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Cross-Country Comparisons of Environmental Concern

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We investigate two approaches to exploring environmental concern in cross-national, big datasets. It is widely believed that environmental concern encompasses at least two components: the cognitive component, i.e. the recognition of environmental threats, and the conative component, i.e. the willingness to do something about them. Previous research examining the International Social Survey Programme Environmental Module used either one general factor linked to environmental concern (Franzen & Vogl, 2013) or two independent factors (Marquart-Pyatt, 2012) to measure the cognitive and connotative factors separately. In the present work we used a multi-group confirmatory factor analysis to examine both approaches. Our results indicate that treating both factors separately was valid for cross-country comparisons. Measuring environmental concern with one factor, however, was not consistent across countries. We conclude by addressing the consequences of our results pertaining to research and policy-making.

Keywords: environmental concern, international comparative analysis, International Social Survey Programme, multi-group confirmatory factor analysis.

Porównania postaw prośrodowiskowych w badaniach międzynarodowych

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W pracy badaliśmy dwa podejścia do mierzenia postaw prośrodowiskowych w dużych, międzynarodowych zbiorach danych. W badaniach nad postawami prośrodowiskowymi zazwyczaj uwzględnia się przynajmniej dwie składowe: poznawczą, związaną ze świadomością istnienia zagrożeń środowiskowych oraz intencyjną, związaną z gotowością zaangażowania się w działania prośrodowiskowe. W badaniach wykorzystujących dane z Międzynarodowego Programu Sondaży Społecznych stosuje się jedno z dwóch podejść do

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pomiaru postaw prośrodowiskowych: model jednoczynnikowy, w którym składowa poznawcza i intencyjna traktowane są jako należące do jednego czynnika (Franzen & Vogl, 2013) albo dwuczynnikowy, w którym obydwie składowe analizowane są osobno (Marquart-Pyatt, 2012). W pracy zastosowaliśmy wielogrupową konfirmacyjną analizę czynnikową w celu zbadania, który z dwóch modeli jest stabilny w porównaniach międzynarodowych. Nasze wyniki wskazują, że tylko model dwuczynnikowy jest stabilny między krajami, w związku z czym spełnia założenia miary używanej w porównaniach międzynarodowych. W pracy przedstawiamy niektóre konsekwencje zastosowania modelu dwuczynnikowego zamiast jednoczynnikowego dla badań nad postawami prośrodowiskowymi oraz omawiamy otrzymane rezultaty w odniesieniu do polityki prośrodowiskowej.

Słowa kluczowe: postawy prośrodowiskowe, porównania międzynarodowe, Międzynarodowy Program Sondaży Społecznych, wielogrupowa konfirmacyjna analiza czynnikowa

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1. Introduction

There is a rising worry over the decrease of environmental concern across the globe. This decrease is coupled with continuous low levels of support for environmental policies and actions. Thus, it becomes more important than ever to determine how environmental concern spreads and what are its determinants and components. Individual researchers continuously develop scales for environmental concern (see: Dunlap, Van Liere, Mergit & Jones, 2000); however, international research projects such as the International Social Survey Programme (ISSP), the World Values Survey (WVS) or the European Values Study (EVS) utilize shorter versions for the purpose of collecting big datasets. Research findings from the latter are often mixed and the studies are incomparable due to using different environmental concern measurements (e.g. Dunlap & York, 2008; Franzen, 2003; Franzen & Meyer, 2010; Kemmelmeier, Krol & Hun Kim, 2002; Marquart-Pyatt, 2008; Marquart-Pyatt, 2012).

1.1. Defining environmental concern

One of the widely accepted definitions of environmental concern given by Dunlap and Jones is: "(…) environmental concern is a broad concept that refers to a wide range of phenomena – from awareness of environmental problems to support for environmental protection – that reflect attitudes, related cognitions, and behavioral intentions towards the environment." (as cited in Schaffrin, 2011).

Various measures have been derived from this definition. These differences in measurement contributed to varying support for the two competing theories on how environmental concern develops and spreads across the globe. The Materialist/Postmaterialist theory (Inglehart, 1990, 1995) states that the shift from Materialist to Postmaterialist values are the main source of the development of environmental concern. Postmaterialistim develops along with the stability and wealth of a society; with more wealth, societies

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are more willing and able to sacrifice resources in the name of higher values. A study using data from the World Value Survey (Inglehart, 1995) indicated that environment protection support derives from either immediate danger or from Postmaterialist values. In the study, low-income societies agreed more strongly than high-income societies on the need to protect the environment. However, when participants were asked about their willingness to contribute financially, participants from low-income countries were more opposed to such support as compared to participants from high-income countries.

