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Comparing environmental awareness of Hungarian students in secondary schools with different socio-economical background

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Abstract

The importance of education for sustainable development and environmental sustainability (ESD) was acknowledged decades ago. Many studies investigated students' environmental awareness, but the majority are simple descriptive ones. Only few studies try to investigate efficiency of ESD in schools and the causal background that shapes students' environmental awareness. By means of questionnaires, environmental awareness of 845 students and their socio-economical background was measured in 13 Hungarian secondary schools. A pragmatic analysis was performed in order to explore which are the main factors, either student's background or school's background related factors, responsible for the huge variation observed in the environmental awareness of students. Different aspects of environmental awareness were investigated, such as self-declared behaviours (consumer habits, healthy food habits, thrifty habits, waste management) and environmental attitudes. In a preliminary study, teachers were also asked in detail on environmental education principles and the related infrastructural background in the schools. We found that aspects of environmental awareness are strongly determined by the students' socio-economic background. Elaborated further analyses of schools' environmental education principles (including eco-school title and practice) are needed to ascertain the effect of ESD on students' attitudes and behaviours.

Keywords: education for sustainability; socio-economical background; eco-schools;

1. Introduction

The concept of sustainability, education for sustainable development and environmental sustainability (ESD) gained attention mainly during the early '90s, after the Brundtland Report of the World Commission in 1987 ("Our Common Future") and the Earth Summit UN conference at Rio de Janeiro in 1992. ESD could be a unique tool to generate transition in human societies in order to be able to protect the environmental equilibrium of our planet or at least to slow down the negative impacts it is suffering due to present-day consumer habits and the intensification of industrial and agricultural production. Accordingly, ESD has been anchored in various forms in trainings and different levels of education (Ware, 1999; Neal & Palmer, 2003; Dillon, 2014). Nevertheless, the overall social attitude that would effectively enable the reduction of environmental burdens is very slowly changing, even in the case of simplest, everyday-to-life

solutions (Wals et al., 2014). Researches both at international (e.g. Palmer, 2002; Jickling & Wals, 2008; Lechner & Rauch, 2014) and national (Zsóka et al., 2011; Marjainé et al., 2012; Mónus & Császár, 2016) level emphasize that improving the efficiency of environmental education in public education is crucial. However the most researches on Hungarian students do investigate only environmental awareness – attitudes, behaviours, and knowledge – per se (e.g. Szittnerné & Szabó, 2009; Marjainé et al., 2012; Pethe, 2012; Török & Lövei, 2012). In order to explore how ESD can be constructed in a more effective way studies that investigate efficiency of ESD and factors affecting students' environmental awareness are essentially needed (Varga, 2004; Kosáros, 2007; Zsóka et al., 2011; Leskó, 2017).

In this study, several aspects of environmental awareness of Hungarian secondary school students, such as self-declared behaviours (consumer habits, healthy food habits, thrifty habits, waste management) and environmental attitudes were investigated. The main factors (students' socio-economic background, school type, and schools' environmental education principles) shaping aspects of students' environmental awareness were explored. Pro-environmental behaviour is affected by personal socio-economical background in a complex way. International studies investigating attitudes, behaviours and its relationships with social factors go back in time to the 1990s (reviewed in Gifford & Nilsson 2014). However, this study is a unique investigation in Hungary, given that to our knowledge, no previous study investigated environmental awareness of students in such a diverse sample of schools.

2. Methods

Questionnaires filled in by 845 students from 38 classes of 13 Hungarian secondary schools were investigated. In each school, only first year (14-15 years old) and last year students (17-18 years old) were targeted. Schools included four schools from the western part of Hungary (Veszprém county; three in the county seat and one in a different town), eight schools from the eastern part of Hungary (Szabolcs-Szatmár-Bereg county; five in the county seat and three in different town), and one school from the capital (Budapest). Four of the schools were a vocational school, seven were general secondary school (grammar school) and two of them had both vocational and grammar school training types. Five of the schools had an eco-school title, eight did not have it. Table 1 shows in detail the composition of the sample. Students filled in the questionnaire in the presence of their teacher from September 2015 to Mars 2016, mainly in an online format, but in some cases, teachers asked us to provide them with printed copies. Filling in the questionnaire took about 20-25 minutes.

