Education, knowledge and biodiversity behaviour in the European Union

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Introduction

There is an increasing amount of research on biodiversity issues in the European Union (EU), some of which has explored citizens' behaviour and its potential determinants. Many of these studies have analysed the impact of education, knowledge and access to information on biodiversity attitudes and behaviour and found strong relationships in these countries, just as other researchers have determined them as significant factors in other parts of the world. As the public is and should be a key participant in biodiversity conservation decision-making, it should also benefit from an increased access to relevant information on biodiversity issues.

The study analyses the impact that education and knowledge (amongst other *a priori* determinants) have on the stated biodiversity behaviour of citizens from 27 European Union members.

Methods

The data used in this study were extracted from Flash Eurobarometer 290 (European Commission, 2010). We selected datasets for 27 EU countries (average sample size of 1,005 observations) and the variables included in the analysis were:

- socio-demographic variables: gender, age, education, place of living (rural or urban);
- biodiversity knowledge and information:
  - Stated knowledge of the implications of biodiversity loss ('*biodiversity knowledge*');
  - Perceived level of information as regards loss of biodiversity ('*information*');
  - Stated knowledge of the Natura 2000 network ('*Natura knowledge*').
- Biodiversity loss perceptions:
  - Perceived impact of biodiversity loss ('*perceived impact*');
  - Perceived importance of halting biodiversity loss ('*perceived importance*').
- Stated efforts to protect biodiversity ('*biodiversity behaviour*').

We use structural equation models (SEM) to test the influence of *a priori* identified determinants on biodiversity behaviour in each of the 27 countries. SEM is a statistical technique used to test and estimate causal relationships amongst variables. The models are estimated with the normal-theory maximum likelihood (MLE) method using the statistical package Lisrel 8.80 (Jöreskog and Sörbom, 2007).

Results

The conceptual model is presented in Figure 1.

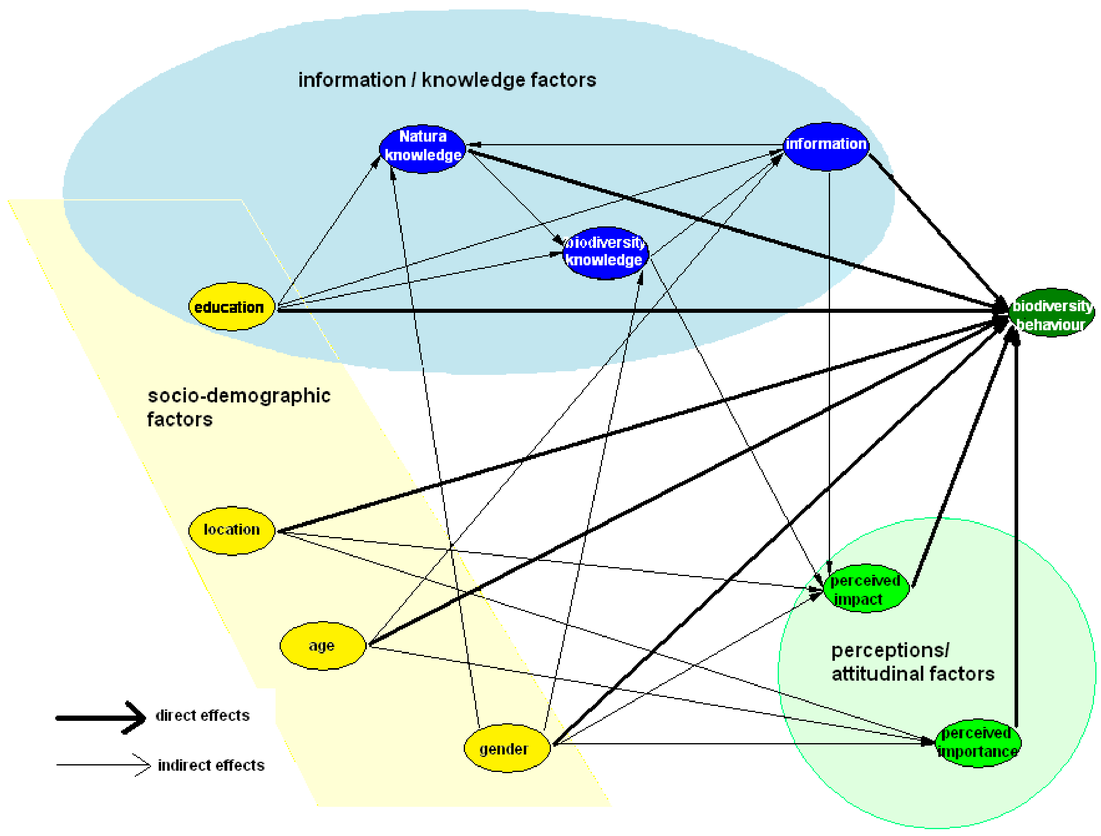

Figure 1. Conceptual diagram

All (27) models have excellent fit according to the measures of absolute, incremental and parsimonious fit (Hair et al., 2006).