The other major theory explaining growth in environmental concern claims this it is an effect of globalization (Dunlap & York, 2008). It derives from the supposition that the Materialist/Postmaterialist theory deprives poorer countries of expression of environmental concern. Using both data from the World Value Survey and an alternative measure for environmental concern, Dunlap & York (2008) demonstrate that environmental concern is not necessarily based on national wealth. This difference stems from the fact that there can be more than one dimension of environmental concern. High and low-income countries had different correlations between these dimensions. This finding indicates that the previously found relationship between country wealth and environmental concern may be a consequence of the difference in expression, not the amount of environmental concern among countries of different wealth.

In this work we ask whether it is more valid to investigate environmental concern with one measure or by comparing its components separately in cross-country analyses using as the example data from the 2010 wave of the ISSP Environmental Module. The results of this study have a direct impact on policy making. A bi-factor measure implies that more than just the intensity of environmental concern needs to be taken into account when devising and measuring the effect of environmental actions and policies. Cross-national differences in the contents of environmental concern need to be taken into account and greater pressure on regional implementations also need to be more strongly considered.

1.2. The uni-factor measure of environmental concern

In their recent work, Franzen and Vogl (2013) present extensive analyses of environmental concern in 33 countries. They compare changes over three waves of the ISSP Environment Module (1993, 2000 and 2010) and discuss the individual-level and macro-level determinants of their one-factor environmental concern measure. Deriving from Dunlap & Jones's definition, environmental concern is defined as "an individual's insight that humans endanger the natural environment combined with the willingness to protect nature". There are two components in this definition, named: cognitive, as the awareness of environmental threats, and conative, as the willingness to invest in solving the issue. Additionally, affective reaction to environmental degradation is mentioned as another component of the measure of environ-

mental concern. As a result of the conducted analyses, the affective and cognitive components are combined together as one factor. The measurement is a uni-factor measure with two theoretical components. It focuses on the vital role of economy: five out of nine items directly relate to economic aspects of environmental concern. The ISSP items they used are listed in Appendix A.

Continuing previous lines of work (Diekmann & Franzen, 1999; Franzen, 2003; Franzen & Meyer, 2010), they found gender, age, education, income, postmaterialism, party affiliation, general social trust, and general institutional trust as individual-level determinants of environmental concern. They measure country wealth based on the price parity corrected gross domestic product, GDP (PPP), and determine it to be significantly positively related to environmental concern.

1.3. The bi-factor measure of environmental concern

Also basing on Dunlap & Jones's definition of environmental concern, in her work Marquart-Pyatt addressed the issue of affluence (2008) and of the importance of regional comparisons (2012) in environmental concern research. For both studies, a bi-factor measure for environmental concern is used. In this measure the same two components are treated as two separate factors: the cognitive (there called "environmental threat awareness") and conative (there called "willingness to sacrifice"). Moreover, the cognitive component is based on different items of the ISSP Environmental Module from those that were used in the uni-factor measure. The questions comprising the bi-factor measure are also presented in Appendix A.

This bi-factor measure includes only three out of nine items directly related to financial issues. Within the cognitive component none of the items are intention-oriented. Rather, they refer to acknowledgement of environmental threats alone. An analysis of the 2000 ISSP wave of data from Central and Eastern European countries (Marquart-Pyatt, 2012) suggests that within industrialized countries, country wealth does not have such a strong relationship with environmental concern as the country's economic growth (2008). The cognitive component had a significant negative correlation or no correlation with personal income. This contradicts findings from the previously described uni-factor measure (i.e. Franzen & Meyer, 2010; Franzen & Vogl, 2013).

2. Materials and Methods

2.1. Glossary

We wish to clarify the following terms used in our study:

component — the connotative or conative component of environmental concern, used both in the bi- and uni-factor measures;

measure — the items, factors and factor loadings used to measure environmental concern;

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factor — the highest level factor within the measure. Environmental concern for the uni-factor measure and either the conative or cognitive factor for the bi-factor measure.

2.2. Data

2.2.1. ISSP Environmental Module

The International Social Survey Programme was formed as a collaboration to collect cross-national data on significant social science topics, including citizenship, social networks, health, religion, and role of government. Every year one topic is investigated as a module. Each module consists of 60 questions and must be adapted for each participating country.

The ISSP Environment Module has been conducted thrice; in 1993, 2000 and 2010. Its focus includes attitudes toward the environment and its protection, willingness to act, ongoing behaviors and government actions related to environment protection, as well as knowledge on the topic of environmental issues. The three waves partially differ from each other, as some questions have changed over the two decades. Materials are accessible through the official website www.issp.org. Data from a few countries are available upon request from the ISSP as some data have been provided after assembling the main dataset.

In our analysis we used data from 33 member countries, a sample that included 47145 respondents aged 18–80. The items used for the following analyses of environmental concern measures included questions about the willingness to pay higher taxes, to pay higher prices, and to cut one's standard of living for the sake of environment protection, an array of questions about environmental beliefs as relating to science and the economy, and about human actions harming the environment. The full list of questions can be found in Appendix A.