The student's questionnaire included 75 items and was constructed based on previous studies performed on students of similar age (Szittnerné & Szabó, 2009; Marjainé et al., 2012; Pethe, 2012; Török & Lövei, 2012). In order to fit the questionnaire to explore the five different aspects of environmental awareness (see below) some new questions were also used. Aspects of environmental awareness analyzed in this study were based on 30 items measured in a five levels Likert-scale, open-ended questions and some other questions irrelevant to this study were not analyzed in this paper. All five aspects were calculated as a mean of five to eight items (Zsóka et al., 2011). Table 2 shows the name, number of items included and the standardized Cronbach's alpha value of the investigated aspects. Items in the questionnaire were organized in successive topics; they were formulated in order to be easily understandable, interesting and not so long considering the motivation of students to fill in completely the questionnaire (Babbie, 1992).

After carefully analyzing students' answers to some highly similar items, and to similar but reversed scale items answers of 69 students were excluded due to serious inconsistency. Altogether answers of 776 students were included to the study for further analyses, from which 690 students answered all relevant questions including items on their socio-economical background.

Table 1. Sample composition according to students' class year, sex, residency, school location, and school type

		students	**proportion in the sample**
class	first year	414	53%
	last year	362	47%
sex	male	320	41%
	female	456	59%
residency	county seat	294	38%
	town	249	32%
	village	233	30%
county	Eastern Hungary (Szabolcs-Sz.-Bereg megye)	419	54%
	Western Hungary (Veszprém & Pest megye)	357	46%
training type	vocational	198	26%
	grammar school	578	74%
ESD principle	eco-school	335	43%
	non-eco-school	441	57%

Table 2. Aspects of environmental awareness analyzed, the number of items they include (see Methods), and the Cronbach's alpha value (standardized) of the measure

name	number of items	Cronbach's alpha
consumer habits	5	0.48
healthy food habits	8	0.63
thrifty habits	6	0.50
waste management	6	0.49
environmental attitude	5	0.58

Statistical analyses were performed using the R statistical and computing environment (R Core Team, 2016). Linear mixed effect models (*lmer* function in R) were used to analyze data. These models allowed to deal with the huge variance found among schools (Fig. 1.; see also Mónus & Császár 2016) and the fact that students' answers from one specific school may intercorrelate with each other since should not be treated as fully independent. In order to statistically deal with this issue, schools were entered as a random factor to the linear models. Each composite variable (aspects of environmental awareness) was analyzed separately and checked for

