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What are the determinants of environmentally significant behavior in the Czech Republic?

A secondary analysis of two ISSP datasets

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Abstract

The main objective of this paper is to test models of environmentally significant behavior on two ISSP datasets from 1993 and 2000 surveys. The pooled dataset contains information on intention of non-activist behavior in the public sphere (willingness to pay higher prices and taxes, and willingness to accept lower living standard for environmental cause), on actual non-activist behavior in the public sphere (petitioning and money-donating), on environmental activism (joining of environmental group and protesting), and on private-sphere environmentalism (sorting of waste, cut-backs on car-use).

Apart from socio-demographic and economic variables, we look particularly at the effect of environmental concern, perceived environmental efficiency, environmental knowledge, and proenvironmental attitudes (as measured on quasi-nep scale). To model the binary and ordinal dependent variables, we use binary logit and ordinal logit models.

The results of the present study suggest that different types of environmental behavior do not form an undifferentiated mass of behavior and warrant caution when putting together different examples and types of environmentally significant behavior and making bold generalizations concerning their derminants.

1. Introduction

In early 1970s, the term environmental behavior (Arbuthnot and Lingg, 1975; Kinnear, Tailor and Ahmed, 1974; Rickson, 1972) emerged in empirical studies. The motivation of social scientists to conduct this kind of research has been not only progress of scientific knowledge but also providing policy and marketing relevant knowledge. For example Arbuthnot and Lingg (1975) suggested that environmental psychologist should study public's response to the environmental crises in order to more effectively design ameliorative programs and policies. Another motivation has been to formulate implications for private sector, especially for marketing (for example Kinnear, Tailor and Ahmed, 1974). This demand for information about determinants of environmentally significant behavior influenced, among other, the concept of environmentally significant behavior. Also the interplay of environmental movement and social science has acted part.

Although there seem to be both theoretical and practical interest in knowing the determinants of environmentally significant behavior, there is considerable confusion as to what constitutes this behavior and how to define it conceptually. Moreover, different terms such as green behavior (Autio et al. 2004, D'Souza et al. 2007, Chan 2001, Schlegelmilch et al. 1996), pro-environmental or pro-ecological behavior (Ellen 1994, Grob 1995, Harland et al. 2007, Allen et al. 1999, Berenguer 2007, Darnton et al. 2006, Norlund et al. 2002, Harland et al. 1999, Milfont et al. 2006, Oreg et al. 2006, Von Borgstede and Biel, 2002), environmentally significant behavior (Stern 2000, Gatersleben et al. 2002, Wall, Devine-Wright and Mill, 2007), environmentally conscious behavior (Ando et al. 2007, Ellen et al. 1991), environmentally friendly behavior (Allen, & Ferrand, 1999, Thøgersen et al. 2006), environmentally responsible behavior (Allen, & Ferrand, 1999, Kaplan 2000, Boccalletti 2006, De Young, 2000), environmentally relevant behavior (Bamberg and Schmidt, 2003, Harland et al., 1999), ecological behavior (Kaiser, 1998, 1999), or simply environmental behavior (Poortiga et al. 2004, Diekmann et al. 1998, 2003, Staats et al. 2004) are used, often in similar meanings.

An important step forward has been made by Stern (2000) who proposed the concept of environmentally significant behavior (ESB). Environmentally significant behavior can be defined in two ways. Either it can be defined by its impact: "the extent to which it changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere" (Stern 2000: 408), or it can be defined from the actor's standpoint as a behavior that is undertaken with the intention to change the environment (Stern 2000: 408).

Based on factor analysis, Stern (2000) has distinguished 3 types of environmentally significant behavior:

1) Environmental activism that includes active participation in environmental movements

2) Non-activist behaviors in the public sphere that includes two sub-groups of behavior:
    a. Active citizenship – i.e. petitioning and joining environmental organizations
    b. Passive citizenship – i.e. support for public policies, or their acceptance

3) Private-sphere environmentalism (i.e. purchase and use of products that have environmental impacts). This category of behavior can be, based on previous empirical evidence, further divided into several sub-categories:

a. Purchase of major goods and services with strong environmental impact
b. Use and maintenance of such goods
c. Green consumerism that is defined by pro-environmental purchase practices
d. Waste disposal

Relatively little is known about determinants of environmentally significant behavior in the Czech Republic, in spite of the fact that there are freely available data from two ISSP surveys (1993, 2000) that contain information on ESB. Several empirical studies exploited these data (see Jandová, 2001; Řeháková, 2001; Soukup, 2001i, 2001ii; Soukup and Jandová, 2001). However, only study by Soukup (2001i) sought to model proenvironmental behavior (as an aggregated index).