From this dataset, we also used two items measuring postmaterialism and the following sociodemographic variables: age, relative income (income standardized within country), education.

2.2.2. World Bank, world development indexes

The World Bank provides a variety of annually updated measures from countries around the globe, including various measures of domestic product, population measures, CO2 emissions etc. The data are available online at www.woldbank.org. We chose the relevant indicators to compare our findings to previous studies: percentage of urban population, population density, and 2011 corrected price parity gross domestic product.

2.2.3. Environmental Performance Index

We used the Environmental Performance Index that measures a variety of factors pertaining to environmental protection. It is available at www.epi.yale.edu.

2.2.4. Items used in the measures of environmental concern

We compared the uni- and bi-factor measures used for the study of the environmental concern from the ISSP (Franzen, 2003; Marquart-Pyatt, 2008). Both measures include the conative and cognitive components. The conative component in both measures is comprised of items indicating the willingness to sacrifice financially for the benefit of environmental protection. The percentage of participants willing and very willing to sacrifice financially is illustrated in Appendix B (Figure B.1).

The uni-factor measure's cognitive component is comprised of 5 items concerning a variety of environmental issues and beliefs. The bi-factor measure's cognitive component is comprised of five items relating to awareness of environmental threats. The items used in both cognitive components can be seen in Appendix A, and the percentage of responses to these items indicating high environmental concern in Appendix B (Figures B.2 and B.3).

2.3. Overview of statistical analyses

The statistical analyses were carried out in three parts: confirmatory factor analysis (CFA), multi-group confirmatory factor analysis (MCFA) and mixed modeling.

We started with the CFA, which determines whether the proposed measures of environmental concern sufficiently explain the patterns of participants' answers to questions about environmental concern. In other words, it measures the environmental concern measure's validity. The uni- and bi-factor measures were analyzed on a pooled sample to establish how well the proposed measures explain the observed data when not taking into account the fact that individuals are nested within countries. We expected good fit for both measures, as they were derived from exploratory factor analyses in the articles in which they were proposed. The good fit, however, may be a product of the country-level co-variations of variables, and not of the individual-level co-variations assumed in the CFA. This means that we may obtain good fit despite poor measure validity. Furthermore, the environmental concern measure could be different across countries, making its comparison between countries problematic.

In order to address these shortcomings an MCFA was conducted to test the questioned stability of the two measures across countries. In this analysis a series of models with increasing restrictions were used to test hypothesized data structure. The change in fit that is smaller than a threshold value indicates that the model is insensitive to the restrictions on the parameters. This procedure enables us to test the assumption that the expression of environmental concern is the same across countries: in the configurational invariance model, only the pattern of loadings is restricted between countries. In the weak measurement invariance the slope parameters are fixed to be equal across countries. In the strong invariance model, both slopes and intercepts are restricted. We expect the strong invariance model not

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to hold for any of the measures, as citizens from different countries face various environmental and socio-political problems.

Finally, the analyses are concluded with re-analyzing the determinants of environmental concern using mixed modeling (similar to Franzen & Vogl, 2013). Our approach was chosen to compare the effect of the individual- and country-level variables. We performed this in a series of steps. In the first step we tested the null model: the model without any predictors, to see how much of the variance in EC is accounted for by country differences. In the second model we used the individual-level predictors to see how much variance they accounted for both on the individual and country level and test their relationship with EC. Finally, we added the country-level predictors to see if they explained a significantly larger proportion of our measure of environmental concern than all the other predictors.

The CFA and MCFA model fit was assessed using standard measures: the chi-squared test, the root mean square error of approximation (RAMSEA; Stinger 1990), and the comparative fit index (CFI; Bentler, 1990; Bentler & Bonnet, 1980) which has the added advantage of being robust to sample size differences. The respective cutoff points for acceptable model fit were RAMSEA < .10, CFI > .90 and RAMSEA < .08, CFI > .95 for good model fit (MacCallum et al., 1996; Hu & Bentler, 1995). The chi-squared test is reported; however, due to being very sensitive to large sample sizes, it was not used as a primary indicator of model fit.

After constraining the models between countries the change in model fit was assessed using additional indices. The change in CFI (delta CFI) and the change in the Bayesian information criteria (delta BIC) were reported for the MCFA alongside the likelihood ratio test (tested using the chi-squared statistic). Delta CFI < .01 is recommended for accessing model invariance (Cheung & Rensvold, 2002).