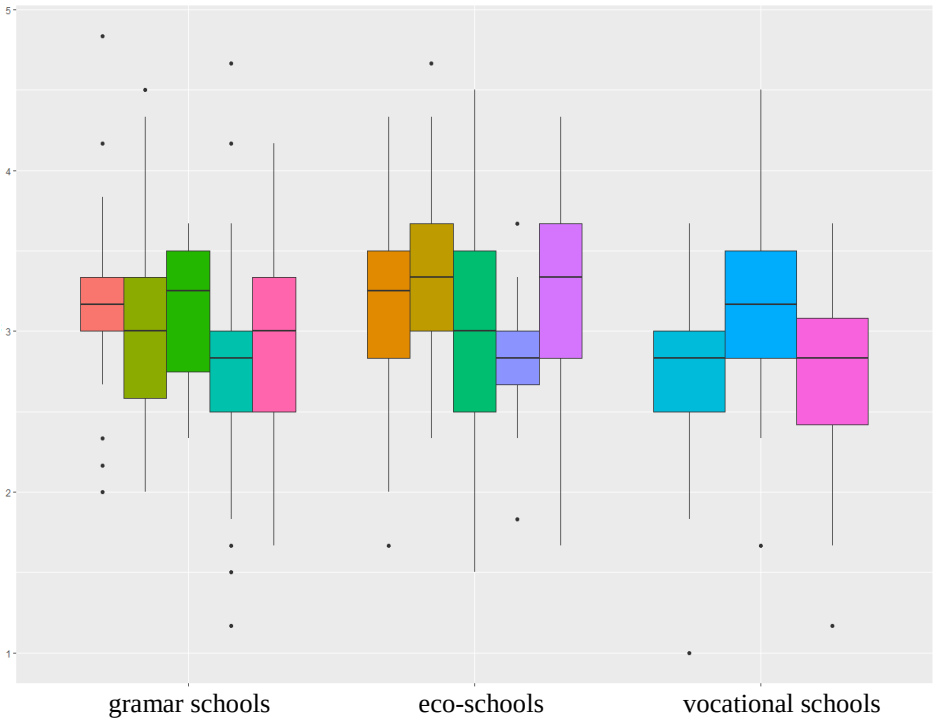

Fig. 1. Descriptives (medians, interquartile ranges, and ranges) of composite variable describing consumer habits of students in different schools. Each of the five investigated aspects of environmental awareness shows similar variability among schools and school types

significant ($\alpha = 0.05$) fixed effects using *Anova* function (*car* package in R; type III variance analysis with Wald chi-square tests; see Fox et al. 2012). The following explanatory variables were entered in each model as fixed effect variables. Education score of parents, county (eastern or western part of Hungary) and type of residency (county seat city, town, and village) described the socio-economical background of students. Training type including vocational or general secondary school (grammar school) categories and ESD principle including eco-school or non-eco-school categories described different school types. Education score of parents was determined from 1 to 6 based on the answers regarding the education of both parents: 1 for less educated parents where one or both parents have only elementary school education (or neither that), and 6 for most educated parents where both parents have higher education diploma.

Table 3. Environmental awareness of Hungarian secondary school students in relation to socio-economical background and school type (results of linear mixed effect models; p-values under 0.05 significance level are bolded)

consumer habits	χ^2	df	P	**healthy food habits**	χ^2	df	P
parents' education	0.006	1	0.936	parents' education	9.801	1	**0.002**
county	9.869	1	**0.002**	county	0.063	1	0.802
residency	6.184	2	**0.045**	residency	0.015	2	0.992
training type	1.339	1	0.247	training type	1.081	1	0.298
ESD principle	2.368	1	0.124	ESD principle	0.003	1	0.959
thrifty habits	χ^2	df	P	**waste management**	χ^2	df	P
parents' education	1.240	1	0.266	parents' education	6.915	1	**0.009**
county	6.739	1	**0.009**	county	5.457	1	**0.019**
residency	2.501	2	0.286	residency	2.476	2	0.290
training type	11.195	1	**0.001**	training type	14.130	1	**0.001**
ESD principle	4.615	1	**0.032**	ESD principle	8.005	1	**0.005**

environmental attitude	χ^2	df	P
parents' education	3.077	1	0.079
county	2.024	1	0.155
residency	2.445	2	0.294
training type	14.229	1	**0.001**
ESD principle	3.457	1	0.063

3. Results

Socio-economical background of students has a significant effect on the aspects of students' environmental awareness in a complex way. Green waste management and healthy food habits were significantly, environmental education attitudes were marginally positively correlated with the parents' education score. Consumer habits, thrifty habits, and waste management were significantly more environmentally friendly in the students living in the western part of Hungary (including Budapest). Type of residency has a significant effect on the consumer habits of students but does not have on other aspects of environmental awareness. Student living in county seat cities or in bigger towns were less environmentally friendly in their consumer habits than students living in villages. School type also affected different aspects of students' environmental awareness. Students learning in vocational schools live and think less green; they are significantly less environmentally friendly in their thrifty habits, waste management, and environmental attitudes. However, interestingly students learning in eco-schools live and think also less green concerning the same aspects of environmental awareness (thrifty habits and waste management), while in the case of their environmental attitudes this effect is only marginally significant. Results with the corresponding statistics are summarized in Table 3. Table 4 and 5 show mean scores for the different aspects of environmental awareness for subgroups of students. Each of the five aspects shows neutral attitude when its score is 3, shows positive pro-environmental attitude in cases when scores are greater than 3, and negative pro-environmental attitude in cases when scores are smaller than 3. Based on Table 4 and 5, healthy food habits of students learning in vocational non-eco-schools with low educated parents show the worst values (mean score for the subgroup: 2.78), and environmental attitudes of students leaving in villages of Eastern Hungary with highly educated parents show the best values (mean score for the subgroup: 3.69) in their pro-environmental aspects.