The present study is novel in that it looks at determinants of different types of environmentally significant behavior as classified by Stern (2000). The paper proceeds as follows. First, we introduce our methodology, including description of dependent and independent variables. Then we describe briefly the data sets. Next we present results of model estimation. Finally, we present some conclusions.

2. Method

Dependent variables

The present study exploit data from two ISSP surveys conducted in 1993 and 2000 (for description of the surveys see the next section). Pooled data set contained information on various behavioral intentions related to environmentally significant behavior and about particular examples of environmentally significant behavior. These behaviors and intentions were measured either as binary, or as ordinal variables (for verbatim of questions, their description, statistics, and measures see the appendix 2, 3 and 4).

Based on Stern's classification of ESB, we could discern following intentions to non-activist behavior in the public sphere:

- *prices* (ordinal)
- *taxes* (ordinal)
- *living* (ordinal)

Further, the dataset contains variables measuring actual non-activist behavior in the public sphere:

- *petition* (binary)
- *money* (binary)

The pooled dataset contained also information on private sphere environmentalism:

- *sorting* (ordinal)
- *car* (ordinal)

The pooled data contained also information on environmental activism:

- *group* (binary)
- *protest* (binary)

Independent variables

As the explanatory variables (for full description and descriptive statistics see the appendix 5) we used sociodemographic variables (*age, male, highschool, college*) and an economic variable (*incstd*) describing respondents.

We also used several "environmental variables", namely:

- *envcncr* (mean score) – environmental concern
- *evknowledge* (summed score) – environmental knowledge (we followed Witherspoon (1994) in how we calculated the score)
- *nep* (mean score) – quasi-nep scale, i.e. proenvironmental attitudes as measured on modified New-environmental-paradigm scale[1]
- *efficiency* (dummy) – one's belief that s/he can do much about the environment

Models

In order to test the effects of the variables on behavioral intentions and environmentally significant behaviors, we employ binary logit model for binary dependent variables (*group, petition, money, protest*) and proportional odds model with logit link for ordinal dependent variables (*prices, taxes, living, sorting, car*).

In binary logistic regression, the dependent variable takes on two values 0 (for not-performing a behavior), and 1 (for performing that behavior). The logit of probability of performing a behavior is then linear combination of explanatory variables,

$$\text{logit}\,[\,P(Y=1)\,] = \alpha + \beta X \qquad (1)$$

where X is vector of explanatory variables, α is a constant, and β is a vector of estimated coefficients. Further, we use ML method to estimate the models.

In proportional odds model, we seek to explain multinomial variable with ordered values. The logit of probability that Y belongs to outcome category j or lower is equal to linear combination of explanatory variables,

$$\text{logit}\,[\,P(\,Y \le j \mid x\,)\,] = \alpha_j - \beta X \qquad (2)$$

[1] Unfortunately, the pooled data do contain nor the full 12-item NEP scale as used e.g. by Dunlap and Van Liere (1978), neither the revised version of 15-item NEP scale (see e.g. Dunlap et al. 2000). For that reason, we were used reduced form of the NEP scale (for verbatim of questions see appendix) and we follow Soukup (2001i) in that we call it quasi-NEP scale.

where α_j is a constant specific for each outcome category, X is vector of explanatory variables, and β is a vector of estimated coefficients.[2]

Models were estimated in statistical environment R (R Development Core Team 2008), using procedures *glm* from *stats* package and *polr* from *MASS* package (see Thompson 2008 for details). Maximum-likelihood method has been used to estimate the models. Results are reported in the following section.

3. Data collection

The two ISSP surveys were conducted on population of the Czech Republic aged 18 years and older in 1993 (ISSP 1993) and in 2000 (ISSP 2000). In both surveys, three-stage stratified random sampling has been used to select the sample. However, the stages were different between the surveys. In 1993, localities were selected first, then electoral sectors, and then respondents were randomly selected from electoral lists. For age cohort aged 18 to 19, not included in the electoral list, the quota sampling has been used to select them at the electoral sectors level. In 2000, three stages consisted of random selection of electoral sectors, households in the electoral sectors, and household members within households (using Kish's tables). Response rate was 72% in 1993 and 55.6% in 2000. Because of the low response rate of the ISSP survey 2000, the sample was not completely representative of the Czech population. There were differences in representativeness in terms of sex, education and age.