3. Results

3.1. Confirmatory factor analyses: evaluating the structure of the two models of environmental concern on a pooled sample

Both models were evaluated using confirmatory factor analysis (CFA) on the pooled sample. CFA fit indices indicated good fit for both models. The root mean square error of approximation (RAMSEA; Stinger 1990) was below .08 indicating good model fit (MacCallum et al., 1996) for both the uni-factor (RAMSEA = .05) and bi-factor (RAMSEA = .06) measures. The comparative fit index (CFI; Bentler, 1990; Bentler & Bonnet, 1980), which has the added advantage of being robust to sample size differences, was also indicative of good fit (Hu & Bentler, 1995) being above .95 for both measures (uni-factor: .96, bi-factor: .97). The chi-squared test was significant for both models (uni-factor: chi-squared(26) = 2885, $p < .001$, bi-factor: chi-

squared(26) = 3447, $p < .001$), indicating poor model fit. This is expected, as the chi-squared test is highly sensitive to sample size. It is common practice to look at other fit indexes when assessing model fit. The standardized factor loadings of the solutions can be seen in Figures 1 and 2.

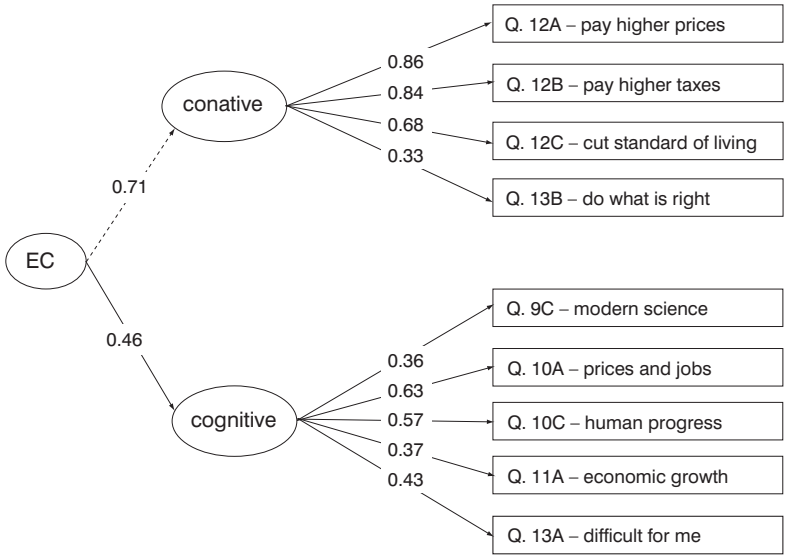

Fig. 1. Standardized CFA paths for the uni-factor EC measure. The dotted line indicates that the unstandardized path coefficient was constrained

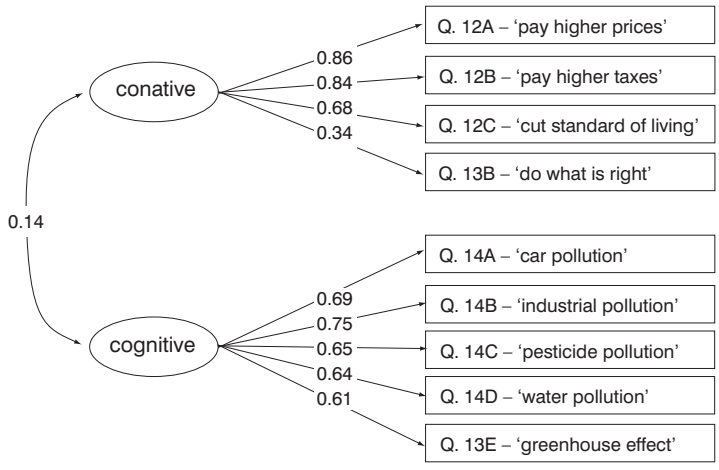

Fig. 2. Standardized CFA paths for the bi-factor EC measure

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Overall, the EC factor explained between 5% and 37% of the conative item variances and, notably less, between 3% and 8% of the cognitive item variances. If summed together the EC Cronbach's alpha would be .69.

The conative component of the uni-factor measure had high loadings for three of the four factors composing it. The item "I do the right thing for the environment even if it takes more money or time" loaded weakly on the conative component. It only explained 10% of that item's variance. The conative component loaded highly on the EC factor, but this was due to constraining that loading in order to identify the model. Taken separately, the factor has Cronbach's alpha of .77.

The cognitive components of the uni-factor measure had moderate loadings on all variables. They explained between 10% and 50% of all of the item variances, although they tended toward the lower end of that spectrum. The cognitive component loaded moderately on the EC factor. Taken together, the factor has low Cronbach's alpha .59, suggesting the factor's low internal consistency.

For the bi-factor measure, all items except the item "I do the right thing for the environment even if it takes more money or time" loaded moderately or highly on their respective components, meaning the factors accounted for between 37% and 74% of the item variances. The factors themselves were weakly related, further supporting the advantage of a two-factor solution. Taken separately the factors would have acceptable Cronbach's alpha of .77 for the conative factor, and .82 for the cognitive factor.

