a measurement scale reflecting its new type of thinking. The so called New ecological paradigm scale (NEP scale) is a set of questions that is used to measure respondents environmental beliefs, attitudes and values as well as an respondents endorsement of a fundamental paradigm or worldview (Dunlap et al. 2000:427).

The NEP scale is one of the three most commonly used method to measure individual`s general environmental beliefs (Hawcroft and Milfont 2010). Despite being popular and well spread method abroad, the NEP scale is not as commonly used in the Czech Republic. If it is being used, it is in modified version where some items are re-worded, some are left out of the survey or the values in the scale are modified (Smith 2012).

This measurement instrument is the main focus of this thesis as we:

- Investigate the structure of the NEP scale. We are mainly interested in the internal consistency of the scale, factorial structure of the scale and the balance of the scale.
- Investigate the relationship between several indicators and the sum of the NEP item questions. We are mainly interested in the links between the socio-demographic variables and the NEP results and comparison of these links across the three surveyed countries.
- Investigate the direct relationship between the NEP scale results and results of our newly constructed environmental behavior scale.

Using the data from the NEP scale measurement, we are able to empirical verify general environmental attitudes of surveyed population. We first describe the results of the NEP scale to see citizens of which country score the highest on the attitudinal measurement of the environmental awareness. Then we use advanced statistical methods to answer the following questions:

- Can we apply the theoretical models constructed by the NEP authors on the population of the Czech Republic, the Great Britain and the Poland?
- Does the NEP scale have high internal consistency across the three surveyed countries? If not, does removing any items from the scale improve the internal consistency?
- Is the NEP scale for data sets from our three surveyed countries unidimensional? If not, does it form the same amount of dimension in each of the three countries?
- Do the same demographic variables act as a predictor for the NEP results in the three surveyed countries?
- Are relationships between socio-demographic indicators and general environmental concern as weak as other studies suggest? If yes, are these links weak in all surveyed countries?
- Is there a positive relationship between the NEP and the environmentally significant behavior measured by the newly created 4-item scale?

After consulting the literature and other studies done on the topic of environmental attitudes research we come with the following research hypothesis:

- The endorsement of the New Ecological Paradigm is high in our data sets, as it has been more than 30 years from the creation of the NEP scale and attitudes toward the nature and environment protection have positively change.

- Inner consistency of the NEP scale is low across the three countries, as other studies have suggested that the NEP scale had issue with low inner consistency in case of their data set.

- Theoretical models constructed and tested in the America by the Dunlap et al are not a good fit for data from our three surveyed countries, as some studies suggest that the different cultural and social backgrounds leads to different type of thinking which does not match the models constructed for other countries.

- Links between the demographic variables and the NEP are weak and significant only, as previous research suggest, in case of age of the respondent and gender of the respondent.

- There is a significant positive relationship between the NEP scale and the environmental behavior scale.

3. History of the NEP

New environmental problems arose in late 1970`s. These issues were often connected to human actions and signalized potential limits to growth with serious consequences to our planet environment. At the time, dominant ecological thinking called Human Exemptionalism Paradigm (HEP) only with difficulties provided sociologist and environmental scientists meaningful ways to comprehend social experience. HEP became obstructive for any sociological efforts to understand and describe new ecological problems and constraints. Therefore, social scientists were in need of an alternative way of ecological thinking and New Ecological Paradigm (NEP) is one of the alternative that arose at the time (Dunlap and Van Liere 1978:42).

New Ecological Paradigm is opposed to HEP. It no longer consider human as mankind staying aside from nature, but it rather focus on humans as a part of nature and human activities as drivers of global environmental changes (Dunlap 2008:11). The HEP stands for very optimistic worldview that progress can continue without limit as all social problems are

ultimately solvable, accepting opinion, that present is better than the past and future will improve upon the present. The NEP is far less optimistic and recognizes the possibility of reaching equilibrium between population and resources in catastrophic ways that even the technology would not be able to mitigate (Dunlap and Van Liere 1978:44).

Table 1: Difference between HEP and NEP

	Human Exemptionalism Paradigm (**HEP**)	New Ecological Paradigm (**NEP**)
Assumptions about the nature of human being	Humans have a cultural heritage in addition to (and distinct from) their genetic inheritance, and thus are quite unlike all other animal species.	Despite exceptional characteristics, humans remain one among many species that are interdependently involved in the global ecosystem.
Assumptions about social causation	Social and cultural factors (including technology) are the major determinants of human affairs.	Human affairs are influenced not only by social and cultural factors, but also by intricate linkages of cause, effect, and feedback in the web of nature
Assumptions about the context of human society	Social and cultural environments are the crucial context for human affairs, and the biophysical environment is largely irrelevant	Humans live in and dependent on a finite biophysical environment that imposes potent physical and biological restraints on human affairs.
Assumptions about constraints on human society	Culture is cumulative; thus technological and social progress can continue indefinitely, making all problems ultimately soluble.	Although human inventiveness may appear to temporarily extend carrying capacity limits, ecological laws cannot be repealed.

(Bowden 2004: 4)

If the old paradigm repeatedly fails to provide sufficient explanations to new circumstances and terms, then the paradigm shift is inevitable (Kuhn 1963:15). This paradigm shift can also be understood as a scientific revolution, when one paradigm better suits the needs of the scientific community and provides better answers for the occurring phenomena (Ritzer 1975:156). Simply put, the NEP served as a better theoretical concept for circumstances that appeared in second half of 20th century and still stands truth till today.

However, the shift from dominant human centric paradigm is was not easy at the beginning, especially in the America. American society around year 1980 strongly believed in progress, material abundance and cultural growth with very little concern about nature or environment, even though it started to become clear that such thinking cannot be sustained in the environment of the future (Dunlap 2008:5). Authors admits, that the change of thinking about nature, sustainable growth and environmental protection took longer than they expected, but if we think about environment today, it is clear that human centric paradigm is no longer dominant and its position is taken by paradigms that are more thoughtful towards the environment and nature.

There was a need to verify if the paradigm shift is truly happening. The theoretical concept alone was not sufficient and authors decided to develop an instrument that will measure individual`s attitudes toward the New Ecological Paradigm and towards the Human Exemptionalism Paradigm.

4. The NEP scale

Theoretical concept of the New Ecological Paradigm is accompanied by empirical tool designed to measure the theoretical concept. This instrument is called New Ecological Paradigm scale and is a set of questions that is used to measure respondents environmental beliefs, attitudes and values as well as an respondents endorsement of a fundamental paradigm or worldview (Dunlap et al. 2000:427). Values of the answers for the NEP scale questions range from 1-strongly disagree to 7-stongly agree with middle value being 4. There is also an option of "I do not know". A NEP score is a value created by sum of all the 15 answers after recoding the value of the pro-HEP worded questions. The score indicates individual`s environmental concern. Higher the value is, the higher respondent`s environmental awareness is. For better illustration, we provide the revised version of the NEP scale as was used in Cecilia 2050 survey and was originally created by Dunlap and collective (Dunlap et al. 2000:433).

Table 2: The Revised 15-item NEP scale

	strongly disagree						strongly agree	I don't know
a. We are approaching the limit of the number of people the earth can support.	1	2	3	4	5	6	7	*88*
b. Humans have the right to modify the natural environment to suit their needs.	1	2	3	4	5	6	7	*88*
c. When humans interfere with nature it often produces disastrous consequences.	1	2	3	4	5	6	7	*88*
d. Human ingenuity will insure that we do NOT make the earth unlivable.	1	2	3	4	5	6	7	*88*
e. Humans are severely abusing the environment.	1	2	3	4	5	6	7	*88*
f. The earth has plenty of natural resources if we just learn how to develop them.	1	2	3	4	5	6	7	*88*
g. Plants and animals have as much right as humans to exist.	1	2	3	4	5	6	7	*88*
h. Despite our special abilities humans are still subject to the laws of nature.	1	2	3	4	5	6	7	*88*
i. The so-called "ecological crisis" facing humankind	1	2	3	4	5	6	7	*88*

	strongly disagree						strongly agree	I don't know
has been greatly exaggerated.								
j. The earth is like a spaceship with very limited room and resources.	1	2	3	4	5	6	7	*88*
k. Humans will eventually learn enough about how nature works to be able to control it.	1	2	3	4	5	6	7	*88*
l. If things continue on their present course, we will soon experience a major ecological catastrophe.	1	2	3	4	5	6	7	*88*
m. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	1	2	3	4	5	6	7	*88*
n. Humans were meant to rule over the rest of nature.	1	2	3	4	5	6	7	*88*
o. The balance of nature is very delicate and easily upset.	1	2	3	4	5	6	7	*88*

(Dunlap 2008)

4.1. Versions of the NEP scale

The NEP scale was originally created as a set of twelve questions to test the acceptance of the dominant Human Exemptionalism Paradigm in the USA. Dunlap and collective were searching for signs of change in thinking about the dominant Human Exemptionalism Paradigm amongst the US people. Signs that would prove that the human centric paradigm is not as dominant and would serve as a strong prove and justification for existence of the New Ecological Paradigm. First researches that used the NEP scale decided that the 12 questions scale is too long and too demanding on the respondents and after the discussion with the NEP scale authors, the shortened 6- item version of the scale was created (Dunlap 2008:8). Original 12-item scale has 8 questions worded as pro-NEP and only 4 as anti-NEP which is an issue that can lead to higher agreement with the NEP than is in the reality. Shortened 6-item version have items worded equally 3 pro-NEP and 3 anti-NEP and is freed of this issue (Dunlap 2008:6).

With new environmental problems and increase of people general awareness about nature and environmental problems there appeared a need for a revised version of the scale. The 12-item scale uses outdated terminology and is lacking some areas of environmental issues that were not relevant when the NEP scale was originally created, such as issues connected to climatic change (Dunlap 2008:9). The revised NEP scale contains 15-items distributed as 8 worded pro-NEP and 7 worded as anti-NEP. This much improved 15-items scale has gained rapid use even outside the United States

4.2. Five facets of the NEP scale

The NEP scale is designed to measure respondent`s general environmental concern and to achieve that, it needs to tap the environmental awareness of the respondent from as broad perspective as it is possible. The authors hypothesized five themes connected with environmental awareness of the respondents to achieve that. They call this themes facets of the scale and each individual facet consists of questions about respondents opinions on actual environmental issues. The revised version of the scale contains 3 questions for each of the 5 hypothesized facets. (Dunlap et al. 2000:432). These facets are described as follows:

“Balance of nature“- items about beliefs that human actions impact the balance of nature

“Ecocrisis“- items about beliefs that humans are causing harm to the environment

“Limits to growth“- items about beliefs that planet Earth has finite number of resources

“Antiexemtionalism“- items about beliefs that human beings are not exempt from constraints of nature

“Anti-anthropocentrism“- items about beliefs that humans have right to modify and control nature

(Amburgey and Thoman 2012:238)

Items from facets “Balance of nature”, “limits to growth” and “anti-anthropocentrism” are present in the original and outdated version of the NEP scale, meanwhile items that form facets “antiexemtionalism” and “ecocrisis” are added later as environmental awareness of people change and new environmental issues and terminology arose. Also, items from two new facets are specifically designed to deal with the weakness of the original NEP scale in terms of pro/anti-environmental wording (Dunlap 2008:9).

According to the authors, answers to these five facets provide respondent`s coherent environmental concern, but authors of the scale prefer to call it respondents ecological worldview (Dunlap et al. 2000:434). If the discussion about environmental issues change in the future, then some of the facets need to be removed or updated for the scale to still be able to measure coherent environmental concern.

5. Literature review

5.1. Environmental attitude measurement

There are plenty of tools that can be used to measure environmental attitudes. However, only three methods are widely used. These are the Ecology scale, the Environmental Concern scale and the NEP scale. “These three scales examine multiple phenomena or expressions of concern, such as beliefs, attitudes, intentions and behavior. These scales also examine concerns about various environmental topics, such as pollution and natural resources. Because they focus on multiple environmental issues and multiple expressions of concern, these measures are all multiple–topic/multiple-expression assessment techniques(Hawcroft and Milfont 2010:144)“ .

Original version of the Ecology scale is comprised of 4 subscales containing a total of 130 items. These four subscales measures willingness to do certain things for natural protection, actual activities respondent does for the environment, degree of individual`s emotionality related to environmental issues and also specific factual knowledge related to environmental issues (Maloney and Ward 1973:584). The ecology scale is massive and is not focused only on general environmental awareness and individual`s attitudes. As the subscales containing questions about actual environmental behavior and factual environmental knowledge has to be focused on certain environmental issues (at the time of the creation of the scale, air and water pollution is the most urgent issue), the subscales about willingness and emotionality are connected also to the certain issues such as pollution. 130-items of the Ecology scale provides very complex picture of individual`s opinions and actions about certain environmental issue, but it is difficult to apply the same set of question when the given environmental issue is no longer actual and the questions are outdated (Hawcroft and Milfont 2010:144)

Similarly to the Ecology scale, the Environmental concern scale also focus on specific environmental issues such as conservation and pollution (Weigel and Weigel 1978). Therefore it provides individual`s attitudes towards environment related to for example pollution or preservation of nature and not just general environmental concern.

The NEP scale differs from two aforementioned scales by measuring environmental attitudes without mentioning any specific issue. It rather measures the endorsement of fundamental paradigm or worldview, as well as measure of environmental beliefs, attitudes and even values (Dunlap et al. 2000:427). It can be said, that the results of the NEP scale measurement shows general individual`s willingness of supporting items related to nature and environment. Upon this willingness it can be calculated or estimated what would respondent`s attitudes towards certain environmental issues be. The NEP scale is more universal measure without clear cut focus on one specific issue. The Ecologic scale and Environmental Concern scale gives us better result of individual`s attitudes and opinions toward pollution, but it is troublesome to generalize such results to create general individual`s ecologic worldview. This can be documented by steep increase of usage of the NEP scale after the pollution problem has become dated (Dunlap et al. 2000:427).