Both ISSP modules included an environmental knowledge scale, attitudinal and behavioral measures, and socio-demographic characteristics. Unfortunately, in 2000, some questions were left out from questionnaire and new questions were added. Also the wording of some questions was slightly changed in 2000 (money donating, cut-backs on car-use). If the changes in wording were essential, the variable has been left out from analyzed data (for example years of education). Some variables had to be recorded because of different number of categories of answers (level of education). The block of Czech-specific questions concerning attitudes regarding local politics was added at the end of the ISSP module in 1993. Instead of this block, questions concerning attitudes regarding politics in general and confidence in institutions were included in 2000. Therefore these blocks were incomparable and have been left out from pooled data.

4. Results

When we look at the correlation matrix (see the appendix 6) of different types of ES behavior and intention, we see that certain behaviors and intentions are associated more closely than others. First of all, intentions of non-activist behavior in the public sphere (*prices, taxes, living*) are highly correlated. However, the question still remains whether they are correlated

[2] Notice the minus sign in this form of parametrization of proportional odds model, which is different from parametrization used in most statistical software (including SAS, but not SPSS). Parametrization that we use leads to β estimates with usual interpretation: the higher is β, the higher proportion of higher values of Y (see Agresti, 2002: 278-279).

because they are all intentions or because they are related to the same type of environmentally significant behavior. The later explanation seems to be more plausible, since we can also witness, that these intentions (*prices, taxes, living*) are correlated with non-activist behavior in the public sphere (*petition, money*), although this correlation is far weaker (not least because of difference in number of value levels.

Further, it is apparent from the correlation matrix, that the two examples of private-sphere environmentalism (*sorting, car*) do not really form a distinct type since they are not inter-correlated. Further, these two types of ESB are correlated with intention of non-activist behavior in the public sphere (*prices, taxes, living*) and partly also with non-activist behavior in the public sphere (*petition, money*). What is interesting is that sorting of waste (*sorting*) is negatively and significantly associated with protesting (*protest*), albeit weakly. This is very interesting results indeed, and would deserves further analysis.

Lastly, we also reveal that the two particular types of environmental activism, that is membership in an environmental group (*group*) and protesting for some environmental cause (*protest*) are not inter-correlated. Importantly, both of these behaviors are correlated with intention of non-activist behavior in the public sphere (*prices, taxes, living*) and with non-activist behavior in the public sphere (*petition, money*). This goes against the typology proposed by Stern (2000) where environmental activism forms a distinct type different from non-activist behavior in public sphere.

To sum up, we may say that different ES behaviors and intentions seem to cluster, albeit in a different way that Stern (2000) would suggest. Generally speaking, behavioral intentions of non-activist behavior in public sphere seem to be associated with most types of ES behaviors. As to the internal consistency of types of ES behavior, only non-activist behavior in the public sphere seems to be coherent. The other two types of ES behavior, private sphere environmentalism and environmental activism seem not to form distinct types.

Now if we look at the estimation of models of ES behavior and intentions (see appendix 7), we realize that the picture we get from our results is far from being neat and clear both in regard to different types of behaviors and intentions and in regard to effects of explanatory variables. But what is apparent at the first sight is that ES behavior is not a mass of coherent behavior influenced by the same covariates.

In terms of power of the models, all of the models performed significantly better that intercept-only model. Indeed, the models performed decently well in terms of McFadden pseudo R2, with some differences between the models.

Let us look at the estimates of ordinal logit models for intention of non-activist behavior in public sphere (*prices, taxes, living*). There seem to be some consistency across these intentions in that people with higher incomes and with higher level of education have, *ceteris paribus*, higher willingness to financial sacrifices, while older people have lower willingness. Also males seem to have lower willingness to sacrifices, but this effect is insignificant with exception of living standard. Effect of fixed effects for time (*year2000*) is negative, meaning that people were mostly less willing to pay much higher prices and taxes or lower their living standard in 2000 than they were in 1993 (statistically not significantly in the case of *living*).

Now let us look at the environmental explanatory variables, environmental concern (*evcncr*), quasi-nep scale (*nep*), environmental knowledge (*evknowledge*), and perceived environmental efficiency (*efficiency*).

Environmental concern has positive and significant effect on willingness to pay higher prices and on willingness to accept lower living standard, but no significant effect on willingness to pay higher taxes. Quasi-nep has positive effect on the three intentions, but only significant in case of *taxes* and *living*.[3] Environmental knowledge seems to have no significant effect on the three intentions of non-activist behavior in public sphere. On the other hand, what appears to have strong positive effect on the intentions is perceived environmental efficiency.