3.2. Multigroup confirmatory factor analyses: evaluating the cross-country stability of the structure of the two models of environmental concern

Cross-national measure stability warrants the comparison of environmental concern among countries and individuals in different countries. It allows for testing whether environmental concern is measured consistently in various countries. To assess both the uni- and bi-factor measures' stability we used multigroup factor analyses (MCFA).

In MCFA a series of models is measured and compared. First, a configurational invariance model is constructed as a baseline. In this model only the pattern (paths) in the structure is kept invariant across countries, but the loadings of individual items on the conative, cognitive, and EC factors can vary from country to country. Next, weak measurement invariance is assessed by constraining all the loadings across countries. When this model is significantly worse than the structural invariance model, cross-country comparisons of EC are problematic. In this case, the EC measure is not uniformly related to the observed responses across countries. Finally, a strong invariance model is accessed to check if the origins of our measures (the intercepts of the linear model) are the same. We do not expect this to be the case. The results of the analysis are in Table 1.

Model	Measure	χ^2	*Df*	$\Delta\chi^2$	*Δdf*	*CFI*	*ΔCFI*	RAMSEA
configurational invariance	uni-factor	4486.180*	825	–	–	0.95	–	0.06
	bi-factor	4979.528*	858	–	–	0.96	–	0.06
weak measurement invariance	uni-factor	6211.068*	1081	1724.888*	256	0.92	0.02	0.07
	bi-factor	6395.488*	1082	1423.788*	224	0.94	0.01	0.06
strong measurement invariance	uni-factor	37709.470*	1372	18113.23*	448	0.50	0.25	0.15
	bi-factor	20740.87*	1273	14529.81*	192	0.73	0.20	0.12

Tab. 1. The fit and incremental measures and statistics for the MCFA of the two EC measures

Although the uni-factor EC measure had a fairly well fitting configural invariance model, all the fit indexes were in acceptable bounds (MacCallum et al., 1996; Hu & Bentler, 1995), < .10 for RMSEA and > .90 for the CFI. The weak measurement invariance model had a worse fit than the configural invariance model (the change in CFI was larger than .02), indicating that the measurement of EC using the uni-factor measure is not uniform across countries, therefore its comparison across countries is not warranted.

The bi-factor EC measure had a good fitting configural invariance model, with a CFI well above .90 and a RMSEA below .08. This indicates that the same items load on the conative and cognitive factors in all countries respectively. Its weak measurement invariance model also had a good fit (see Table 1). The difference in model fit was small enough to infer measurement invariance of the bi-factor measure across countries (delta CFI < .01; Cheung & Rensvold, 2002). This warrants the comparison of these two factors separately between countries. This means that the strength of the relationship between the level of the observed responses and the components of environmental concern were consistent among countries. As expected, strong invariance did not hold for the bi-factor measure, meaning that the mean levels of the observed responses for a given value of the cognitive and conative component (the intercept) were not consistent among countries.

3.3. Mixed model analysis using the bi-factor model

Finally, we performed a mixed-model analysis to investigate the individual- and country-level determinants of the conative and cognitive factors of environmental concern. The analysis included the countries that had at least one observation on all the individual- and country-level variables. Taiwan, Argentina, Israel, and Japan were excluded for not fulfilling this requirement. Data were not imputed in any of the models. The results of the analysis can be seen in Tables 2 and 3.

Overall, the differences between countries accounted for 10% of the variance of the conative component of EC. Together, the individual-level variables also accounted for 10% of this variance (20% of the country-level

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	Null model	Model 1 (individual-level variables)	Model 2 (full model)
Individual-level variables			
Sex – female		0.62*(0.27)	0.62* (0.27)
Age in years (18–80)		0.04*** (0.01)	0.04*** (0.01)
Squared age		0 (0.001)	0 (0.001)
Intermediate secondary degree		2.26*** (0.46)	2.26*** (0.46)
Secondary degree		4.64*** (0.46)	4.64*** (0.46)
University degree incomplete		6.00*** (0.53)	6.00*** (0.53)
University degree complete		10.00*** (0.51)	10.00*** (0.51)
Relative income within country		1.19*** (0.14)	1.19*** (0.14)
Postmaterialisim		3.67*** (0.23)	3.67*** (0.23)
Party affiliation		–1.89*** (0.17)	–1.89*** (0.17)
General trust in people		1.93*** (0.12)	1.93*** (0.12)
General trust in government		2.48*** (0.13)	2.48*** (0.13)
Country-level variables			
per capita GDP (PPP)			0.20* (0.09)
Population density			0.02* (0.01)
Environmental Performance Index			–0.01 (0.15)
Constant	45.43*** (1.34)	29.67*** (1.48)	19.68 (12.57)
Intraclass correlation (ICC)	0.1	0.09	0.07
Variance of conative component			
Country-level	51.11	40.86	31.23
Individual-level	459.05	419.30	419.30
Unique variance explained			
Country-level (%)	–	20.05	18.85
Individual-Level (%)	–	8.66	0
$\Delta\chi^2$	–	2098.20***	10.94*
Δdf	–	12	3
Δp	–	< 0.001	0.01