5.2. Criticism of the NEP scale

Some of the researches point out that the NEP scale is insufficient measurement tool of empirical values in less developed countries(Chatterjee 2008). Erdogan suggest, that the NEP scale is "a product of a certain organized space and time with respect to their conceptual content and formulation of issues in selected statements, therefor using the unmodified scale in different cultures may be problematic (Erdoğan 2009:1029)." Meaning that the NEP scale was created as an answer to HEP which was dominant type of thinking in the USA at the time of the NEP scale creation. Especially Eastern Europe and Asia or Africa states proves to have different thinking which is poorly reflected by the NEP scale.

Other critique argues, that the NEP scale measurement is a poor method for predicting environmental behavior. Willits and Scott argues that there is a support for the NEP as a predictive for environmentally significant behavior, but the correlations are usually weak. Other social characteristics are more predictive for environmental behavior than the NEP is (Scott and Willits 1994). However, other studies shows, that the NEP can be used as a predictive for environmental behavior. Casey in his analysis proves "that the number of reported ecological behaviors is significantly related to scores on all scale measuring environmental concern…positively with endorsement of the NEP revised scale (Casey and Scott 2006:62)."

Lastly, very significant critique that is persistent among various studies is the issues of dimensionality of the NEP scale. As the 15-items of the NEP scale combines into the NEP score, indicating the environmental awareness of the respondent, it is very important for the scale to be unidimensional in order to work with the NEP score as an indicator of general environmental awareness.

5.3. Dimensionality of the NEP scale

Important aspect of every scale that aspires to measure one coherent view is its inner consistency. Level of inner consistency determines if we should be treating the scale as a tool that measures one general construct and is unidimensional or as a multidimensional tool that measures several closely related sub-topics. Cronbach`s Alpha analysis is commonly used method to determine the inner consistency of the scale. Generally accepted value of

Cronbach`s Alpha is 0,7 or higher, but in environmental research, value of 0,69 is also acceptable (Lovelock 2010:473). Lower Value of Cronbach`s Alpha than 0,7 indicates weaker inner consistency of the questions in the scale (Peterson et al. 2008:298).

The NEP scale is followed by the ongoing discussion about its dimensionality since its creation. Original 6-item scale can form up to three related dimensions and the newest 15-item version of the NEP scale can form as many as 5 dimensions. Some studies points out, that treating the NEP scale as a unidimensional instrument can result in poor reflection of respondent`s ecological beliefs and it is preferred to treat the NEP scale as a several highly correlated subscales (Amburgey and Thoman 2012:249).

Dunlap et al (2000:431) respond to this critique by pointing out that the scale as big as 15 questions almost always form more than one factor- depending on the sample. Therefore more realistic measure of scale`s utility is its degree of internal consistency. There are more approaches how to analyze data from NEP measurement. It is possible to treat the NEP scale as singular measure, create subscales or specify dimensions beforehand and then conduct confirmatory factor analysis to validate these dimensions. Dunlap suggested that the researchers should decide to treat NEP scale as a single or multi-dimensional scale according to their own data analysis (Dunlap 2008:13).

Dunlap at al conducted several surveys on Washington state residents to test the internal stability of the NEP scale. Results shows strong correlations between individual questions as well as high value of inner consistency of the scale (coefficient alpha= 0,83). Removing any of the 15 questions of the revised NEP scale would only lower the inner consistency. Test on American citizens suggest that the sets of 15 items can be taken as internally consistent measuring instrument (Dunlap et al. 2000:434). However, other studies conducted on different sample are less optimistic and suggest that the NEP scale measurement have issues with dimensionality.

Bulgarian study consists of three surveys conducted in an area which sustained heavy damage from local petrochemical plant suggest, that the shortened 6-item version of the scale have low value of internal consistency (Cronbach value ranging from= 0,45 to 0,54). Indeed the following factor analysis revealed that the shortened version of the NEP scale used on Bulgarian sample creates two factors and the authors suggest that the similar results can be achieved by further reducing the 6-item scale into 3-item scale (Bostrom et al. 2006:33-34).

For 12-item scale, authors often find up to three correlated factors. Albrecht et al were among the first researchers to test the dimensionality of the original 12-item scale. His findings are contrary to Dunlap`s findings as he finds out that the NEP scale tested on American farmers forms three factors and decide to spilt NEP scale into three subscales (Albrecht 1982:93). In similar fashion to Albrecht`s survey, Holt and Lofgren find out that the correlated three-factor model is the most appropriate for their sample of 900 military members and Shin find similar three factors to those formed in Albrecht survey on data sample of Korean visitors of national park (Holt and Lofgren 2005;Shin 2001).

15-item scale dimensionality is the most relevant, as this version of the scale is the newest and its usage is recommended by the Dunlap et al (2008:13). Some authors decided for second-order factor analysis with 5 factors of 3 questions according to hypothesized facets of the NEP (Amburgey and Thoman 2012; Fleury-Bahi et al. 2015). According to their findings, 5 factor model fits their data samples better than the unidimensional model, but in case of Fleury-Bahi study, two questions needs to be removed for model to be acceptable. Nigerian study also suggest that the 5 factors is the best fit for 15-item scale, but questions from hypothesized facets are loaded among different factors, therefore the theory is not applicable on Nigerian sample(Ogunbode 2013).

Table 3: Previous studies on the NEP multi-dimensionality topic

Country	Authors	Cronbach`s alpha	Version of the scale	Factors
Bulgaria	Bostrom et al	0,45	6-item	2
Sweden	Gooch	-	6-item	2
Turkey	Erdogan	0,53	15-tiem	4
France	Fleury-Bahi et al	-	15-item	5
USA	Amburgey, Thoman	-	15-item	5
Nigeria	Ogunbode	0,61	15-item	5
USA	Albrecht et al	0,78	12-item	3
USA	Holt, Loftgren	-	12-item	3
Korea	Shin	0,69	12-item	3

Results of the aforementioned studies suggest, that not only nationality of people matters. Consistency of the scale can be influenced by the chosen target population. Dimensionality of samples consisting only of people from areas hit by ecologic disaster, highly educated people, students, farmers, military members and so on proves to be different than the dimensionality of the original sample of state Washington citizens.

According to Amburgey and Thoman (2012:242) researcher can work with the NEP scale as:

- Unidimensional single-factor structure (if the data set supports this model)
- Several independent factor structures depending on the data sample (extracted by using Exploratory Factor Analysis)
- High-order or Second-order factor structure which closely represents Dunlap`s conceptualization of five interrelated facets underlying a general environmental worldview

5.4. Socio-demographic indicators and the NEP

Van Liere and Dunlap found out that the socio-demographic indicators have only limited use in explaining environmental concern as even the most explain variables have only weak correlations links (Van Liere and Dunlap 1980). This claim is supported by findings of Gooch. "The results of his analysis indicate that the demographic variables have no substantial explanatory value for environmental concern in the three countries included in the study" (Sweden, Latvia, Estonia) (Gooch 1995:532). However, there are other studies that suggest that demographic values have usage in explaining environmental concern. Especially gender proves to be relevant explanatory variable as more than one study concludes (Casey and Scott 2006), (Rauwald and Moore 2002:729). Female respondents tends to have higher NEP score meaning they might have higher environmental concern and awareness than the male respondents. This can be caused by female being traditionally more socialized into caregiver roles that predispose them to be more compassionate and protective (Casey and Scott 2006:59). Area of living can also be significant explanatory variable as Chung suggest. People from rural areas tends to agree with endorsement of New Ecological Paradigm more than people from urban areas(Chung and Poon 2000:198). Other often useful socio-demographic variables such as education, income, age, political ideology shows promise in

some cases, but overall are only moderately useful as an explanatory variable for general environmental concern.

Before we progress to the analytical part of this thesis, we present the factual results of the NEP measurement

6. Secondary analysis

Analytical part of this thesis is based on a secondary analysis of the data set from survey Cecilia2050 done by Ščasný, Zvěřinová, Czajkowski, Kyselá and Zágorska (2016). First advantage is that secondary analysis is less demanding on resources such as time and finance (Boslaugh 2007:3). Getting data with quality and size comparable of those from Cecilia2050 survey is unreachable for our team. Second benefit is availability of the expert and professional community for the survey as more reputable collectives have access to experts from surveyed countries which is especially helpful when conducting research in several different countries as it is the case of the Cecilia205 survey (Boslaugh 2007:4). The final version of the Cecilia2050 questionnaire was consulted and revised with an expert from the United Kingdom who double-checked if the values and terms are correct and understandable for the UK respondents. In case of Poland, two Polish experts were part of the original research team.

In order to use data from Cecilia2050 survey we acquired written permission of the original research team and we made sure that the data set is anonymous according to basic ethical code of secondary analysis (TRIPATHY 2013). As the respondents were informed and agreed to, the data are used only for research purposes and results of the analysis are not intended for any kind of financial profit.

6.1. Survey

Survey was conducted by the Ščasný et al (2016) on adult population of the Czech Republic, Poland and Great Britain. The survey collected information about public acceptance of different environmental policies with main focus on acceptance of European Union emission reduction targets.

The questionnaire was prepared by the research team based on an extensive testing of previous versions. The instrument was modified based on an qualitative pre-survey carried in 2014 in Czech republic (14 semi-structured interviews) and then tested as a web survey on a representative sample of Czech adult population (n=747)(Ščasný et al. 2016:33). The survey consists of four parts. First part contains general and specific values and believes about policies of the European Union. Second part consists of policy specific beliefs and discrete choice experiments. This part includes perceived effectiveness of certain policy instruments, perceived fairness of cost distribution and two discrete choice experiments. Third part consists of environmental values and attitudes. These attitudinal questions include 15 items of NEP scale measuring environmental values and attitudes and two concepts of the VBN model, namely personal norm and ascription of responsibility (Ščasný et al. 2016:37) . Fourth part consists of demographic information about the respondent.

Ščasný at al decided to use computer assisted web interviews (CAWI) as a method for data collection. The team decided to combine it with computer assisted personal interviews (CAPI) in case of the Czech Republic and the Poland to lower systematic bias caused by the lower internet coverage in those countries (78% of population in the Czech Republic and 75% in Poland compared to 90% in the UK). External companies specializing on data collection were used in all surveyed countries (Stem/Mark in Czech Republic and GMI in the UK and Poland) (Ščasný et al. 2016a:41).

"The sampling procedure was based on quotas on gender, age, education and region computed by from national census statistics. The attainment of the quotas was monitored during data collection and checked after the data has been collected regarding the actual representatives of the sample compared to the statistical data. Some observations had to be excluded from the final sample in order to reach targeted quota"(Ščasný et al. 2016:41). Target population in our analysis is an adult population of all three surveyed countries. To check whether the sample data are consistent with hypothesized distribution, the research team used chi-square goodness of fit test. Sample did not match the set quotas, therefore some valid cases were excluded in order to reach targeted category rations. The final sample that is being used in our analysis is not significantly different from the target population in terms of gender, age, region of living and education and can be considered as representative in those terms (Ščasný et al. 2016a:45–46).

Main wave of data collection conducted in October 2015 with total of over five thousand respondents (n=5555). Most of responses were from the Czech Republic (n= 2738)

followed by the UK (n=1757) and Poland (n= 1737). After cleaning up the data, excluding some cases to reach target quotas and excluding so called speeders (respondents that finished the questionnaire quicker than 48% of the median time in given country) total number of responses is a little over four thousand (n=4098). 1581 of the responses is from Czech Republic, followed by 1266 responses from Poland and 1251 responses from the UK (Ščasný et al. 2016a:42–43).

7. The NEP results

We made two adjustments to the NEP scale before counting the final score. First we recode the pro-HEP worded items so that disagreement with them would mean higher NEP score. Second, we put all answers from category "I do not know (88)" and put them as a neutral answer on the scale (value 4). If we look at the results we can see that people from the Czech Republic have the highest environmental concern as measured by the NEP. People from the Great Britain have almost the same concern as a people from the Poland. People from all three countries show positive endorsement of the New Ecological Paradigm (table 4).

If we split the results for the pro-NEP worded items and pro-HEP worded items, we can see that the scale is well balanced as without opposite worded question, there would be Acquiescent response bias present. Environmental concern would be much higher if only measured by the pro-NEP worded items. The NEP score if measured only by the pro-HEP items is only closely above the neutral threshold in the Czech Republic and below the neutral threshold for the Great Britain and the Poland (table 5). This can be also explained not just by the overall unwillingness of respondents to strongly disagree with the items in the scale and therefore scoring maximum points in the recoded pro-HEP questions, but also that the respondents are more optimistic about the future and human abilities to "save" the planet. As the pro-HEP questions ask about opinions on the abilities of human race to mitigate the impacts of their actions. Especially item 6 "The earth has plenty of natural resources if we just learn how to develop them" have the most chosen answer "strongly agree" proving that people are optimistic about the limits of our planet.

Last result is with what item/s have people agree the most and with what item/s people disagree the most. In all surveyed countries the highest agreement was with the question "Plants and animals have as much right as humans to exist" with average score over 6,2 in the

Czech Republic. Two items share the highest disagreement. For the Czech Republic and the Great Britain, the highest disagreement has question “Humans were meant to rule over the rest of nature”, in the Poland the highest disagreement is with the item “Humans have the right to modify the natural environment to suit their needs” instead. Also most often chosen value for the majority of the pro-NEP items is 7 (maximum agreement) meanwhile most often chosen value for the majority of the pro-HEP is 4 (neutral value).

Table 4: Average NEP score and the neutral point of the scale.

	NEP-average sum	NEP average per item
Czech Republic	75,4902	5,03
Great Britain	70,8721	4,72
Poland	70,1493	4,68
Neutral value	60,0000	4,00

Table 5: Average NEP score and the neutral point of the scale for the pro-NEP and pro-HEP worded items

		NEP-average sum	NEP average per item			NEP-average sum	NEP average per item
Pro-NEP worded items (8)	Czech Republic	45,6	5,7	Pro-HEP worded items (7)	Czech Republic	29,9	4,271429
	Great Britain	43,1	5,3875		Great Britain	27,8	3,971429
	Poland	43,7	5,4625		Poland	26,4	3,771429
	Neutral value	32	4		Neutral value	28	4

8. Statistical methods

To know how to efficiently work with the NEP scale we need to how many factors our data create. Different factors might be related to different causalities which would remain hidden without using factor analysis to extract the factorial structure of the data.