The variance explained in the models varies from 17 to 42 per cent (Table 1).

In terms of individual effects, biodiversity information, knowledge and perceived impact of biodiversity loss have the strongest effects on biodiversity behaviour in most models. Perceived importance of halting biodiversity loss, age and education have strong effects in most models, while gender and location show lower or not significant effects in most models, varying widely between models (Table 1).

	Total effects on biodiversity behaviour									
Country	Gender	Age	Education	Location	Knowledge	Information	Natura	Impact	Importance	R-square
Austria	0.17**	0.18**	0.10**	0.19**	0.08**	0.19**	0.29**	0.33**	0.16*	0.33
Belgium	0.12*	0.01*	0.04**	0.05**	0.27**	0.28**	0.08**	0.26**		0.23
Bulgaria	0.06**	0.08*	0.22**	-0.12**	0.06**	0.31**	0.17**	0.24**	0.08**	0.17
Cyprus	0.13**	0.33**	0.13**	0.02*	0.18**	0.38**	0.03*	0.06**	0.20**	0.24
Czech Republic	0.16**	0.23**	0.36**	0.15*	0.16**	0.29**	0.36**	0.14**	0.26**	0.37
Denmark	0.23**	0.21**	0.06**	0.06**	0.10**	0.16**	0.16**	0.16**	0.18**	0.20
Estonia	0.18**	0.15**	0.12*	0.32**	0.07**	0.25**	0.16**	0.17**	0.11*	0.23
Finland	0.16**	0.07**	0.08*	0.10*	0.18**	0.30**	0.12*	0.36**	0.28**	0.32
France	0.14**	0.28**	0.10**	0.10*	0.08**	0.21**	0.18**	0.16**		0.18
Germany	0.01	0.19**	0.06**	0.10*	0.20**	0.22**	0.14**	0.05*	0.16**	0.19
Greece	0.08**	0.27**	0.21**	0.04	0.10**	0.21**	0.07*	0.26**	0.17*	0.19
Hungary	-0.06*	0.11**	0.14**	-0.01*	0.1**	0.28**	0.25**	0.22**	0.14*	0.20
Ireland		0.10*	0.03*	0.08*	0.04*	0.03*	0.06*	0.10**	0.24**	0.18
Italy		0.11*	0.05*	0.07*	0.09**	0.28**	0.10**	0.34**	0.22**	0.23
Latvia	0.19**	0.06**	0.04**	0.01	0.13**	0.48**	0.05**	0.21**	0.09**	0.21
Lithuania	0.13*	0.03**	0.08**	-0.19*	0.02*	0.23**	0.44**	0.02*	0.08*	0.21
Luxemburg	0.11**	0.12**	0.03*	-0.04**	0.14**	0.12**	0.32**	0.37**	0.20**	0.29
Malta	0.07*	0.06**	0.06*	0.02*	0.25**	0.18**	0.18**	0.31**	0.14**	0.23
Netherlands	0.17**	0.22**	0.07**	0.23**	0.23**	0.16**	0.12*	0.29**	0.22**	0.32
Poland	0.02	0.2**	0.39**	0.08	0.19**	0.28**	0.14*	0.18**	0.19*	0.23
Portugal	0.12**	0.05**	0.23**	0.11**	0.36**	0.16**	0.18**	0.33**	0.18**	0.32
Romania	-0.01	0.05**	0.15**	0.12*	0.06**	0.22**	0.31**	0.24**	0.18**	0.20
Slovakia	0.03	0.22**	0.35**	-0.05	0.16**	0.39**	0.17**	0.36**	0.13*	0.36
Slovenia	0.19**	0.17**	0.11**	0.19**	0.09**	0.19**	0.3**	0.4**	0.18**	0.39
Spain	0.28**	0.19**	0.07**	0.10*	0.09**	0.22**	0.04**	0.31**	0.15**	0.28
Sweden	0.01	0.21**	0.07**	0.02*	0.13**	0.19**	0.06*	0.29**	0.18**	0.19
United Kingdom	0.14**	0.15**	0.17**	0.02	0.13**	0.31**	0.85**	0.33**	0.28**	0.42

Table 1. Standardised total effects (5% significance level ; ** 1% significance level)*

Conclusions

Results show that, alongside other determinants, knowledge will significantly impact biodiversity behaviour in each of the countries studied, emphasizing once again the importance of information to enhance the biodiversity knowledge of the public.

This might suggest the need for the European Union to invest more in enhancing the biodiversity information available to the public and improving access to it through measures such as biodiversity education campaigns. In recent years the amount of information on biodiversity issues available to public has increased considerably, however there is a need for ample, clear, sufficiently strong, and consistent signals. Policy-makers should ensure an efficient knowledge transfer to the public and subsequently facilitate their informed response.

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