Note. * indicates $p < .05$, ** indicates $p < .01$, *** indicates $p < .001$

Tab. 2. Coefficients and comparison tests for models examining the conative component of environmental concern

	Null model	Model 1 (individual-level variables)	Model 2 (full model)
Individual-level variables			
Sex – female		3.08* (0.21)	3.08* (0.21)
Age in years (18–80)		–0.02*** (0.01)	–0.02*** (0.01)
Squared age		–0.002*** (0.0004)	–0.002*** (0.0004)
Intermediate secondary degree		0.61 (0.35)	0.61 (0.35)
Secondary degree		0.87*** (0.35)	0.87*** (0.35)
University degree incomplete		1.83*** (0.40)	1.83*** (0.40)
University degree complete		2.66*** (0.39)	2.66*** (0.39)
Relative income within country		0.03*** (0.11)	0.03*** (0.11)
Postmaterialisim		0.60*** (0.18)	0.60*** (0.18)
Party affiliation		–2.31*** (0.13)	–2.31*** (0.13)
General trust in people		–0.48*** (0.09)	–0.48*** (0.09)
General trust in government		–0.52*** (0.13)	–0.52*** (0.13)
Country-level variables			
per capita GDP (PPP) in thousands of U.S. Dollars			–0.30* (0.08)
Population density			–0.01* (0.01)
Environmental Performance Index			–0.01 (0.15)
Constant	70.52*** (1.19)	78.48*** (1.39)	94.59*** (10.56)
Intraclass correlation (ICC)	0.14	0.14	0.09
Variance of cognitive component			
Country-level	40.61	40.02	22.50
Individual-level	247.89	239.29	239.29
Unique variance explained			
Country-level (%)	–	1.45	18.85
Individual-Level (%)	–	3.47	0
$\Delta\chi^2$	–	818.09***	19.75***
Δdf	–	12	3
Δp	–	< 0.001	< 0.001

Note. * indicates $p < .05$, ** indicates $p < .01$, *** indicates $p < .001$

Tab. 3. Coefficients and comparison tests for models examining the cognitive component of environmental concern

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variance and 9% of the individual-level variance). The country-level variables accounted for another 2% of conative component variance (all of it being 19% of the country-level variance). The best fitting model was the full model, having significantly better fit than the one with only country-level variables, and the null model.

All the individual-level variables were positively related to the conative component, except for party affiliation (participants with more conservative political views had a lower value of the conative factor) and squared age (no significant relation). There was no significant difference between middle-aged adults and the rest of the sample. Both the price parity corrected GDP per capita and population density were positively related to the conative factor of environmental concern.

Both the price parity corrected per capita GDP and population density were negatively related to the cognitive factor. The higher the per capita GDP and population density, the lower the cognitive factor This is in stark contrast to the analyses of determinants for the conative factor.

Overall differences among countries' mean cognitive component of environmental concern accounted for 14% of the variance of that component. Together, the individual-level variables accounted for 3% of the cognitive factor's variance (1% on the country-level variance and 3% of the individual-level variance). The country-level variables accounted for another 6% of cognitive factor's variance (all of it being 43% of the country-level variance). The best fitting model was the full model, having better fit than the one with only country-level variables, and the null model.

The relative income was not significantly related to the cognitive factor. Trust in government and trust in people was negatively related to the cognitive factor, in contrast to the conative factor. People with more conservative views had less belief in the threat of environmental change.

4. Discussion and Conclusions

In the study, we assessed two previously proposed measures of environmental concern for analysis in the ISSP Environmental Module: the uni- and bi-factor measures. We found that when comparing environmental concern across countries, it is advantageous to investigate it as a multifaceted measure rather than as a summary measure. In particular, when using the uni-factor measure of environmental concern, the results are very similar to using just the factor comprising the conative component.

When aggregating the measure, information about the determinants of the cognitive and conative components of environmental concern is lost. This information is especially important to policy-making, as it points to differences in needs and acceptance for various environmentally friendly policies and laws. For instance, we found that an increase in general trust in people and in government was related to the willingness to sacrifice financially

for the good of the environment, whereas it was inversely related to the acknowledgement of environmental threats. This may point to a need for different types of environmental protection actions for people and societies where the general level of trust is low, as compared to those where it is high.

Similarly, the gross domestic product of a country was positively related to the willingness to sacrifice financially, but negatively to the acknowledgement of environmental threats. This could be indicative of the different structure of environmental concern in wealthier and less wealthy countries. In conclusion, these findings corroborate that environmental policies should vary as a function of countries' wealth.