8.1. Cronbach`s Alpha coefficient

We conducted a Cronbach`s Alpha (CA) test to determine the inner consistency of the scale. Our three data sets shows reasonably high values of CA (Table 6) proving, that the revised version of the NEP scale can reach sufficient values of the CA. The lower value of the CA than the optimal value of 0,7 or higher in case of the Czech Republic suggest minor issues in scale consistency. Removing items which causes lower inner consistency leads to significant increase in scale`s consistency which peaks at 8 items (removing any other question form the remaining 8 would only lower the inner consistency). This may be caused by the wording of the NEP scale. As we showed in the literature review, the NEP scale contains 8 questions worded as pro-NEP and 7 questions worded as opposite pro-HEP. Indeed even 7 pro-HEP worded questions provide higher inner consistency than the full 15-item scale (table 6). However removing half of the questions of the scale from the final analysis would be problematic. First, the opposite worded questions are in the scale to balance it. Removing the opposite worded questions would cause so called Acquiescent response bias-tendency of respondents to agree to all questions or to questions where they are in doubt (WATSON 1992), to be an issue of the remaining 8 questions. Second problem is, that despite the reliability of the scale is higher, the overall validity of the research is lower as newly create 8-item scale no longer measures what the NEP scale was theoretically designed to measure.

Table 6: Internal consistency of the data sets of the three surveyed countries

Country	Cronbach's Alpha for the 15 items NEP scale	Cronbach's Alpha for the 8 items worded as pro-NEP	Cronbach's Alpha for the 7 items worded as pro-HEP
Czech Republic	0,653	0,835	0,713
Great Britain	0,75	0,866	0,846
Poland	0,743	0,844	0,763

It is important to note that the high value of CA does not necessarily means unidimensionality as proven by Cortina (1993:6–7).To check the possible multidimensionality of the NEP scale in our sample we need to use other instruments.

8.2. Factor analysis

We are using factor analysis to verify the amount of dimensions our data create. The NEP scale is an instrument which has proven its usefulness in other researches and we need to examine if this instrument is also appropriate for the population included in our study (Harrington 2009:5). As we showed in the literature review, there is no consensus among the scientific community about the dimensionality of the New Ecological Paradigm Scale. Factor structure of the NEP scale measurement differs data set from data set. We are comparing data sets from three different countries. Population structure and quotas were set on the same level therefore any possible differences between dimensionality of the tested data sets should be caused by the differences of the thinking of the people from the surveyed countries.

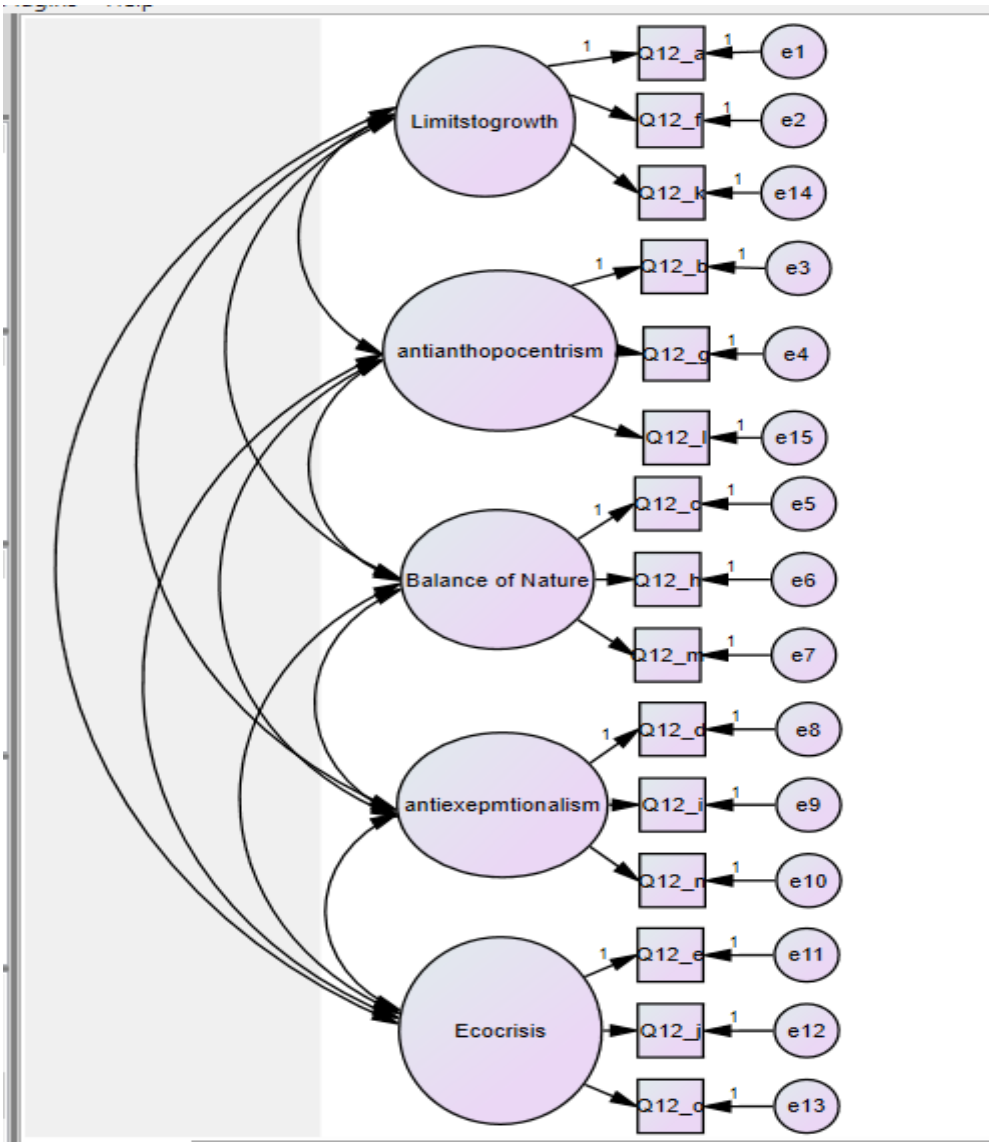
8.2.1 Confirmatory factor analysis

To confirm or refute multi-dimensional scheme as hypothesized by Dunlap et al (2008) we are using Confirmatory Factor Analysis (CFA) as it is the suitable method when we

are trying to validate number of factors. CFA requires some prior specifications of the model such as number of factors, correlations between factors or item-factor loading pattern. This prior specifications are based on the empirical and theoretical findings of the prior researches done on similar topic (DeVaney 2016:570). Confirmatory Factor Analysis is also useful tool when we try to reduce the number of variables that are highly correlated while still explaining the same amount of variance (Suhr 2005:5). We conducted a confirmatory factor analysis using statistical program Amos for each of the three surveyed countries.

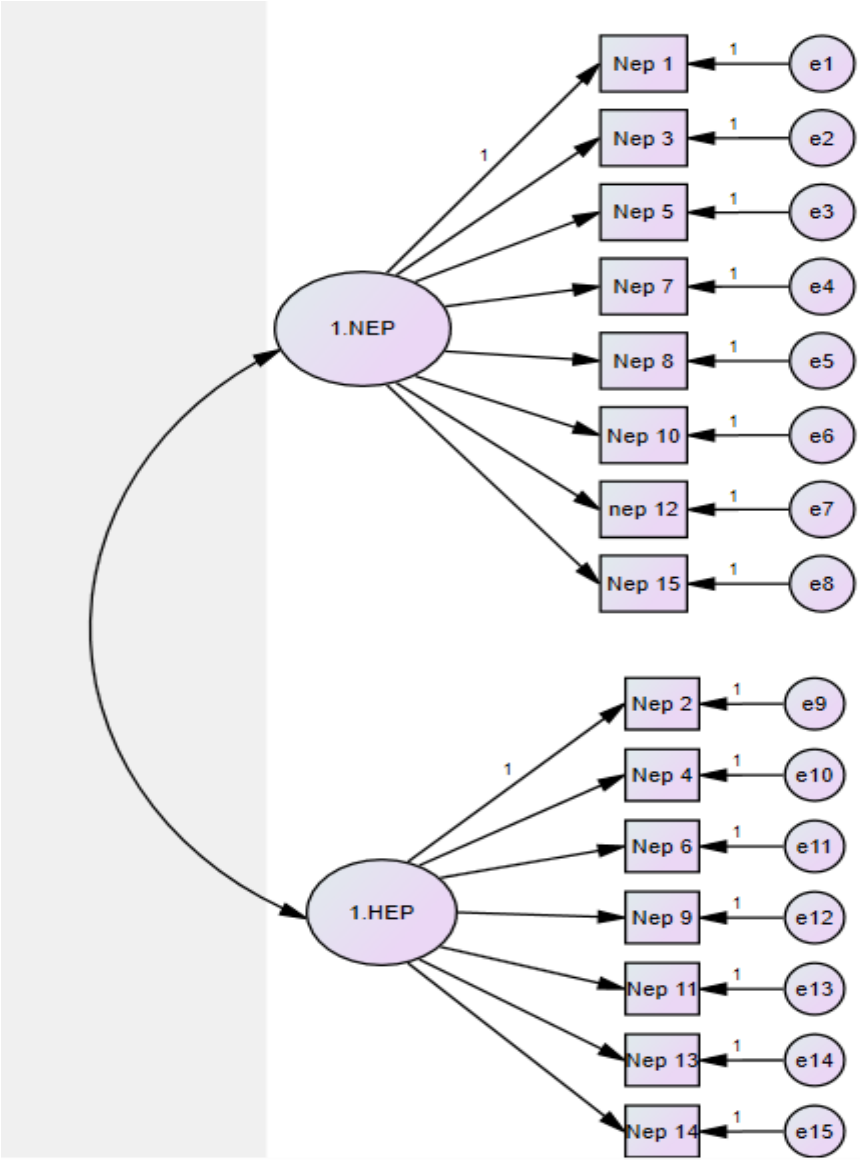
Model 1: Five correlated factor structure: First model we tested is a model of 5 correlated factors containing 3 items each (figure 1). These items are loaded into the factors according to the theoretical scale facets constructed by Dunlap et al (2000). Other studies prove that this model can be a good fit for the data ((Amburgey and Thoman 2012; Fleury-Bahi et al. 2015). This theoretical model is based on survey conducted on the American citizens. Dunlap et al (2000) used exploratory factor analysis which revealed five facet described in the NEP Scale section of this thesis. By using confirmatory factor analysis, we tested if the thinking of our respondents from the Great Britain, Poland and the Czech Republic is comparable to the thinking of the tested American citizens. As showed on literature review, model that is correct in one social context can be problematic in different social environment.

Figure 1: Five factor model deigned according to five theoretical facets of the NEP scale



Model 2: Two correlated factor structure: This model represents the NEP scale as a two correlated factor construct. Items are distributed into factors as they represent agreement to the NEP or to the HEP respectively (figure 2). Using this model we tested if respondents strongly perceive differences between pro-NEP worded questions and pro-HEP questions. Cronbach`s alpha analysis suggested, that removing all the HEP or NEP worded question rises the internal consistency of the scale which is telling that there might be a distinction between NEP and HEP worded items of the scale.

Figure 2: Two factor model designed according to HEPxNEP theory



For both models model fit was assessed statistically through a number of fit indexes. First indicator is *degrees of freedom* (CMIN/DF) where values lower than 5 are optimal (Arbuckle 2008.). Second indicator is *Parsimonious Comparative fit index* (PCFI) based on the Bentler`s comparative fit index (Bentler 1990) where values above 0,8 are considered as a good fit. Third indicator is Root mean square error of approximation (RMSEA) where values below 0,05 are considered as a good fit with upper value of 0,1 being the threshold for

acceptable model and corresponding value of Pclose should be higher than 0,05 (Bollen and Long 1993). Last indicator included is *Goodness-of-fit index* (GFI) which should be higher than 0,9, but can be problematic indicator as it is influenced by the bigger sample sizes and by the higher number of variables in the model.

Model 1 results: Factor analysis reveal unacceptable values of all indicators with overall GFI being low (table 7). Most promising results shows 5 factor model for the Czech Republic but even with removal of most problematic items, the values of indicators will still be over the universally accepted thresholds for the good fir of the model. This results tells that the model of 5 facets constructed by Dunlap et al (2000) based on exploratory analysis of data from survey on the American citizens in not a valid option for the data from *Cecilia2050* survey conducted in the Czech Republic, Poland and the Great Britain.