4. Discussions

Based on the mean scores of total sample (Table 4) we can conclude, that the population averages are worst in the case of healthy food habits and of consumer habits – they are close to neutral; and are the better in the case of environmental attitudes. A pattern frequently found in previous studies; active pro-environmental behaviours are not necessary the consequence of positive pro-environmental emotions and environmental knowledge (Kollmuss & Agyeman, 2002; Varga, 2004; Marjainé et al., 2012; Gifford & Nilsson, 2014).

Table 4. Mean scores of subgroups and total sample for the aspects of environmental awareness in Hungarian secondary school students in relation to their socio-economical background (for significance tests see Table 3)

parents' education[a] (subgroup N)	county	residency	healthy food habits	consumer habits	waste management	thrifty habits	environmental attitude
low (76)	Eastern HU	village	2.92	3.06	3.25	3.11	3.25
low (76)	Western HU	village	2.90	3.42	3.38	3.38	3.32
low (44)	Eastern HU	county seat	3.11	3.13	3.39	3.07	3.38
low (28)	Western HU	county seat	2.96	3.22	3.23	3.15	3.34
low (61)	Eastern HU	town	2.83	2.89	3.06	2.96	3.13
low (59)	Western HU	town	2.99	3.25	3.11	3.16	3.32
high (20)	Eastern HU	village	3.03	3.30	3.28	3.13	3.69
high (36)	Western HU	village	3.11	3.42	3.38	3.09	3.54
high (133)	Eastern HU	county seat	3.23	3.11	3.50	3.11	3.59
high (63)	Western HU	county seat	3.07	3.33	3.42	3.22	3.47
high (48)	Eastern HU	town	3.17	3.05	3.48	3.31	3.53
high (46)	Western HU	town	3.00	3.41	3.49	3.18	3.33
SD ranges for all subgroups:			0.52-0.64	0.57-0.78	0.58-0.78	0.67-0.89	0.55-0.84
mean score for total sample (N = 776):			3.02	3.03	3.19	3.15	3.53
total SD (N = 776):			0.60	0.58	0.71	0.74	0.70

Table 5. Mean scores of subgroups for the aspects of environmental awareness in Hungarian secondary school students in relation to parents' education, school type and school ESD principle (for significance tests see Table 3)

parents' education[a] (subgroup N)	training type	ESD principle	healthy food habits	consumer habits	waste management	thrifty habits	environmental attitude
low (86)	grammar	non-eco-school	3.08	3.14	3.40	3.18	3.43
low (97)	vocational	non-eco-school	2.78	3.09	3.15	2.98	3.10
low (135)	grammar	eco-school	2.93	3.15	3.22	3.23	3.34
low (26)	vocational	eco-school	3.11	3.56	3.14	3.26	3.18
high (177)	grammar	non-eco-school	3.22	3.18	3.54	3.23	3.64
high (28)	vocational	non-eco-school	2.88	3.05	3.08	2.90	3.18
high (129)	grammar	eco-school	3.08	3.31	3.45	3.17	3.49
high (12)	vocational	eco-school	3.03	3.37	3.08	2.89	2.97
SD ranges for all subgroups:			0.52-0.68	0.61-0.71	0.60-0.74	0.69-0.93	0.55-0.88

[a] – Both in Table 4 and 5: students were groupped in high and low parents' education categories according to at or above, and below the median parents' education score (total sample), respectively.

Furthermore, our study found a complex pattern of socio-economical background affecting several aspects of environmental awareness in secondary school students. Parents' education strongly affected healthy food habits and environmentally friendly waste management habits of students, and slightly (only marginally significantly) affected environmental attitudes. Results suggest that ESD should make special attention to develop a highly effective way of changing students' motivation and socially inherited habits in order to achieve significant change in pro-environmental behaviours of societies. Our result contrasts to that of Lallukka et al. (2007) where investigating healthy food habits of employees in Finland they found an effect of own education, but not of parents' education. On the other hand, the relationship between parents' education and green waste management or environmental attitudes suggests that educated people are more receptive to pro-environmental behaviours and attitudes, and they can socially transmit their habits. A fact that draws the attention to the importance of ESD in secondary schools and even in higher education institutes, the levels of education where ESD did not receive sufficient emphasis yet in Hungary (Havas et al. 2004).