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Appendix A

Tab. A.1. The list of ISSP Environmental Module questions included in the study

ISSP Number	Questions	Reverse coding
Conative component (identical for both measures)		
Q. 12A	How willing would you be to pay much higher prices in order to protect the environment?	
Q. 12B	How willing would you be to pay much higher taxes in order to protect the environment?	
Q. 12C	How willing would you be to accept cuts in your standard of living in order to protect the environment?	
Q. 13B	I do what is right for the environment, even when it costs me money or takes more time.	
Uni-factor cognitive component		
Q. 9C	Modern science will solve our environmental problems with little change to our way of life	R
Q. 10A	We worry too much about the future of the environment and not enough about the prices and jobs	R
Q. 10C	People worry too much about the human progress harming the environment	R
Q. 11A	In order to protect the environment the country needs economic growth	R
Q. 13A	It is just too difficult for someone like me to do much about the environment	R
Bi-factor cognitive component		
Q. 14A	In general, do you think that air pollution caused by cars is…	
Q. 14B	In general, do you think that air pollution caused by industry is…	
Q. 14C	And do you think pesticides and chemicals used in farming are…	
Q. 14D	And do you think that pollution of COUNTRY'S rivers, lakes and streams is…	
Q. 15E	In general, do you think that a rise in the world's temperature caused by climate change is…	

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Appendix B

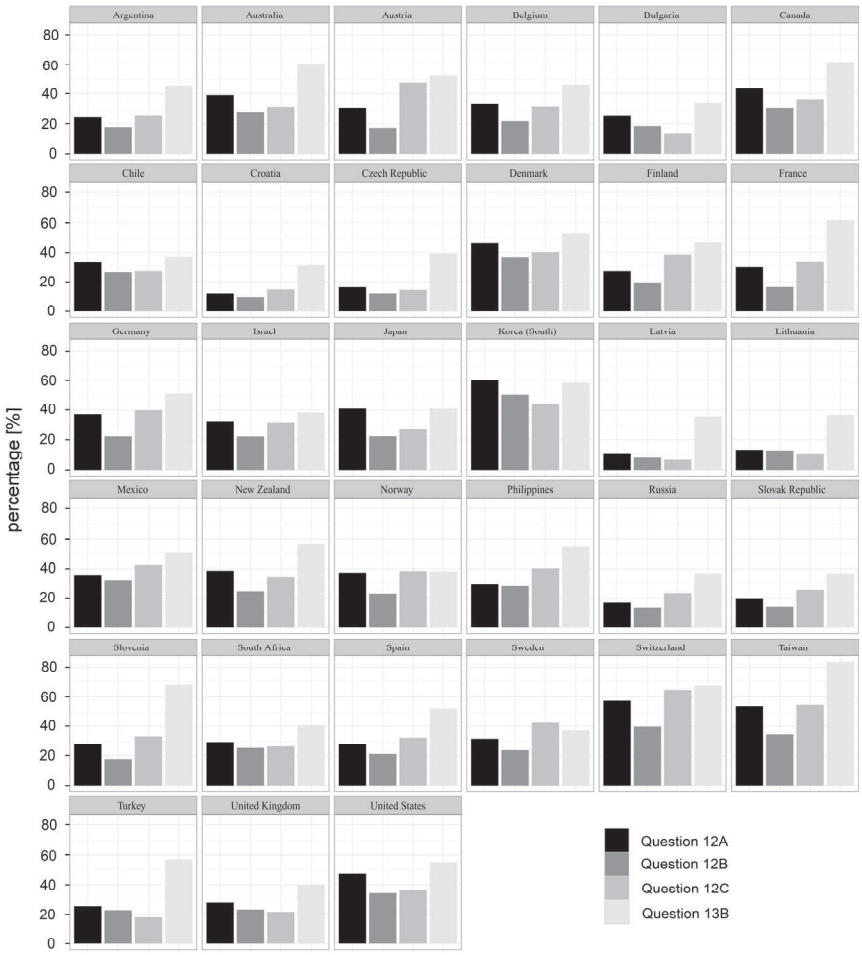

Fig. B.1. Percentage of people willing and very willing to sacrifice financially in the items comprising the conative component of EC in both measures