Table 7: Indicators for five factor model (five facets distribution)

	CMIN/DF	RMSEA	PCLOSE	GFI	PCFI
Czech Republic	25,436	0,112	0	0,873	0,572
Great Britain	48,565	0,165	0	0,781	0,511
Poland	43,177	0,156	0	0,763	0,511

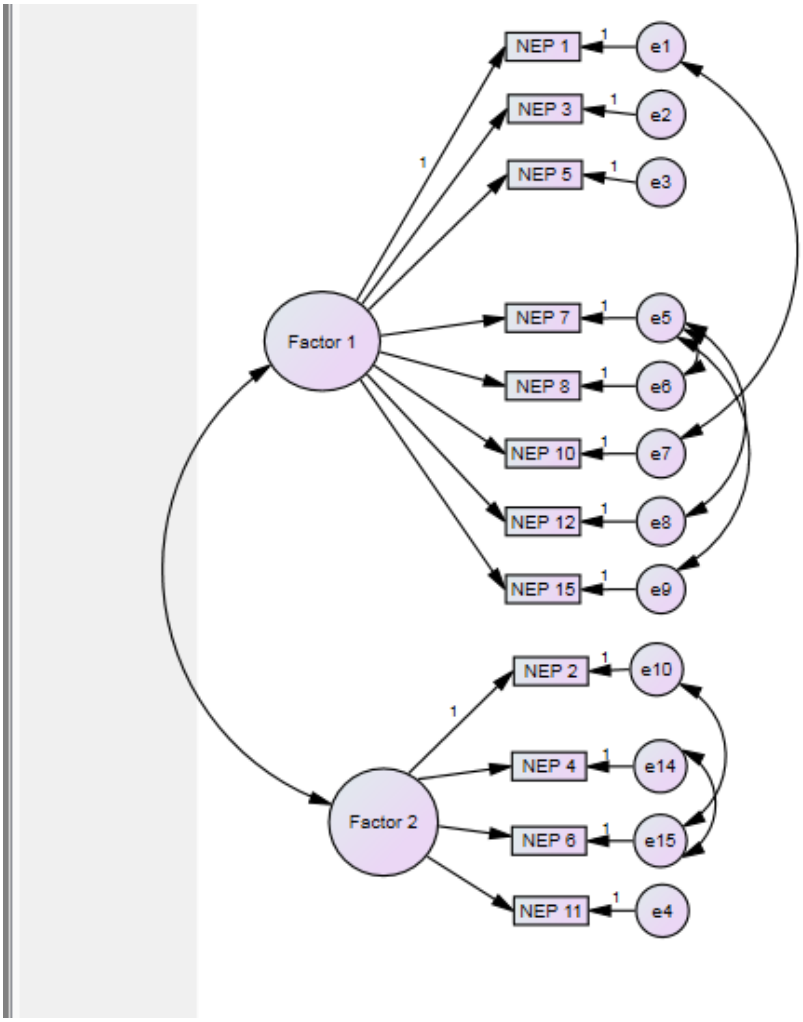
Note: CMIN/Df= degrees of freedom; RMSEA= root mean square error of approximation; GFI= goodness of fit; PCFI= Parsimonious comparative fit index.

Model 2 results: Factor analysis reveal that the two factor distribution is a possible model for the Czech Republic. For the Great Britain the values are narrowly over the acceptable level and for Poland, the model is unacceptable (table 8). For the Czech Republic some cases were excluded for the final model in order to fulfill the conditions for model fit (figure 3). Namely item 6 and item 11 (Nep 6:The earth has plenty of natural resources if we just learn how to develop them; Nep 11: Humans will eventually learn enough about how nature works to be able to control it) which cause problems not only in case of the Czech Republic but also in case of Great Britain and Poland. Removing other items would cause overall increase on model quality, but we decided to settle on model with acceptable values of indicators and with as many items from the original 15-item scale as possible.

Table 8: indicators for two factor model (HEPxNEP)

	CMIN/DF	RMSEA	PCLOSE	GFI	PCFI
Czech Republic	5,1	0,046	0,903	0,978	0,709
Great Britain	6,775	0,057	0,05	0,98	0,534
Poland	7,826	0,063	0,002	0,974	0,58

Figure 3: Two factor model for the Czech Republic following the NEPxHEP scheme



We decided to use different method for the Great Britain and the Poland where confirmatory factor analysis rejected both of the theoretical models.

8.2.2 Exploratory factor analysis

For cases where the hypothesized model is not applicable, we are using Exploratory Factor Analysis (EFA) to establish a new factor model that would better fit our data set (Tinsley and Brown 2000). As in cases of the Great Britain and the Poland, where the factor structure is not clear, EFA allows us to identify how many factors are optimal for chosen data set and how the items load in those factors (Suhr 2005).

For both data sets we conducted a Bartlett`s test of sphericity with KMO to validate suitability of using EFA. We also extracted the communalities and factorial weights to be able to identify the explanatory power of the model and be able to obtain the number of factors and amount of total variance they explain. We used Promax rotation as individual factors are permitted to be correlated with one another (Introduction to SAS: UCLA). Also factor correlations appear to be driven by the data as factor correlation matrix reports values higher than 0,32 meaning that there is at least 10% overlap in variance among factors (Brown 2009: 21).

Results of the exploratory factor analysis of the data set from the Great Britain shows both value of sampling adequacy and the value of the test of sphericity are suitable for EFA. Test of sphericity suggest rejecting null hypothesis thus the variance of differences are not equal. Sampling adequacy is fairly strong at 0,892 which is much higher than the generally accepted minimum of 0,6 (table 9). Total eigenvalues of the EFA propose a 3 factor solution with strong first two factors (eigenvalues of 4,8 and 3,2 respectively, explaining 52% of the variance) and third factor with eigenvalue just over the 1.0 at 1,13. These three factors explain total of 61% of the variance. The eigenvalues after the Promax rotation are much more balanced (table 10). The first factor consist of 7 items worded pro-HEP and 0 items worded pro-NEP. Factor two and three consist of 5 respectively 3 items worded as pro-NEP. Exploratory factor analysis suggest, that the pro-NEP worded items 1, 10 and 12 are not consistent with the pro-NEP worded items 3,5,7,8 and 15 and should be interpreted separately. That is the main difference between the theoretical models tested via confirmatory factor analysis which we ultimately decided to reject for the poor fit. If we look at the

distribution of items from hypothetical facets, we can see that they are loaded into factors with no clear pattern with the exception of items from facet rejection of exemptionalism (items 4,9,14) which are all loaded in first factor (table 11).

Similarly to the Great Britain, the results of the exploratory factor analysis of the data set from the Poland shows both value of sampling adequacy and the value of the test of sphericity are suitable for EFA. Test of sphericity suggest rejecting null hypothesis thus the variance of differences are not equal. Sampling adequacy is little weaker than in the case of the Great Britain, but still strong at 0,880 (table 10). Eigenvalues of the EFA propose 3 factor solution. As in case of the Great Britain, first two factors are strong (eigenvalues of 4,6 and 3,0 explaining 51% of variance) and third factor is weak with eigenvalue of 1,22 explaining 8% of the variance. All three factor combined explain 59% of the variance which is number very similar to the one from the Great Britain (table 11). The difference between the results from the Poland and the Great Britain is the items factor loading. Factor 1 consists of 5 pro-NEP worded questions and 1 pro-HEP worded question as opposed to factor 1 from the Great Britain which consist of 7 pro-HEP worded questions. That means that bigger portion of the variance is explained by the factor which can be identified as a pro New Ecological Paradigm. Second factor is loaded with 6 pro-HEP items and third factor contains 3 pro-NEP items. In the Poland sample there is also no strong pattern of distribution of the items from theoretical five facets. Like in the case of the Great Britain, items from facet rejection of exemptionalism load into pro-HEP factor (table 11).

Table 9: Values of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and the Bartlett's Test of Sphericity for the Great Britain and the Poland

	Sampling Adequacy	Test of Sphericity
Great Britain	,892	0,000
Poland	,880	0,000

Table 10: initial eigenvalues (>1) with eigenvalues for Promax rotation (blue) for the Great Britain and the Poland

		Initial Eigenvalues			Rotation Sums of Squared Loadings
	Components	Total	% of Variance	Cumulative %	Total
Great Britain	1	4,823	32,156	32,156	3,896
	2	3,247	21,648	53,804	3,566
	3	1,137	7,579	61,382	3,334
Poland	1	4,624	30,825	30,825	3,983
	2	3,001	20,006	50,831	3,386
	3	1,229	8,193	59,024	2,872

Table 11: Factor loadings of the NEP items in the Great Britain and the Poland

		Number of Items						
	Factor	Limits to growth	anti anthropo centrism	fragility of natures balance	rejection of exemp tionalism	possibility of eco crisis	NEP	HEP
Great Britain	1 Factor	2	1	1	3	0	0	7
	2 Factor	0	1	2	0	2	5	0
	3 Factor	1	1	0	0	1	3	0
Poland	1 Factor	1	1	2	0	2	5	1
	2 Factor	1	1	1	3	0	0	6
	3 Factor	1	1	0	0	1	3	0

The results of the exploratory factor analysis are consistent with the results of the confirmatory factor analysis. CFA results for the 2 factor pro-HEP and pro-NEP model were on the threshold of acceptability for the Great Britain. EFA offers solution of 3 factors which shows clear pattern of pro-HEP and pro-NEP in the Great Britain. Meanwhile CFA results for the 2 factor pro-HEP and pro-NEP model were much more rejecting for the Poland. EFA offers 3 factor solution which deviate more from the 2 factor pro-HEP and pro-NEP model.

Above findings show us that the high value of internal consistency (as measured by the CA coefficient) does not guarantee unidimensionality of the scale. We decided to treat the NEP scale as multi-dimensional instrument and evaluate each dimension separately. Using confirmatory factor analysis and exploratory factor analysis we extracted 3 models that we

use in regression analysis. For the Czech Republic we use 2 factor model based on theoretical concept of pro-NEP and pro-HEP distribution. For the Great Britain and the Poland we use 3 factor models constructed based on results of the exploratory factor analysis. For both countries, the models share many similarities but differs in factor loadings of items. Also these 3 factor models have strong showing of pro-NEP and pro-HEP distribution proving that they are not so different from the theoretical 2 factor HEPxNEP model.

We also use 1-factor 15- item model as a "control" model. This type of model we would be using if we would accept the premise that the NEP scale is and unidimensional measurement instrument and settle with high internal consistency without creating any ad hoc dimensions with various factoring techniques (Dunlap et al. 2000:431).

9. Regression analysis

Before we can proceed with the regression analysis we introduce the types of variables we are using in regression analysis. First type of the variables are socio-demographic variables. Second type of variable is environmentally significant behavior. For the demographic variables we look for the influence of the demographic indicators on the overall environmental awareness indicated by the recoded sum of the answers on the NEP scale questions (NEP score). For the environmental significant behavior we look for the influence of the NEP score on the environmental behavior. For the purposes of the analysis, we use 4 items on environmental behavior topic which we recoded into one 4-item scale.

9.1. Socio-demographic variables

By doing regression analysis we explore the relationships between the general environmental concern as measured by the NEP scale and the socio-demographic indicators. As we showed in the literature review the socio-demographic variables have usually weak links with the environmental concern measured by the NEP scale. Only gender usually has meaningful links with the NEP score. Strength of the links between other demographic variables and the NEP differs from data set to data set. Demographic indicators we use in the regression analysis are:

◦ Education

◦ Age

◦ Size of the municipality

◦ Attendance in the political election

◦ Current relationship status

◦ Current occupation

◦ Gender

◦ Personal income

We recoded all of our socio-demographic variables to so called “dummy” variables in order to fulfill the conditions for the linear regression (Šafr 2016). We created new categories for most of the variables to obtain easier and clearer interpretation. The new categories are simplified with an exemption of current occupation where we used dummy variable for each of the 9 choices from the questionnaire. Table 12 shows categories for our soci-demographic variables.

Table 12: Categorized socio-demographic variables

Variables	Categories			
Income	None	Below average	Above average	
Age	18-27	28-43	44-60	61+
Current relationship status	Single	In relationship		
Size of municipality	Village(below 10 000 residents)	Town(above 10 000 residents)		
Education	Elementary school	High school	University	
Attendance in election	No	Yes		
gender	Male	Female		

We checked the correlations between the independent variables and find out several strongly correlated items, mainly between some categories of age and of current occupation such as people under 27 and students or people over 61 and retired. Another fairly strong link we found out between the income and highly educated respondents. We could remove one of the highly correlated items from the analysis as that would not weaken our regression analysis by much as two correlated items often indicate the same thing (Rabušič 2004), but we decided to keep all of our variables in the regression model as even the highest correlation are around 0,6 which is the lower end of what is considered as a high degree of correlation.

9.2. Environmentally significant behavior- variables

For purpose of the analysis we constructed a 4-item scale consisting of yes/no questions on theme of environmentally significant behavior. These questions are

- Are you a member of any group whose main aim is to preserve or protect the environment?
- In the last five years, have you signed a petition about an environmental issue?
- In the last five years, have you given money to an environmental group?
- In the last five years, have you taken part in a protest or demonstration about an environmental issue?

We recoded the final sum of the items meaning that higher score means higher environmentally significant behavior (table 13).

Table 13: Frequency table for the Environmental behavior scale (4=low, 8=high)

	Score	Frequency	Percent
Czech Republic	4,00	1071	67,7
	5,00	333	21,1
	6,00	130	8,2
	7,00	37	2,3

	Score	Frequency	Percent
	8,00	10	0,6
	Total	1581	100,0
Great Britain	4,00	820	65,5
	5,00	223	17,8
	6,00	118	9,4
	7,00	54	4,3
	8,00	36	2,9
	Total	1251	100,0
Poland	4	915	72,3
	5,00	212	16,7
	6,00	90	7,1
	7,00	36	2,8
	8,00	13	1,0
	Total	1266	100,0

In the next step we explored if our newly constructed scale is internally consistent and if it is unidimensional. Results of the reliability analysis reveal that the scale have relatively high internal consistency, but with the exception of the Great Britain, does not reach generally accepted value of 0,69 (table 14). But the factor analysis reveal that in all three countries the scale is unidimensional with strong first factor (strongest being in the Great Britain) which is positive. Furthermore removing any item from the scale would lower the inner consistency by considerable amount. Inner consistency of our environmental behavior scale is not optimal, but still fairly strong and we consider our scale as a telling about the environmentally significant behavior.

Table 14: Cronbach's Alpha and number of factors of the environmentally significant behavior scale

Country	Cronbach's Alpha	Factors
Czech Republic	,527	1
Great Britain	,702	1
Poland	,607	1

In order to perform linear regression we checked for the linearity relationship between the NEP sum score and the sum score of the Environmental behavior scale. The linear relationship is occurring between NEP score and the score of the environmental behavior scale, but in case of some individual factors the linear relationship is not clear. In case of the Czech Republic, we identified there is a nonlinear relationship in addition to the linear component (table 15). We can say that the environmentally significant behavior score rises or decreases with the rise of the NEP score, but in a highly inconsistent way across different levels of the NEP score (IBM knowledge center).

Table 15: Linearity between NEP score and the Environmental behavior scale (Sig<0,05 means linearity respectively Deviation from linearity)

	Linearity	Deviation from Linearity
Czech Republic	,000	,010
Great Britain	,000	,134
Poland	,006	,549

The linear regression tells us in what direction the relationship is and also how strong it is.