Now if we move from intention to actual non-activist behavior in public sphere (*petition, money*), we see that many effects that we could observe in the case of intention are present also when it comes to behavior, more so in the case of petitioning than money donating.

Again, we see negative effect of age and positive effect of education and environmental concern on donating and petitioning. Perceived environmental efficiency has positive effect that is, however, significant only in the case of money donating. Other variables in the model explaining petitioning and money donating have no significant effect. Importantly, we do not see any significant effect of fixed effects for time, suggesting that probability of petitioning and money donating was not different between 1993 and 2000 when controlling for other variables.

Now we can proceed to models of environmental activism (*group, protest*). In fact, we realize that the two models estimated are quite different. Older people and males have higher probability of joining environmental group. On the other hand, older people have lower probability of protesting. Effect of gender on protesting is insignificant. Education has positive but weak effect on protesting, while it has no significant effect on membership in an environmental group. Further, perceived environmental efficiency has positive effect on joining environmental group, while it has no significant effect on protesting. Interestingly, neither quasi-nep nor environmental knowledge has any significant effect on protesting, or membership in an environmental group. In addition, fixed effects for time were not significant in either case, suggesting that, everything else equal, probability of taking part in a protest or demonstration or joining an environmental group were similar in 2000 and in 1993.

Finally, let us look at two examples of private sphere environmentalism, waste sorting (*sorting*) and cutting back on driving a car for environmental reasons (*car*). Even here we can see quite different patterns of influences that somewhat blur the picture that we get.

Effect of income seems to be negative both for sorting and cutting back on car use, but significant only in the case of *car*. We could probably find many explanations for this pattern, one of them being higher value of leisure time for people with higher incomes. Effect of age is mixed: negative for car-use cut-backs and positive for waste sorting. Also effect of gender seems to be mixed: males do significantly more often cut back on car use, while females do more often (yet statistically insignificantly) sort waste. Environmental efficiency has significant positive effect both on waste sorting and on car-use cut-backs. Effect of other

[3] In fact, this is the only case when quasi-nep has some effect on intention and/or behavior in the models that we have estimated.

variables, including quasi-nep scale, environmental concerns, and environmental knowledge is insignificant. In addition, we see that fixed effect of time is positive and significant, suggesting that people were, everything else equal, actually more willing to sort waste and cut back on car use for environmental reasons in 2000 than in 1993.

5. Conclusions

This paper has demonstrated that there are significant differences between environmentally significant behaviors, and that these are far from forming and undifferentiated mass of behavior.

Controlling for other characteristics, our study shows that people were more prone to perform behaviors denoted as private-sphere environmentalism (waste sorting, cut-backs on car-use) in 2000 than in 1993. However, the situation was different when it came to intention of non-activist behavior in public sphere (paying of higher prices and taxes for environmental reasons): people expressed higher willingness to perform these activities in 1993 than in 2000. Nonetheless, there were no differences between 1993 and 2000 in terms of actual non-activist behavior in public sphere when we controlled for other variables. One may therefore hypothesize that higher intentions indicated in 1993 did not actually turn into practice.

Effects of the most of socio-demographic variables on ESB seem to be mixed, with the exception of education which is always positive (but not always significant). As to the environmental variables (environmental concern, quasi-nep, environmental knowledge, and environmental efficiency), their effect on ESB seems to be consistent across all behaviors and intentions in terms of direction, but is not always significant. Environmental concern and environmental efficiency have positive and mostly significant effect on ESB. Quasi-nep (pro-environmental attitudes) has positive effect only on intention to non-activist behavior in public sphere (willingness to pay higher taxes and willingness to lower living standard for environmental cause); in all other cases its effect is insignificant. Environmental knowledge appears to have no significant effect on any type of ESB, or on intention of ESB.

As to the types of environmentally significant behavior, our study has revealed that non-activist behavior in the public sphere (petitioning, money donating) and its intention (willingness to pay higher prices and taxes, and willingness to lower living standard) form a relatively coherent type.

On the other hand, private sphere environmentalism (sorting of waste, cut-backs on car-use) and environmental activism (joining of environmental group, protesting) do not really form internally coherent types, neither in terms of correlation nor in what covariates have effect on them. However, further analysis would be needed to shed light on this interesting phenomenon. In any case, our results warrant caution when putting together different examples and types of environmentally significant behavior and making bold generalizations concerning their determinants.