The study gives additional support to the findings on a smaller incomplete subsample of the current sample analyzed in an earlier stage of data collection. In Mónus & Császár (2016) differences were found between students of the western and eastern part of Hungary in their thrifty habits, consumer habits, and to some extent in their waste management. This study confirms the previous findings using a more comprehensive analysis using more background (confounding) variables and a mixed effect design. Differences between counties of Hungary may be attributable to various cultural and socio-economical backgrounds. Veszprém county and the capital outreaches Szabolcs-Szatmár-Bereg county practically in all relevant socio-economical macrostatistics, e.g. in national student competency indicators (Szabó et al. 2018), per capita income and rate of unemployment (Hungarian Central Statistical Office; www.ksh.hu). On the other hand, people from the western part of Hungary may have intensive interplay with Austria (and its inhabitants), a country with people and education more developed considering pro-environmental behaviour and ESD. All these differences may be responsible for the spatial pattern found in environmental awareness. Concerning the last investigated socio-economical variable, students with their residency in county seat cities or in bigger towns were significantly less environmentally friendly in their consumer habits than students living in villages, which is supposedly mostly attributable to the different possibilities these students can achieve. Our results well fit previous studies as the rural-urban gradients, economic and cultural differences in pro-environmental behaviours are well documented in the literature (Kollmuss & Agyeman 2002; Vicente-Molina et al. 2013; Gifford & Nilsson 2014).

Furthermore, significant differences were found in several aspects of environmental awareness among school types, a very important result of the present study which should involve development in ESD integration in secondary schools. Students learning in vocational schools and even in eco-schools (eco-schools are acknowledged by the ‘eco' title due to their elaborate and complex ESD; Breiting et al. 2005) were less environmentally friendly in their thrifty habits, waste management, and environmental attitudes. It was already documented in Hungary that vocational school generally has lower efforts in ESD, and hence integrating more elaborated ESD practices to the vocational trainings are crucial in order to approach sustainability of societies (Havas et al. 2004). However, the results on pro-environmental behaviours and environmental attitudes (even the latter differ only marginally from general secondary schools’ students) of eco-school students in the present study are astonishing. Previous researches on the effect of ESD are also contrasting. Some study found improvement in pro-environmental behaviours even after some week of intensive ESD curriculum (e.g. McNeill & Vaughn 2012), while other studies did not find evidence of change in behaviour even after extended curriculum compared in case of Flemish eco-schools and control schools (Boeve-de Pauw & Van Petegem, 2011). Without questioning the impact and the intensive ESD related work in Hungarian eco-schools the following explanations are proposed to the above mentionned finding. As the study investigated self-declared answers on behaviour instead of the behaviour itself, one can imagine that eco-schools' students perceived their own behaviour less environmentally friendly than students from general secondary schools. However, this scenario does not explain why students from vocational schools self-declared less their behaviour to be pro-environmental, and more interestingly, why exactly in case of the same aspects of environmental awareness. A more plausible explanation for authors is that students learning in the analyzed eco-schools are students of lower socio-economical status, between the status of students of the analyzed general secondary schools and of the analyzed vocational schools. As eco-school title may contribute to the recognition of a school, but gives no other advantage (e.g. financial support), it is possible that highly recognized schools apply less often for the title than medium or poorly recognized ones. In that situation, the found pattern may also reflect the socio-economical status of schools, and hence the students who learn in. Further, elaborated research is needed to explore how the excessive ESD related pedagogical work affect the improvement of pro-environmental behaviour and environmental attitudes of students in Hungarian eco-schools. Preliminary analyses on the relationship of students' environmental awareness and teachers' declared environmental education policy of schools suggest that socio-economical background of students is more determinative in developing pro-environmental behaviours than the schools' environmental education policy.

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Short professional biography

Ferenc Mónus is associate professor at the Institute of Environmental Sciences, University of Nyíregyháza, responsible for subjects related to Evolutionary Ecology and Sustainability Education. He received his Ph.D. degree in 2011, his main research fields include foraging and antipredator strategies in birds, the role of spatial position in behavioural response of birds, human mate choice, and methods and efficacy of Environmental Education.