9.3. Regression models

We use two types of regression analysis. For the 1-factor 15-items model we use stepwise regression as it allows us to identify which predictors provide good fit and improve ours model prediction performance by reducing variance caused by estimating unnecessary

terms (JMP SAS tutorial). Dependent variable is recoded sum of the items (the NEP score) and independent explanatory variables are demographic variables.

For our three models constructed by confirmatory and exploratory factor analysis we use multivariate general linear model. As we are using the IBM SPSS version 22 statistical program multivariate general model is the method to use for processing regression with multiple dependent variable such as individual factors. Model for the Czech Republic have two dependent variables- sum of the scores of the items loaded into factor 1 and sum of the scores of the items loaded into factor 2. For easier interpretation, the scores from the HEP-worded questions are recoded on the opposite values meaning that the higher score means higher acceptance of the NEP even in the case of the HEP-worded items. Model for the Great Britain and the Poland have 3 dependent variables. They are sums of the recoded variables loaded in to the factors as was described in factor analysis section of this thesis. Independent variables are our categorized demographic values.

10. Results of the regression analysis

10.1. Stepwise regression

The stepwise regression enters the variables gradually until the last variable with significant relationship with the dependent variable enters. Therefore the first entered variable is the one with the strongest explanatory power which is useful information. However the stepwise regression has some disadvantages. First If two highly correlated variables are in the predicted variables, only one of the might make it into the model (Andale 2015). In our data set it might be the case of occupation retired and occupation student being highly correlated with the age categories. Second disadvantage is that some dummy variables may get removed from the model even if they are deemed important to be included(Derksen and Keselman 1992) . To prevent missing on the important variable, we also run non-stepwise linear regression to check the significant predictor variables.

Stepwise regression revealed that 5 out of 8 demographic variables are relevant for predicting the NEP score in the Czech Republic and the Great Britain. Only 4 are relevant in the Poland (table 16).

Table 16: Demographic variables with significant relevance for predicting the NEP score

Czech Republic	Attendance in election	Great Britain	Attendance in election	Poland	Age
	Gender		Gender		Size of municipality
	Age		Age		Current occupation
	Current occupation		Income		Income
	Income		Education		
	Education		Size of municipality		

If we look at the strength and direction of the relationship for each country separately we can see that:

◦ Czech Republic

Most reliable variable for predicting environmental awareness measured by the NEP is attendance in election followed by the gender and age. The results tells us that people who attend elections are expected to have higher NEP score than those who do not, Men are expected to have lower NEP than female, people in age of 18-27 are expected to have lower NEP than people above 27 years old, people who are unemployed are expected to have higher NEP than people from other occupation categories. People with income below average are expected to have higher NEP than the people with above average income or no income at all and people with university education are expected to have higher NEP than the people with high or elementary education (Table 17).

◦ Great Britain

Results for the Great Britain are consistent with the results for the Czech Republic. People attending election are expected to have higher NEP, people above 63 years old are expected to have higher NEP than the people from younger age categories, Females are

expected to have higher NEP than men, people with elementary education are expected to have lower NEP, people with income above average are expected to have lower NEP than people with no income or income below average. Only difference is that current occupation have no relationship with the NEP in case of the Great Britain, but size of municipality has. People from city areas are expected to have higher NEP than the people from village areas (table 17).

◦ Poland

Results for the Poland suggest that there are less amount of significant demographic indicators for predicting the NEP score. As for the specific results, people of age 18-27 are expected to have lower NEP than people of older age categories, people from city area are expected to have higher NEP score than people from village areas, people without income are expected to have higher NEP than people with income and people which are working as entrepreneur are expected to have higher NEP that people from other occupation categories (table 17).

Table 17: Coefficients for relationships between demographic variables and the NEP score

Czech Republic	Constant	74,415	Great Britain	Constant	66,215	Poland	Constant	70,145
	Attendance in election-yes	2,117		Attendance in election-no	2,845		age 18-27	-4,267
	Gender-male	-1,893		age 64+	5,628		Size of municipality - town	1,471
	Age 18-27	-2,102		gender-female	1,965		Occupation-entrepreneur	2,946
	Occupation - unemployed	3,217		Education-Elementary	-2,500		Income-none	2,451
	Income-below average	1,344		Income-above average	-2,689			
	Education-university	1,557		Size of municipality - town	1,486			

We compared the result of the stepwise regression with general linear regression to find out if any variable is missing and should be added to the stepwise model. The general linear regression does not show any new significant relation between the NEP and predictor variables and therefore we have no reason to think that our results of the stepwise regression are not valid. Now we compare these results with the results for our multiple-factor models to see if the same variables explain NEP score of items loaded into different factors.

10.2. Multivariate General Linear Model

General linear model revealed that 6 out of 8 demographic variables are relevant for predicting the NEP score in the Czech Republic. 5 are relevant in the Great Britain and 7 are relevant in the Poland. As for predictors that are relevant for individual factors we can see that there are big differences between our three surveyed countries (table 18.1, 18.2).

Table 18.1: Demographic variables with significant relevance for predicting the NEP score of individual factors (Czech Republic)

Czech Republic	Factor 1- 8 pro-NEP items	Age
		Current Occupation
		Attendance in election
	Factor 2-5 pro-HEP items	Income
		Gender
		Education

Table 18.2: Demographic variables with significant relevance for predicting the NEP score of individual factors (Great Britain, Poland)

Great Britain	Factor 1-7 pro-HEP items	Age	Poland	Factor 1-5 NEP items, 1 HEP item	Income
		Size of Municipality			age
		Gender			Relationship
		Education			Size of Municipality
	Factor 2-5 pro-NEP items	Age		Factor 2-6 HEP items	current occupation
		Attendance in election			
		Gender			
		Education			
	Factor 3- 3 pro-NEP items	Age		Factor 3-3 NEP items	age
		Attendance in election			gender
		Education			education

If we look closer at these differences we can find out:

- Czech Republic

In the Czech Republic we have two factors- pro-NEP and pro-HEP. Each of the factors have 3 different significant variables for predicting the factor`s NEP score. Meaning that the environmental beliefs connected with the Human Exemptionalism Paradigm can be predicted by the different demographic variables than the beliefs connected with the New Ecological Paradigm. The 6 predictors distributed between the 2 factors are the same as the predictors for 1 factor model. Their distribution being 3 in the 1 pro-NEP factor and 3 in the 2 pro-HEP factor is a sign that splitting the NEP scale into two scales is meaningful for the interpretation. According to our analysis the new environmental paradigm attitudes are related to age and being in retirement (which is highly correlated to the age) and also being active in political voting. Meanwhile the attitudes toward the Human Exemptionalism Paradigm can be

predicted by the gender, education and income (income and education have medium correlation to each other) (table 19).

Table 19: Multivariate general linear model results for the Czech Republic (sig<0,05]

Czech Republic	Factor 1- 8 pro-NEP items	Constant	49,783
		age 18-27	-4,653
		age 28-43	-2,761
		Occupation-retired	-2,541
		Attendance in election- No	-2,127
	Factor 2-5 pro-HEP items	Constant	16,051
		Income- None	1,378
		Gender-Male	-,644
		Education-Elementary	-,917

- Great Britain

Meanwhile in the Great Britain, there is not a huge difference between the variables predicting individual factors. We can conclude from this that the British people are more consistent in their beliefs about environment and are not perceiving any huge difference between accepting the NEP and equally refuting the HEP. If we look at the direction of the relationship in case of the Great Britain we found out pretty expected results that are very similar to the results of the stepwise regression (1 factor solution). The HEP items are recoded which means that the higher score means higher disagreement with the HEP and higher agreement with the NEP (table 20). Overall in case of the Great Britain we can see that individual factors are influenced by the slightly different predictors thus the 3 factor solution suggested by the exploratory factor analysis. But all of the predictors also act as a predictors in the case of 1 factor solution with the same direction of influence and therefore there is not a huge difference if we use 1 factor model or Ad-Hoc created 3 factor model.

Table 20: Multivariate general linear model results for the Great Britain (sig<0,05)

Great Britain	Factor 1-7 pro-HEP worded items	Constant	29,768
		age 18-27	-3,421
		age 28-43	-2,205
		Size of Municipality-Town	2,479
		Education-Elementary	-1,202
		Gender-male	-1,083
	Factor 2-5 pro-NEP worded items	Constant	24,260
		age 18-27	-1,674
		age 28-43	-1,956
		Education-Elementary	-,772
		Attendance in election-yes	2,393
		Gender-male	-,736
	Factor 3- 3 pro-NEP worded items	Constant	14,222
		age 18-27	-1,138
		age 28-43	-1,019
		Attendance in election-yes	,888
		Education-Elementary	-,519

- Poland

In case of the Poland there is an issue of factor 2 which consist of beliefs about Human Exemptionalism Paradigm. This factor is predicted only by the current occupation of the respondent. This result suggest that the attitudes toward the Human Exemptionalism Paradigm are influenced and predicted by some other indicators than the socio-demographic indicators. Occupation entrepreneur is only predictor for the 2 factor (HEP-worded items) and

is also a predictor represented in the 1 factor 15-items solution suggesting that the entrepreneurs are expected to have higher NEP score than the other occupation categories. Results then show us more differences in case of the Poland. First Polish respondents from municipality under 10 000 are expected to have higher NEP than ones from the city. That is the opposite compared to ones in the Czech Republic and the Great Britain. Same applies for people with only elementary education. In the Czech Republic and the Great Britain people with higher education are expected to have higher NEP. In the Poland, it is the opposite.

Differences can be found also between the 3 factor model and the 1 factor model. 1 factor model showed than only 4 demographic variables can be used as significant predictor, meanwhile treating the NEP scale as a 3 dimensional instrument gives us 7 demographic variables as a significant predictors for the NEP score. Also 1 factor model shows that people from town are expected to have higher NEP, but if we split the scale, we can see that the NEP score of the first factor items (5 NEP items and 1 HEP item) is expected to be higher for people from village areas (Table 21). Overall we can say that the attitudes toward the endorsement of the NEP in Poland is related to plenty demographic indicators with no clear pattern. Meanwhile attitudes toward the Human Exemptionalism Paradigm cannot be predicted by the demographic indicators in case of the Poland and are related to some non-demographic indicators.

Table 21: Multivariate general linear model results for the Poland (sig<0,05)

Poland	Factor 1- 5 NEP items, 1 HEP item	Constant	32,665
		Income- none	1,509
		Age 18-27	-2,509
		Age 28-43	-1,704
		Relationship- in a relationship	-1,323
		Size of municipality- Village	,998
	Factor 2- 6 HEP items	constant	23,243
		Occupation- entrepreneur	2,537
	Factor 3- 3 NEP items	Constant	16,346
		Age 18-27	-1,281
		Age 28-43	-1,132
		Gender-male	-,462
		Education-elementary	,617

10.3. Environmental behavior scale

In next analysis we put our environmental behavior scale as a dependent variable and sum of the NEP items as an independent variable. We can see that direct links between the NEP and actual environmental behavior are very weak (table 22). In general there is a significant positive link between the environmental attitudes measured by the NEP and environmental behavior measured by our environmental behavior scale. For each point of increase in the NEP sum score, we can expect a 0,009 (CZ) 0,012 (GB) 0,006 (PL) increase in

environmental behavior scale score. Meaning that having maximum possible NEP score of 105 would be expected in average to increase our environmental behavior scale score by around 1 (Environmental behavior scale have range of values between 4-8). It is still possible that the NEP have high amount of mediated influence on the environmentally significant behavior as proven by the literature (Gatersleben, Murtagh, and Abrahamse 2014)

Table 22: Correlations and regression parameter estimates for the environmental behavior scale and the NEP score.

		Regression	Correlation	Significance
Czech Republic	Constant	3,789	0,13	,000
	Sum of 15-items	,009		
Great Britain	Constant	3,779	0,149	,000
	Sum of 15-items	,012		
Poland	Constant	4,043	0,077	,006
	Sum of 15-items	,006		

11. Analysis-conclusion

Firs we found out that the Czech respondents have the highest average NEP score while respondents from the Great Britain and the Poland have almost the same average NEP score. According to our results the people tends to accept the New Ecological Paradigm while being somehow neutral to the Human Exemptionalism Paradigm.

Cronbach`s Alpha analysis revealed that inner consistency for the Great Britain and Poland is above the 0,7 value suggesting that the NEP scale is internally consistent in those countries. For Czech Republic, the value is 0,65 which is just narrowly below the 0,7 value and we concluded that the internal consistence of the NEP scale in the Czech Republic is also fairly strong.

However the inner consistence measure by the Cronbach`s Alpha does not mean that the scale is unidimensional. We tested two hypothesized model- model of 5 dimensions with 3

items each and model with 2 dimensions with items distributed according to pro-NEP and pro-HEP meaning. Model of 5 dimensions is not suitable for any of our three countries. However the model of 2 dimensions is more suitable for our surveyed countries. For the Poland we dismissed this model as several test values suggest poor fit. For the Great Britain we ultimately also dismissed this model as values of the test are just closely below the acceptable threshold. For the Czech Republic we only removed 2 items from the scale to achieve a suitable fit. We decided to use 2 dimensional hypothesized model for the data set form the Czech Republic. For the Great Britain and the Poland we used exploratory factor analysis to construct a new model, more fitting for the data sets. For England we constructed 3 factor model with strong first two factors. This model also bare many similarities with the 2 dimension hypothesized model, as the pro-NEP and pro-HEP items are not mixed in the individual factors. Constructed model for the Poland also consists of 3 factors, but the first factor is loaded with both pro-NEP and pro-HEP items and several other items are loaded differently than in the case of the Great Britain.

We looked for the relationship between the NEP and the socio-demographic variables. To do so we used regression analysis. First we used stepwise regression to test these relationships using the whole 15-item scale loaded into one factor as a dependent variable, then we used multivariate general linear model to test these relationship using our ad hoc created factors as dependent variables. We found out that the demographic variables can be used as predictors for the NEP. Our analysis revealed that more demographic variables than the literature suggested act as predictors for the NEP in our sample. Age, income, education, current occupation, attendance in election, gender, size of municipality and even current marital status have showed some links to the NEP across the countries. We found out that the lower NEP is expected within younger people, people who do not attend election, being a men and in case of Poland, being in a relationship. Higher NEP is then expected within the people from town areas, people without income and in case of the Poland, within the people who work as an entrepreneur.