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Appendix 1: Verbatim of questions (environmental explanatory variables)

NEP (*nep*)
[Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree]
We believe too often in science, and not enough in feelings and faith.
Overall, modern science does more harm than good.
Any change humans cause in nature - no matter how scientific - is likely to make things worse.
Economic growth always harms the environment.

Environmental knowledge (*evknowledge*)
[definitely true - probably true - probably not true - definitely not true]
Antibiotics can kill bacteria, but not viruses.
Human beings developed from earlier species of animals.
All man-made chemicals can cause cancer if you eat enough of them.
If someone is exposed to any amount of radioactivity, they are certain to die as a result.
The greenhouse effect is caused by a hole in the earth's atmosphere.
Every time we use coal or oil or gas, we contribute to the greenhouse effect.

Environmental Concern (*evcncr*)
[extremely dangerous, somewhat dangerous, not very dangerous, not dangerous at all]
In general, do you think that air pollution caused by cars is, for the environment...
In general, do you think that air pollution cased by industry is, for the environment ...
In general, do you think that pesticides and chemicals used in farming are, for the environment...
In general, do you think that pollution of rivers and lakes and streams in the Czech Republic is, for the environment...

Environmental efficiency (*efficiency*)
[strongly agree, agree, neither agree nor disagree, disagree, strongly disagree]
It is just too difficult for someone like me to do much about the environment.

Appendix 2: Verbatim of questions (environmentally significant behavior and behavioral intention)

prices (behavioral intention: non-activist behavior in the public sphere)
[very willing - fairly willing - neither willing nor unwilling - fairly unwilling - very unwilling]
How willing would you be to pay much higher prices in order to protect the environment?

taxes (behavioral intention: non-activist behavior in the public sphere)
[very willing - fairly willing - neither willing nor unwilling - fairly unwilling - very unwilling]
How willing would you be to pay much higher taxes in order to protect the environment?

living (behavioral intention: non-activist behavior in the public sphere)
[very willing - fairly willing - neither willing nor unwilling - fairly unwilling - very unwilling]
How willing would you be to accept cuts in your standard of living in order to protect the environment?

sorting (behavior: private-sphere environmentalism)
[always - often - sometimes - never]
How often do you make special effort to sort glass or metal or plastic or paper and so on for recycling?

car (behavior: private-sphere environmentalism)
[always - often - sometimes - never]
How often do you cut back on driving a car for environmental reasons?

group (behavior: environmental activism)
[yes - no]
Are you member of any group whose main aim is to preserve or protect the environment?

petition (behavior: non-activist behavior in the public sphere)
[yes - no]
In the last five years, have you signed a petition about an environmental issue?

money (behavior: non-activist behavior in the public sphere)
[yes - no]
In the last five years, have you given money to an environmental group?

protest (behavior: environmental activism)
[yes - no]
In the last five years, have you taken part in a protest or demonstration about an environmental issue?

Appendix 3: Description of dependent variables (binary outcomes)

	group		*petition*		*money*		*protest*	
	abs. freq.	**(%)**	**abs. freq.**	**(%)**	**abs. freq.**	**(%)**	**abs. freq.**	**(%)**
0 = „no“	2182	(97.0)	1924	(85.5)	2077	(92.4)	2157	(95.9)
1 = „yes“	67	(3.0)	325	(14.5)	172	(7.6)	92	(4.1)
Total	2249	(100)	2249	(100)	2249	(100)	2249	(100)

Appendix 4: Description of dependent variables (ordinal outcomes)

	prices		*taxes*		*living*		*sorting*		*car*	
	abs. freq.	**(%)**	**abs. freq.**	**(%)**	**abs. freq.**	**(%)**	**abs. freq.**	**(%)**	**abs. freq.**	**(%)**
5= „very willing“ / „always“	84	(3.9)	45	(2.1)	61	(2.8)	467	(21.0)	53	(2.4)
4	542	(25.2)	319	(15.0)	378	(17.5)	481	(21.6)	185	(8.3)
3	559	(26.0)	456	(21.4)	449	(20.8)	520	(23.3)	539	(24.2)
2	606	(28.2)	762	(35.7)	670	(31.1)	184	(8.3)	633	(28.5)
1 = „very unwilling“ / “never“	360	(16.7)	551	(25.8)	598	(27.7)	575	(25.8)	814	(36.6)
Total	2151	100	2133	100	2156	100	2227	100	2224	100