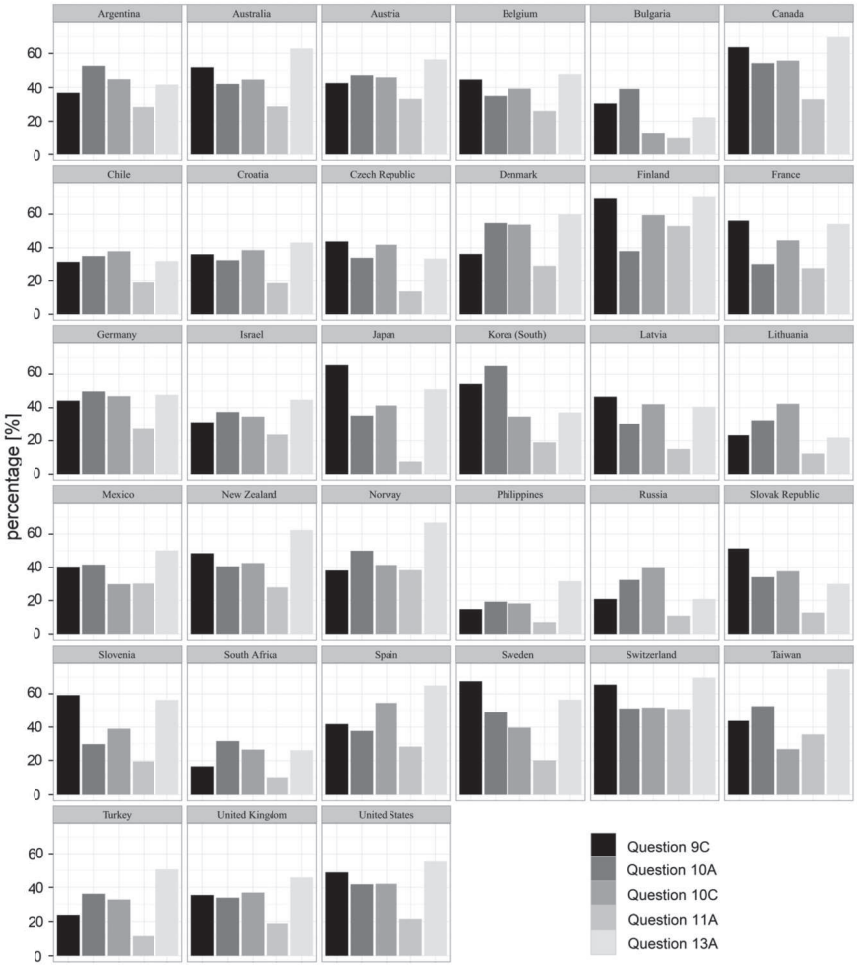

Fig. B.2. Percentage of disagreeing and strongly disagreeing responses to items comprising the cognitive component in the uni-factor EC measure

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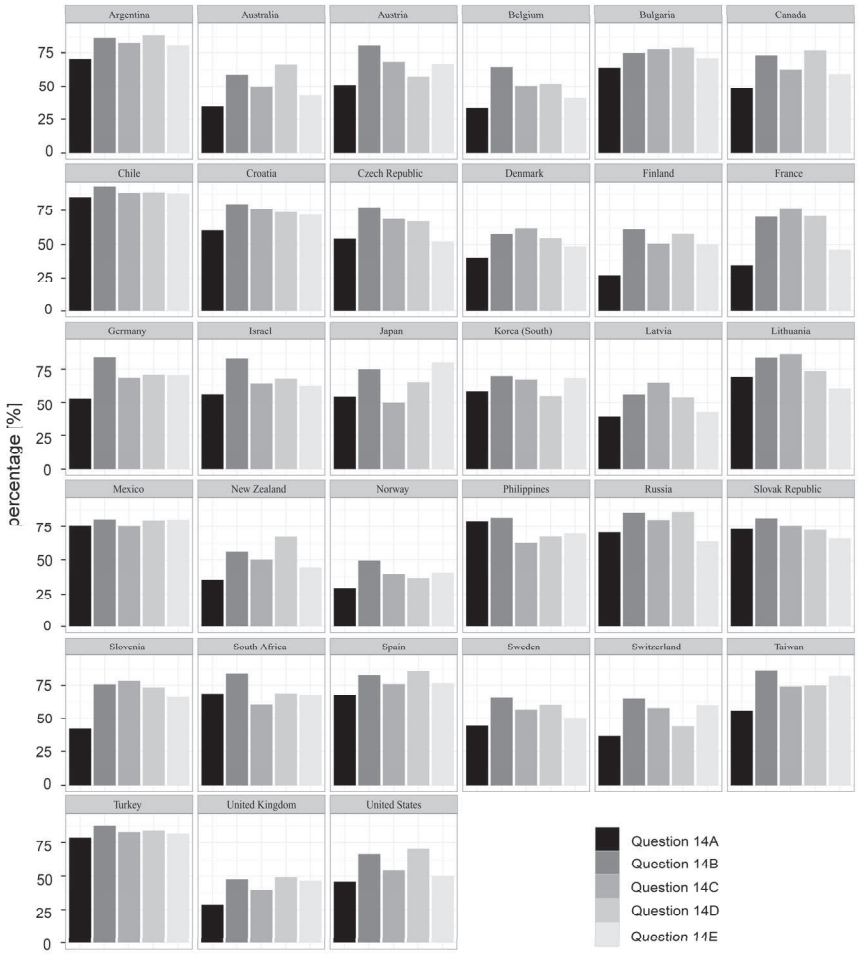

Fig. B.3. Percentage of agreement and strong agreement to the items comprising the cognitive factor in the bi-factor EC measure