Last step was constructing our environmental behavior scale. We selected 4 questions from the questionnaire that measure respondent`s environmentally significant actions and behaviors. We recoded these questions into one 4-item scale with values being “4-lowest environmentally significant behavior”, “8- highest environmentally significant behavior”. We used linear regression to verify the relationship between the general environmental awareness measured by the NEP and our environmental behavior scale. We found out that the

relationship between the NEP and environmental behavior is significant and positive, but the link is very weak and growth in environmental behavior is only marginal in relation to growth of the general environmental awareness.

12. Recommendations for the future research

For following research it would be interesting to verify the relationship between the demographic variables and the NEP score in the surveyed countries using different questionnaire to find out if the result would be similar. Especially some of the results of the analysis of the Polish data set are contrary to results from the Czech Republic and the Great Britain. Another similar analysis would verify if the Poland is as different in terms of social context as our analysis suggest.

Another interesting option would be exploring the mediated relationship between the general environmental beliefs as measured by the NEP and environmental behavior measured by already existing or newly created environmental behavior scale. By using more complex structure equation modeling (SEM) it would be possible to see the influence of the general environmental beliefs on the environmentally significant behavior through various indicators.

Another interesting method would be to focus on one of these three countries and find out possible cultural and social reasons, why some socio-demographic indicators are relevant and others, who might be relevant in different countries, are not. Then construct a new questionnaire to verify or refute these hypothesis.

Lastly, it would be interesting to add more indicators to the analysis. Socio-demographic indicators have only limited power to explain the NEP and adding new indicators into analysis that are more related to the environment such as knowledge about the environmental issues, personal experience with the natural disasters, attitudes towards the animals or some version of the individual `s environmental burden.

13. Conclusion

Target of this thesis was to explore the environmental attitudes as measured by the NEP scale. We introduced the New Ecological Paradigm and the Human Exemptionalism Paradigm as two opposite views of understanding the nature and environment and the NEP scale as an instrument designed to measure the general endorsement of these two paradigms. We conducted secondary analysis of data sets from the Czech Republic, the Great Britain and the Poland to explore the properties of the NEP scale on the existing data. All these three data sets are from the survey about European policy acceptance conducted in year 2015 by the Ščasný et al.

In the literature review we described original and revised version of the NEP scale with the context that lead to the need of revised version of the scale. Historical development of the NEP and the NEP scale as well as some criticism of the NEP scale. We showed several studies on a similar topic which helped to form our research hypothesis and also some other scales designed to measure environmental attitudes.

In the analysis section we focused mainly on the properties of the NEP scale and on the relationships between the NEP scale and the socio-demographic variables. We found out that the:

◦ According to our data sets, the highest general environmental awareness of the three surveyed countries have respondents from the Czech Republic. Environmental awareness of the British and Polish respondents is almost on the same level. Overall respondents from all three countries have positive endorsement of the New Ecological Paradigm while being neutral towards the Human Exemptionalism Paradigm. This support the hypothesis that the people are more environmentally concerned than they were in the time of creation of the original NEP scale.

◦ The NEP scale have high amount of inner consistency in the Great Britain and the Poland with slightly lower, but still strong, inner consistency for the data from the Czech Republic. Removing 7 questions from the scale would increase inner consistency the most, but we concluded that removing 7 questions would broke the balance of the scale and lower its overall validity. This refute the hypothesis that the NEP scale have low internal consistency.

◦ Theoretical models as hypothesized by the authors of the NEP scale do not provide a good fit for our data as tested by the Confirmatory Factor Analysis. Model with 5 dimensions with 3 question that was successfully tested on the American citizens does not fulfill the

criteria of several “goodness of fit” tests in any our surveyed countries. Model with 2 dimensions constructed according to the scale distribution of pro-NEP questions and pro-HEP questions showed good fit for the Czech Republic, but not for the Great Britain or the Poland. We concluded that dimensionality of each data sets is different and apply the theoretical model only on the data form the Czech Republic. This finding both support and refute the hypothesis, that the theoretical models from other countries are not a good fit for our data sets as in case of the Great Britain and the Poland, they are not, but in case of the Czech Republic, we successfully applied one of the models.

◦ For the Poland and the Great Britain we constructed new ad hoc created models using Exploratory Factor Analysis. Both countries have 3 factor solution, but differs in the factor loading of the items into individual factors.

◦ Stepwise regression of the 1- factor version of the NEP scale revealed that there are significant links between several of the demographic variables and the NEP results. This was supplemented by the findings of multivariate general linear modeling analyzing our created 2, respectively 3 factor models, which showed even more demographic variables as possible predictors for the NEP results. This finding refute the hypothesis that only the age and gender are reliable demographic predictors for the NEP results.

◦ Environmental behavior scale which we constructed from 4 items in the questionnaire showed only weak links to the general environmental attitudes measure by the NEP scale. This support the hypothesis that there is a positive relationship between the NEP and environmental behavior scale, but the direct correlations are weak and we support the opinion, that the influence of the environmental attitudes on the environmental behavior is meditated through different indicators.

Final observation is that the results for our three surveyed countries bare many similarities such as the direction of links between the NEP and demographic variables or overall endorsement of New Ecological Paradigm, but in terms of inner consistency and dimensionality of the NEP scale, our three countries are different. We suggest to follow the recommendation from the Dunlap et al and conduct Cronbach`s and factor analysis to check the dimensionality of the scale for the given data set and decide afterwards if it is better to create any ad hoc factors or treat the scale as a unidimensional internally consistent measuring device.

14. Sources

Albrecht, Don 1982 The New Ecological Paradigm: An Exploration into the Nature and Correlates of Iowan's Environmental Orientations. Retrospective Theses and Dissertations. http://lib.dr.iastate.edu/rtd/7020.

Amburgey, Jonathan W., and Dustin B. Thoman 2012 Dimensionality of the New Ecological Paradigm: Issues of Factor Structure and Measurement. Environment and Behavior 44(2): 235–256.

Andale, S.2015. Stepwise regression. Statistic how to (online) accessed (17.05.2017) available at: http://www.statisticshowto.com/stepwise-regression/

Arbuckle, James N.d. Amos 17.0 User's Guide | Structural Equation Modeling | Estimation Theory. Scribd. https://es.scribd.com/document/266339349/Amos-17-0-User-s-Guide, accessed May 6, 2017.

Bentler, P. M. 1990 Comparative Fit Indexes in Structural Models. Psychological Bulletin 107(2): 238–246.

Bollen, Kenneth A., and J. Scott Long 1993 Testing Structural Equation Models. SAGE.

Boslaugh, Sarah 2007Secondary Data Sources for Public Health: A Practical Guide. Cambridge University Press.

Bostrom, Ann, Richard Barke, Rama Mohana R. Turaga, and Robert E. O'Connor 2006 Environmental Concerns and the New Environmental Paradigm in Bulgaria. The Journal of Environmental Education 37(3): 25–40.

Brown, James Dean 2009. Choosing the right type of rotation in PCA and EFA. JALT testing & evaluation SIG newsletter. Vol 13.No. 2. p(19-23) Issn 1881-5537

Casey, Dr Paul J., and Kylie Scott 2006 Environmental Concern and Behaviour in an Australian Sample within an Ecocentric – Anthropocentric Framework. Australian Journal of Psychology 58(2): 57–67.

Chatterjee, Deba Prashad 2008 Oriental Disadvantage versus Occidental Exuberance: Appraising Environmental Concern in India — A Case Study in a Local Context. International Sociology 23(1): 5–33.

Chung, Shan-Shan, and Chi-Sun Poon 2000 A Comparison of Waste Reduction Practices and the New Environmental Paradigm in Four Southern Chinese Areas. Environmental Management 26(2): 195–206.

Cortina, Jose M. 1993 What Is Coefficient Alpha? An Examination of Theory and Applications. Journal of Applied Psychology 78(1): 98–104.

Derksen, Shelley, and H. J. Keselman 1992 Backward, Forward and Stepwise Automated Subset Selection Algorithms: Frequency of Obtaining Authentic and Noise Variables. British Journal of Mathematical and Statistical Psychology 45(2): 265–282.

DeVaney, Thomas A. 2016 Confirmatory Factor Analysis of the Statistical Anxiety Rating Scale With Online Graduate Students. Psychological Reports 118(2): 565–586.

Dunlap, Riley E. 2008 The New Environmental Paradigm Scale: From Marginality to Worldwide Use. The Journal of Environmental Education 40(1): 3–18.

Dunlap, Riley E., and Kent D. Van Liere 1978 The "New Environmental Paradigm." The Journal of Environmental Education 9(4): 10–19.

Dunlap, Riley E., Kent D. Van Liere, Angela G. Mertig, and Robert Emmet Jones 2000 New

Trends in Measuring Environmental Attitudes: Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale. Journal of Social Issues 56(3): 425–442.

Erdoğan, Nazmiye 2009 Testing the New Ecological Paradigm Scale: Turkish Case. African Journal of Agricultural Research 4(10): 1023–1031.

Fleury-Bahi, Ghozlane, Aurore Marcouyeux, Elise Renard, and Nicolas Roussiau 2015 Factorial Structure of the New Ecological Paradigm Scale in Two French Samples. Environmental Education Research 21(6): 821–831.

Gary N.d. From Environmental to Ecological Sociology. http://ecologicalsociology.blogspot.com/2009/10/from-environmental-to-ecological.html, accessed April 20, 2017.

Gatersleben, Birgitta, Niamh Murtagh, and Wokje Abrahamse 2014 Values, Identity and pro-Environmental Behaviour. Contemporary Social Science 9(4): 374–392.

Gooch, Geoffrey D. 1995 Environmental Beliefs and Attitudes in Sweden and the Baltic States. Environment and Behavior 27(4): 513–539.

Harrington, Donna 2009 Confirmatory Factor Analysis. Oxford University Press, USA.

Hawcroft, Lucy J., and Taciano L. Milfont 2010 The Use (and Abuse) of the New Environmental Paradigm Scale over the Last 30 Years: A Meta-Analysis. Journal of Environmental Psychology 30(2): 143–158.

Holt, Daniel T., and Steven T. Lofgren 2005 Examination Of The New Environmental Paradigm Scale In A Military Sample1. Perceptual and Motor Skills 100(3): 791–794.

IBM knowledge center 2017. Anova and tests of linearity (online) accessed (17.05.2017) available at: https://www.ibm.com/support/knowledgecenter/en/SSLVMB_24.0.0/spss/tutorials/means_anovatests.html

Introduction to SAS 2017. Factor analysis: SPSS anotated output (online) Accessed (17-05.2017) UCLA: Statistical Consulting Group. Available at : https://stats.idre.ucla.edu/spss/output/factor-analysis/

JMP statistical discovery 2017. Stepwise regression Models. SAS institute.(online) Accessed: (17.05.2017) available at : http://www.jmp.com/support/help/Stepwise_Regression_Models.shtml#mdd-about

Kuhn, Thomas 1963 The Structure of Scientific Revolutions. American Journal of Physics 31(7): 554–555.

Lovelock, Brent 2010 Disability and Going Green: A Comparison of the Environmental Values and Behaviours of Persons with and without Disability. Disability & Society 25(4): 467–484.

Maloney, Michael P., and Michael P. Ward 1973 Ecology: Let's Hear from the People: An Objective Scale for the Measurement of Ecological Attitudes and Knowledge. American Psychologist 28(7): 583–586.

Ogunbode, Charles A. 2013 The NEP Scale: Measuring Ecological Attitudes/Worldviews in an African Context. Environment, Development and Sustainability 15(6): 1477–1494.

Peterson, M. Nils, Vanessa Hull, Angela G. Mertig, and Jianguo Liu 2008 Evaluating Household-Level Relationships between Environmental Views and Outdoor Recreation: The Teton Valley Case. Leisure Sciences 30(4): 293–305.

Rabušič,Ladislav.2004. Mnohonásobná linearní regrese (online) accessed (17.05.2017) available at: https://is.muni.cz/el/1423/podzim2004/SOC418/multipl_regres_1.pdf

Rauwald, Kimberly S., and Colleen F. Moore 2002 Environmental Attitudes as Predictors of Policy Support across Three Countries. Environment and Behavior 34(6): 709–739.

Ritzer, George 1975 Sociology: A Multiple Paradigm Science. The American Sociologist 10(3): 156–167.

Ščasný, Milan, Iva Zvěřinová, Mikolaj Czajkowski, Eva Kyselá, and Katarzyna Zagórska 2016 Public Acceptability of Climate Change Mitigation Policies: A Discrete Choice Experiment. Climate Policy 0(0): 1–20.

Scott, David, and Fern K. Willits 1994 Environmental Attitudes and Behavior: A Pennsylvania Survey. Environment and Behavior 26(2): 239–260.

Shin, Won Sop 2001 Reliability and Factor Structure of a Korean Version of the New Environmental Paradigm. Journal of Social Behavior & Personality 16(1): 9–18.

Smith, Michael 2012. Životní prostředí (ISSP 2010)-Česká Republika.Sociologický ústav AV ČR.

Suhr, D. 2005. Principal component anaylssi vs exploratory factor analysis. Statistics and data analysis pp 203-30

Šafr, Jiří. 2016. Analýza kvantitativních dat 2 a 3: Regresní analýza mnohorozměrná lineární regrese.

Tinsley, Howard E. A., and Steven D. Brown 2000 Handbook of Applied Multivariate Statistics and Mathematical Modeling. Academic Press

TRIPATHY, Jaya Prasad 2013 Secondary Data Analysis: Ethical Issues and Challenges. Iranian Journal of Public Health 42(12): 1478–1479.

Van Liere, Kent D., and Riley E. Dunlap 1980 The Social Bases of Environmental Concern:

A Review of Hypotheses, Explanations and Empirical Evidence. The Public Opinion Quarterly: 181.

WATSON, DOROTHY 1992 Correcting for Acquiescent Response Bias in the Absence of a Balanced Scale: An Application to Class Consciousness. Sociological Methods & Research 21(1): 52–88.