Appendix 5: Description of independent variables

Variable	Type	Description	Mean	S.d.
year2000	dummy	fixed effects for time; 1=year 2000	0.55	0.5
incstd	continuous	per capita income of the household [thousand CZK_{2000}][4]	7.18	8.44
age	continuous	age of a respondent	45.81	16.73
male	dummy	gender; 1=male	0.44	0.5
highschool	dummy	education; 1=high school degree	0.5	0.5
college	dummy	education; 1=university degree	0.09	0.29
envcncr	continuous $\in\langle 1;5\rangle$	average score of environmental concern; 5=strongest env. concern	2.09	0.55
nep	continuous $\in\langle 1;5\rangle$	average score on the nep scale; 5=strongest proenvironmental attitudes	3.1	0.78
evknowledge	continuous $\in\langle -12;12\rangle$	summed score of environmental knowledge; 12=highest knowledge	2.23	2.25
efficiency	dummy	perceived environmental efficiency; 1=s/he thinks that it is not difficult for him/her to do something about the environment	0.5	0.5

Appendix 6: Correlation matrix (Spearman's rho)

	prices	taxes	living	sorting	car	group	petition	money	protest
prices	1.000								
taxes	0.613 ***	1.000							
living	0.483 ***	0.549 ***	1.000						
sorting	0.067 **	0.024	0.030	1.000					
car	0.113 ***	0.078 ***	0.089 ***	0.150	1.000				
group	0.037 •	0.002 **	0.033	0.038 •	0.044 *	1.000			
petition	0.105	0.103 ***	0.101 ***	0.019 *	0.050 *	0.054 *	1.000		
money	0.034 *	0.053 *	0.067 **	0.085 •	0.084 ***	0.156	0.205 ***	1.000	
protest	0.032 *	0.043 *	0.053 *	-0.029 *	0.029	0.083 •	0.266 ***	0.118 ***	1.000

Note: ***sig.<0.001; **sig.<0.01; *sig.<0.05; • sig.<0.1.

[4] To translate nominal 1993 incomes into real incomes of 2000, we used deflation factor of 2.058 (nominal GDP per capita has been used as deflator).

Appendix 7: Models of environmentally significant behavior (binary logit and ordinal logit)

	Binary logit								Ordinal logit									
	money		**protest**		**group**		**petition**		**prices**		**taxes**		**living**		**sorting**		**car**	
(Intercept)	-1.518	*	0.721		-3.813	***	0.118											
year2000	0.166		-0.773		0.361		-0.259		-0.240	•	-0.383	**	-0.055		1.464	***	0.703	***
incstd	0.012		-0.007		-0.030		0.009		0.015	•	0.020	*	0.002		-0.008		-0.016	*
age	-0.003		-0.024	**	0.022	*	-0.016	**	-0.006	*	-0.008	*	-0.009	**	0.014	***	-0.010	***
male	0.209		0.268		0.812	**	0.126		-0.014		-0.021		-0.231	*	-0.070		0.570	***
highschool	0.218		0.360		-0.023		0.713	***	0.288	**	0.417	***	0.407	***	0.060		0.235	*
college	1.011	**	0.906	*	0.024		0.700	*	0.944	***	1.136	***	0.923	***	0.409	*	0.748	***
envcncr	0.645	**	0.918	**	0.234		0.527	***	-0.288	***	-0.417		-0.407	***	-0.060		-0.235	
nep	-0.010		0.301		0.027		0.164		-0.944		-1.136	*	-0.923	*	-0.409		-0.748	
evknowledge	0.034		-0.100		0.026		-0.009		0.023		-0.011		-0.031		0.017		0.013	
efficiency	0.493	*	-0.001		1.016	**	0.240		-0.042	***	-0.136	***	-0.140	***	-0.057	***	0.082	•
1|2									-2.197	***	-2.784	***	-1.999	***	-2.498	***	-4.122	***
2|3									0.156		-0.707	*	0.269		-1.330	***	-2.476	***
3|4									1.377	***	0.546	•	1.354	***	-0.303		-0.925	**
4|5									2.849	***	2.177	***	2.800	***	0.131		0.371	
nobs	1523		1523		1523		1523		1470		1456		1475		1521		1519	
log likelihood	-377		-250		-217		-591		-2123		-2016		-2082		-2213		-2017	
McFadden R2	0.380		0.349		0.279		0.363		0.333		0.331		0.335		0.360		0.335	
AIC	775		522		457		1205		4274		4060		4192		4455		4063	

Note: ***sig.<0.001; **sig.<0.01; *sig.<0.05; • sig.<0.1.

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