Weigel, Russell, and Joan Weigel 1978 Environmental Concern: The Development of a Measure. Environment and Behavior 10(1): 3–15.,

15. List of Annexes

1) Cronbach`s alpha for different number of items in the scale

2) Three factor model for the Great Britain (work version-illustration)

3) Three factor model for the Poland (work version-illustration)

4) One factor model for the Czech Republic (working version)

5) NEP score distribution Czech Republic (histogram)

6) NEP score distribution Great Britain (histogram)

7) NEP score distribution Poland (histogram)

8) The NEP scale results for the Czech Republic

9) The NEP results for the Great Britain

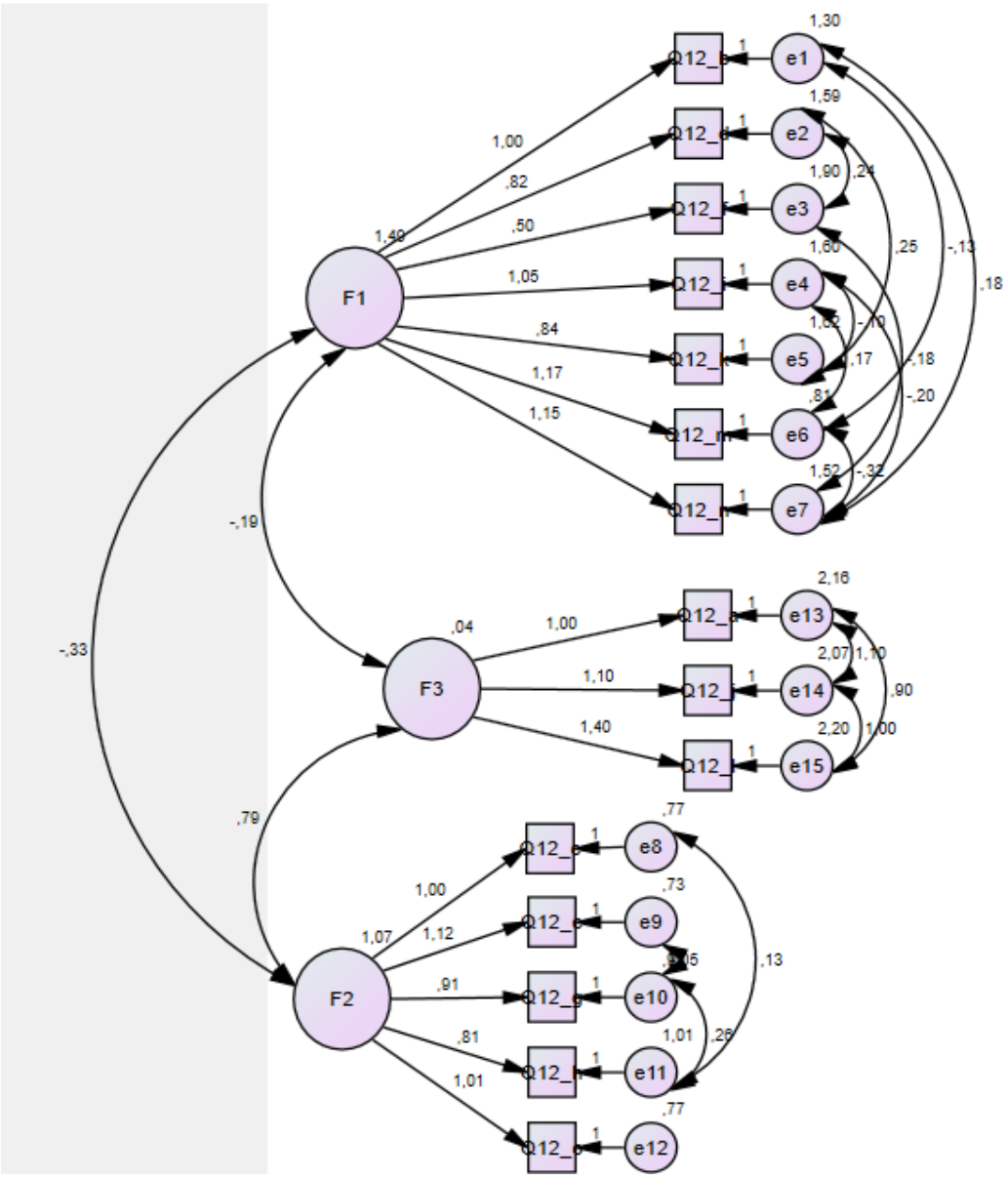
10) The NEP results for the Poland

16. Annexes

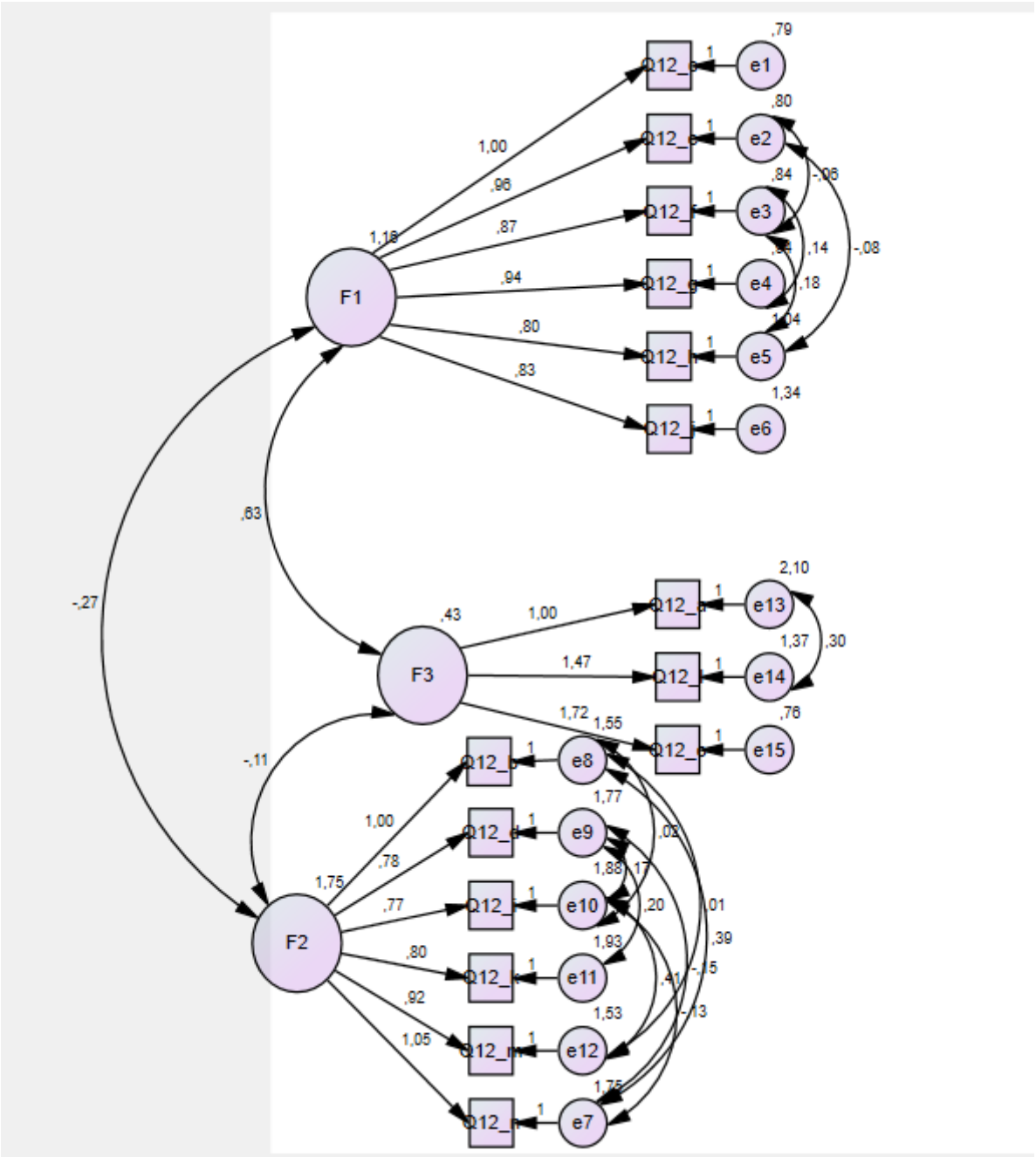
Annex 1: Cronbach`s alpha for different number of items in the scale

N of Items	Czech Republic	Great Britain	Poland
15	,629	,742	,732
14	,643	,738	,733
13	,667	,737	,735
12	,705	,753	,748
11	,757	,778	,783
10	,789	,803	,813
9	,819	,839	,858
8	,827	,874	,840
7	,823	,871	,846
6	,815	,858	,834
5	,811	,856	,822
4	,781	,812	,776
3	,745	,782	,748
2	,721	,698	,646
1	Na	Na	Na

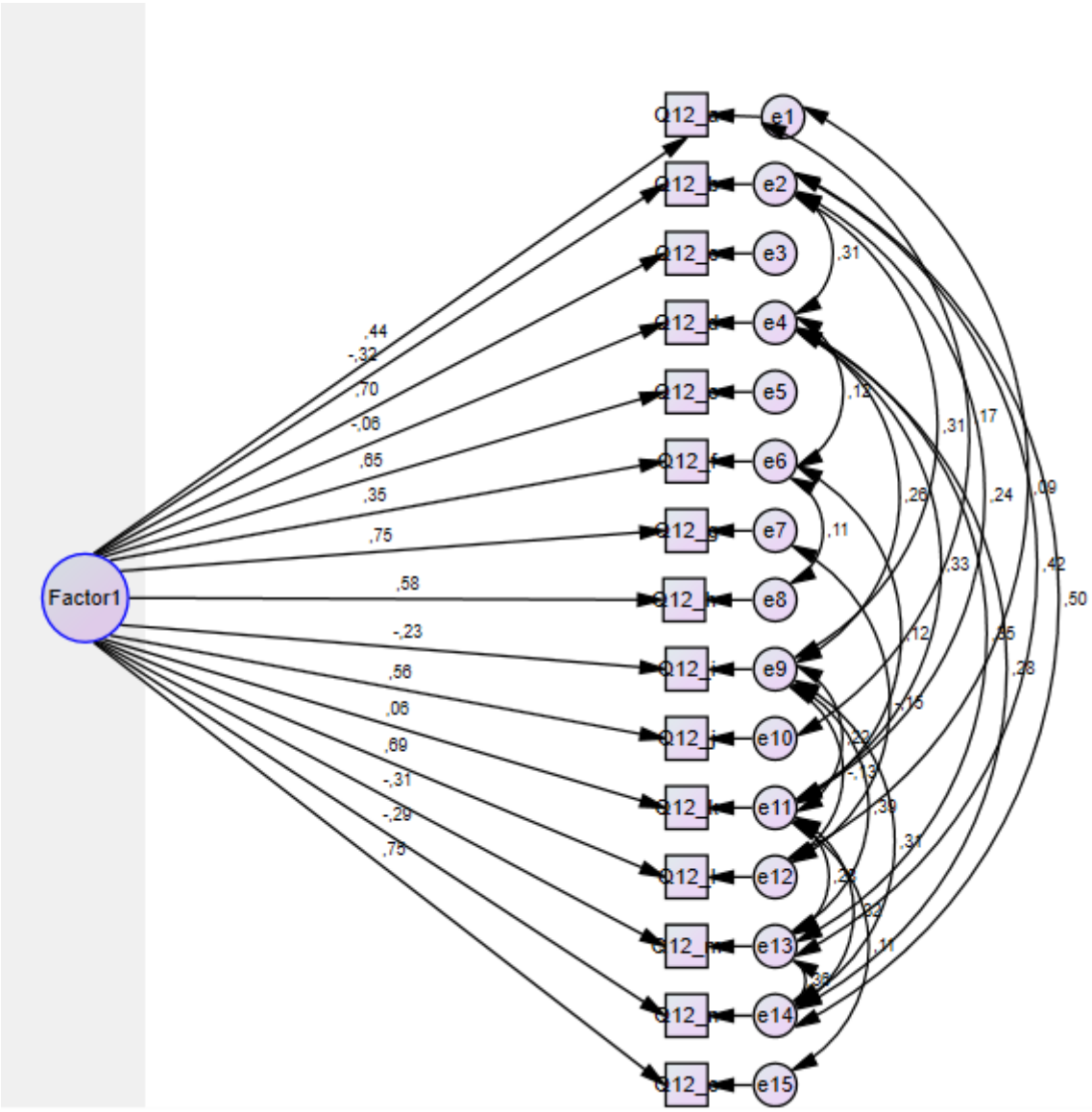
Annex 2: Three factor model for the Great Britain (Illustration)



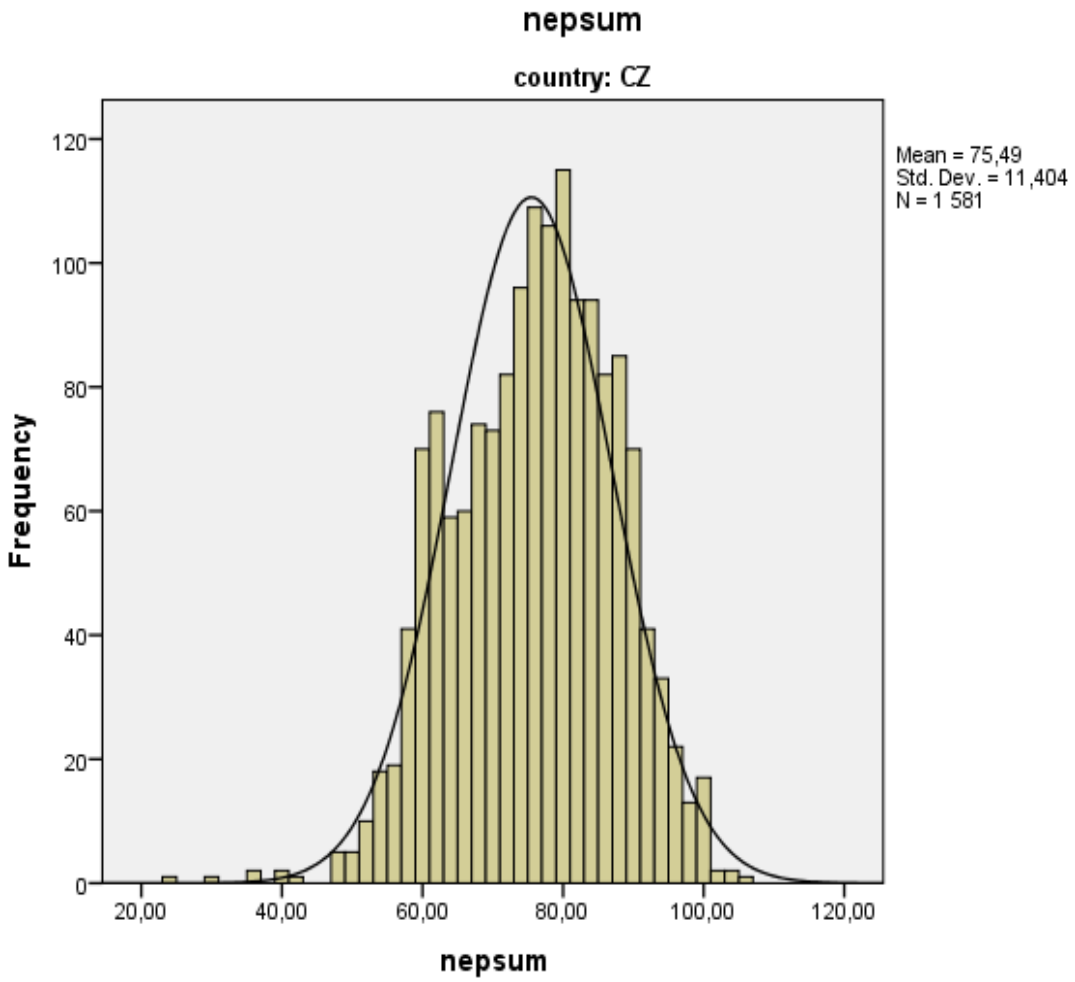
Annex 3: Three factor model for the Poland (work version-Illustration)



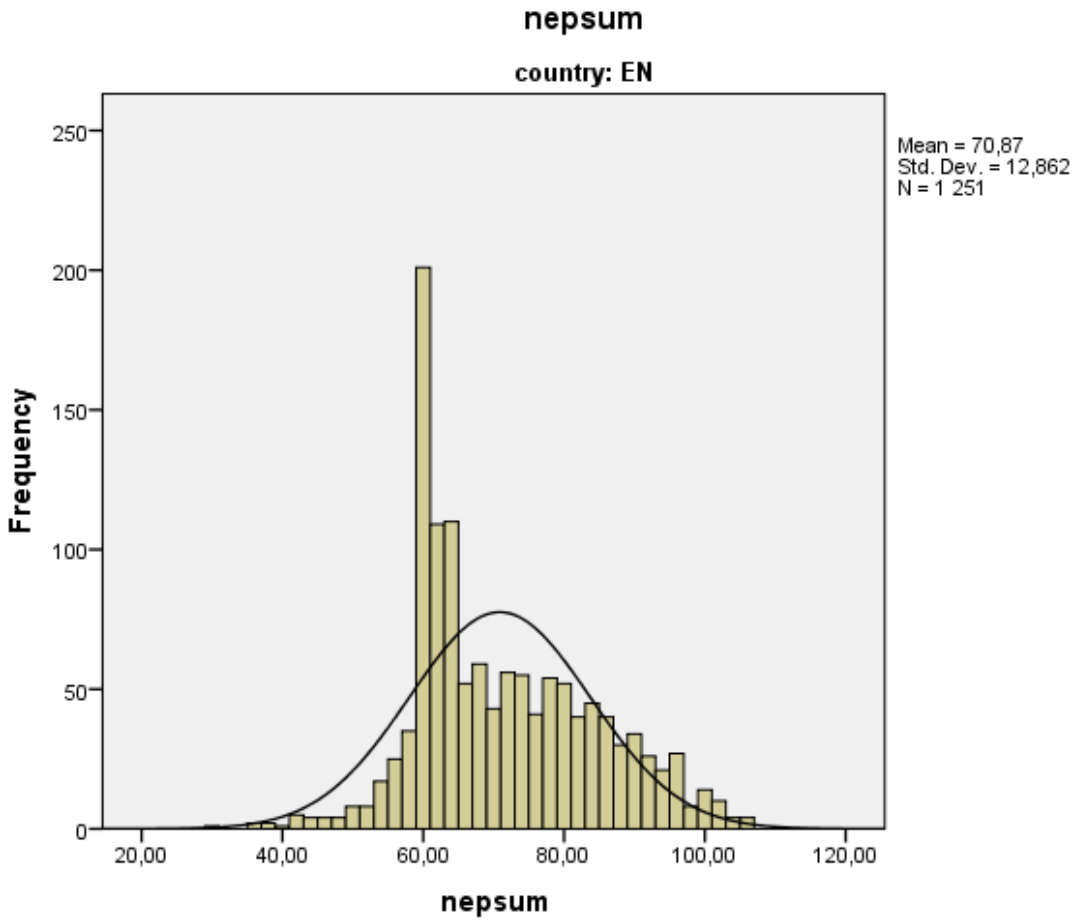
Annex 4: One factor model for the Czech Republic (working version)



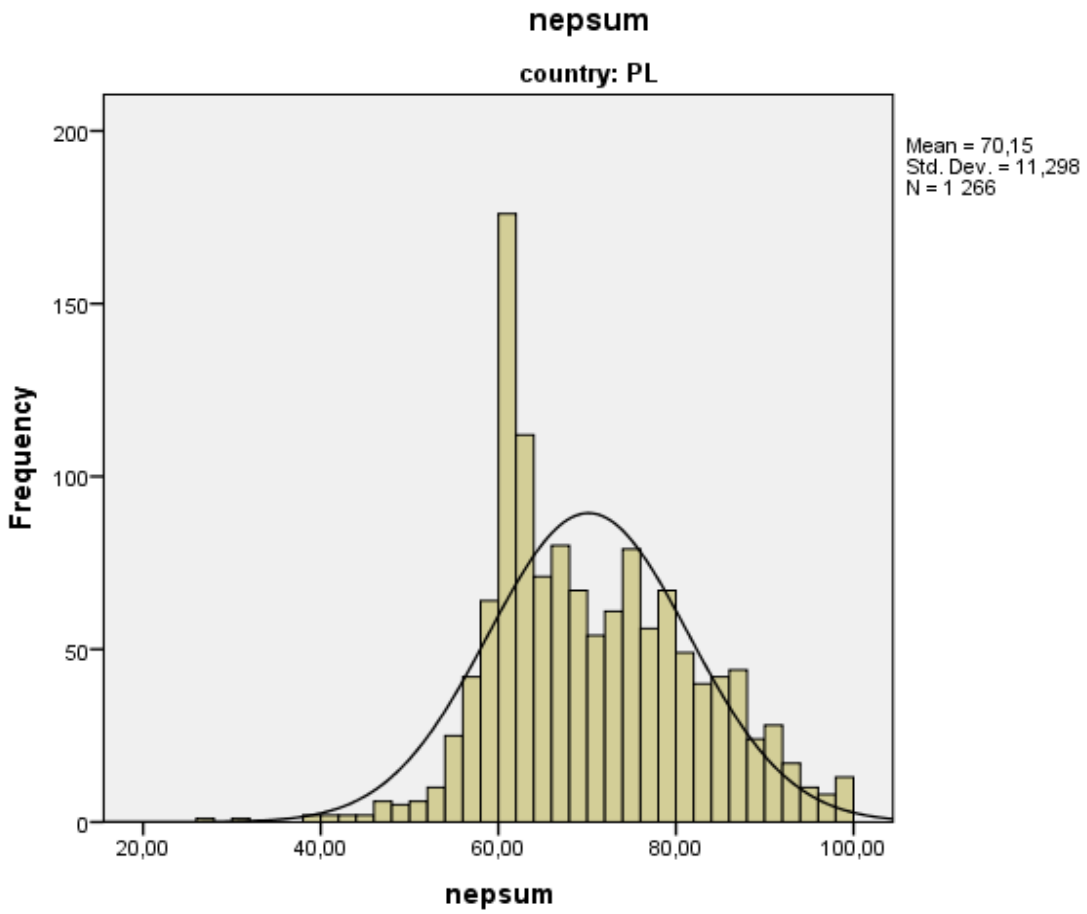
Annex 5: NEP score distribution Czech Republic (histogram)



Annex 6: NEP score distribution Great Britain (histogram)



Annex 7: NEP score distribution Poland (histogram)



Annex 8: The NEP scale results for the Czech Republic

Question	N	Mean	Median	Mode	Std. Deviation	Variance
1a We are approaching the limit of the number of people the earth can support.	1398	5,23	6,00	7	1,625	2,641
2b Humans have the right to modify the natural environment to suit their needs.	1538	2,85	3,00	1	1,671	2,791
3c When humans interfere with nature it often produces disastrous consequences.	1524	5,85	6,00	7	1,416	2,005
4d Human ingenuity will insure that we do NOT make the earth unliveable.	1404	4,07	4,00	4	1,708	2,918
5e Humans are severely abusing the environment.	1534	5,81	6,00	7	1,438	2,067
6f The earth has plenty of natural resources if we just learn how to develop them.	1518	5,44	6,00	7	1,441	2,077
7g Plants and animals have as much right as humans to exist.	1528	6,29	7,00	7	1,167	1,362
8h Despite our special abilities humans are still subject to the laws of nature.	1522	5,96	6,00	7	1,339	1,793
9i The so-called “ecological crisis” facing humankind has been greatly exaggerated.	1446	3,63	4,00	3	1,766	3,117
10j The earth is like a spaceship with very limited room and resources.	1489	5,70	6,00	7	1,542	2,378
11k Humans will eventually learn enough about how nature works to be able to control it.	1452	4,21	4,00	4	1,661	2,758
12l If things continue on their present course, we will soon experience a major ecological catastrophe.	1490	5,53	6,00	7	1,446	2,091
13m The balance of nature is strong enough to cope with the impacts of modern industrial nations.	1508	3,14	3,00	1	1,737	3,016
14n Humans were meant to rule over the rest of nature.	1532	2,72	2,00	1	1,815	3,294
15o The balance of nature is very delicate and easily upset.	1524	5,90	6,00	7	1,331	1,772

Annex 9: The NEP results for the Great Britain

Question	N	Mean	Median	Mode	Std. Deviation	Variance
1a We are approaching the limit of the number of people the earth can support.	1080	5,30	6,00	7	1,543	2,382
2b Humans have the right to modify the natural environment to suit their needs.	1123	3,73	4,00	4	1,775	3,149
3c When humans interfere with nature it often produces disastrous consequences.	1126	5,58	6,00	7	1,349	1,819
4d Human ingenuity will insure that we do NOT make the earth unliveable.	1064	4,34	4,50	4	1,749	3,061
5e Humans are severely abusing the environment.	1138	5,68	6,00	7	1,413	1,995
6f The earth has plenty of natural resources if we just learn how to develop them.	1120	4,97	5,00	6	1,597	2,552
7g Plants and animals have as much right as humans to exist.	1142	5,94	6,00	7	1,307	1,708
8h Despite our special abilities humans are still subject to the laws of nature.	1123	5,85	6,00	7	1,236	1,527
9i The so-called “ecological crisis” facing humankind has been greatly exaggerated.	1087	3,90	4,00	4	1,929	3,722
10j The earth is like a spaceship with very limited room and resources.	1108	5,28	6,00	6	1,519	2,308
11k Humans will eventually learn enough about how nature works to be able to control it.	1096	4,08	4,00	4	1,770	3,133
12l If things continue on their present course, we will soon experience a major ecological catastrophe.	1088	5,22	5,00	6	1,551	2,406
13m The balance of nature is strong enough to cope with the impacts of modern industrial nations.	1104	3,74	4,00	4	1,802	3,246
14n Humans were meant to rule over the rest of nature.	1116	3,53	4,00	1	1,982	3,930
15o The balance of nature is very delicate and easily upset.	1121	5,58	6,00	7	1,350	1,822

Annex 10: The NEP results for the Poland

Question	N	Mean	Median	Mode	Std. Deviation	Variance
1a We are approaching the limit of the number of people the earth can support.	1104	4,84	5,00	5	1,725	2,976
2b Humans have the right to modify the natural environment to suit their needs.	1201	3,68	4,00	1	1,890	3,573
3c When humans interfere with nature it often produces disastrous consequences.	1199	5,76	6,00	7	1,358	1,844
4d Human ingenuity will insure that we do NOT make the earth unliveable.	1106	4,21	4,00	5	1,805	3,257
5e Humans are severely abusing the environment.	1195	5,79	6,00	7	1,334	1,779
6f The earth has plenty of natural resources if we just learn how to develop them.	1208	5,95	6,00	7	1,234	1,522
7g Plants and animals have as much right as humans to exist.	1203	5,99	7,00	7	1,311	1,720
8h Despite our special abilities humans are still subject to the laws of nature.	1203	5,89	6,00	7	1,295	1,677
9i The so-called “ecological crisis” facing humankind has been greatly exaggerated.	1157	4,13	4,00	4	1,824	3,328
10j The earth is like a spaceship with very limited room and resources.	1182	5,51	6,00	7	1,493	2,230
11k Humans will eventually learn enough about how nature works to be able to control it.	1142	3,99	4,00	5	1,868	3,490
12l If things continue on their present course, we will soon experience a major ecological catastrophe.	1157	5,07	5,00	6	1,567	2,455
13m The balance of nature is strong enough to cope with the impacts of modern industrial nations.	1165	3,88	4,00	4	1,835	3,368
14n Humans were meant to rule over the rest of nature.	1201	3,77	4,00	1	2,012	4,050
15o The balance of nature is very delicate and easily upset.	1190	5,60	6,00	7	1,418	2,012