

**Theses of Doctoral (PhD) Dissertation**

**Psychological determinants of pro-environmental  
behavior**

**The role of social value orientation, environmental attitudes,  
perceived criticality and behavioral habits**

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## **The aim of the dissertation, definition of the subject**

The dissertation discusses the psychological aspects of pro-environmental behavior, an actual problem confronting people with serious challenges. According to Kollmuss and Agyeman (2002, pp. 240.) pro-environmental behavior “means behavior that consciously seeks to minimize the negative impact of one’s actions on the natural and built world (e.g. minimize resource and energy consumption, use of non-toxic substances, reduce waste production).”

On the one hand natural sciences can make important contributions to the process of resolution by developing alternative resources of energy thus decreasing the effects of harmful materials or avoiding exploitation of natural resources. On the other hand social and behavioural sciences also can play significant role both in promoting behavioural changes and in altering damaging human habits by increasing pro-environmental behaviour (Stern, 1992). As human activities have global effects on our environment not just the development and promotion of environmentally friendly technologies are need to be developed but international and interdisciplinary cooperation are also required.

Thus the aim of our researches is to examine some significant factors (perceived criticality of decisions, differences of social value orientation, pattern of environmental attitudes, extent of connectedness to nature, behavioural habits and temptations regarding the reasons for not behaving pro-environmentally) influencing pro-environmental behaviour by applying several theoretical points of views and methods.

## **Social dilemmas (The first study)**

We developed our first study on the basis of social dilemma situations where there is a great conflict between individual and collective interests. While the improvement of long-term collective interests requires from people to change their way of consumption, the best short-term individual outcomes can be achieved by unlimited/unrestricted consumption. Pro-environmental behaviour can be characterized by the same aspects, for instance wasting time by environmental friendly commuting and other pro-environmental transportation means, or by recycling and waste disposal activities. In our first research two well-established determinants of pro-environmental behavior – social value orientation, the difference of people’s preferences about the outcomes for themselves and an unknown other in social

dilemma situations (Messick & McClintock, 1968) and perceived criticality referring to “one’s perception about one’s criticality in the provision of public good” (Chen, Au, Komorita, 1996; p. 39) – were examined in a two rounded social dilemma situation. We also observed the connection between social value orientation and environmental attitudes “the collection of beliefs, affects, and behavioral intentions a person holds regarding environmentally related activities or issues” (Schultz, Shriver, Tabanico and Kazian, 2004, p. 31).

### ***Methods of the first study***

133 undergraduate psychology students (mainly females) took part in the experiment from the University of Debrecen in 2008. To examine our hypotheses all participants met three methods during the experiment: a group session revealing how feedback of the group’s performance modifies the contributions of the individuals; and two questionnaires measuring environmental attitudes and social value orientation.

The base of the group session was a scenario (a two rounded step-level public good dilemma), in which perceived criticality of participants was manipulated by giving them feedback about their contributions to the provision of the public good. Low perceived criticality stated that much more contributions were made than minimally required, while high perceived criticality expressed that contributions were just barely reached the target. In case of sufficient number of contributions were made, participants were equally rewarded regardless of the size of their personal contributions. The scenario represents the logic of environment protection: in real life situations behaving pro-environmentally requires extra efforts from people (in form of energy, time or money) and the whole community can benefit from this behaviour, not just the person who invested efforts.

Participants also filled in a questionnaire with five scales of the short-form of the Environmental Attitudes Inventory (Milfont & Duckitt, 2006), specifically the Conservation Motivated by Anthropocentric Concern scale, the Ecocentric Concern scale, the Support for Interventionist Conservation Policies scale, the Environmental Movement Activism scale and the Environmental Threat scale.

Finally participants filled in a questionnaire measuring social value orientation by triple-dominance measurement of social values (Messick & McClintock, 1968; Van Lange, Otten, De Bruin, & Joireman, 1997) in which people make nine choices about how they allocate certain sum of points to themselves and to another person. According to their decisions people can be easily classified as cooperators, individualists or competitors.

### ***Results of the first study***

First we hypothesize that – as previous researches found – first round contributions of people with different kind of social value orientation will differ, cooperative people will more inclined to make higher contributions in the first round than others. Contrary to our assumption the correlation between first round contributions (cooperative behavior in the social dilemma situation) and the number of cooperative choices in the social value measurement was not significant ( $r=-0,062$ ;  $p>0,1$ ). Basically this result is opposed to the findings of previous studies regarding cooperative people are more inclined to be careful with the resources (e.g. Liebrand és Van Run, 1985) or handle them in a more cooperative way (e.g. Van Vugt és munkatársai, 1995).

In the second hypothesis we predict that the condition of high perceived criticality will increase the contributions of the participants. Result showed that the effect of the manipulation of perceived criticality was significant and positive ( $F(1; 124)= 4,32$ ;  $p\leq 0,05$ ); in case of high perceived criticality contributions were higher in the second round.

The third hypothesis regarding to the effect of both perceived criticality and social value orientation on the second round contributions (together with first round contributions). To test this assumption we examined three-way interaction of the manipulation of perceived criticality, cooperative answers on the measurement of social value orientation and extent of first round contributions. The tendency of the results supported our prediction ( $F(2; 124)=2,27$ ;  $p\leq 0,10$ ), which means that perceived criticality has stronger effect in case of less cooperative answers especially together with low first round contributions.

Our fourth question is referring to the connection of environmental attitudes and social value orientation: We expected more preservation from prosocial and more utilization from proself people. The result of the examined scales of Environmental Attitude Inventory revealed a marginally negative correlation between cooperative social value orientation answers and Conservation Motivated by Anthropocentric Concern scale ( $r=-0,16$ ;  $p\leq 0,1$ ), cooperators seemed to be more aversive of anthropocentric aspects of conservation.

### **Ecomarketing (The second study)**

In our first study the role of influencing determinants of pro-environmental behaviour (social value orientation, environmental attitudes and perceived criticality) were confirmed in a social dilemma situation. It was found to be worth extending our researches and to examine

whether these variables have also effect on the evaluation of the effectiveness of pro-environmental marketing.

### ***Methods of the second study***

In order to examine our hypothesis we applied questionnaire researches with the following methods.

Similarly to our first experiment participants filled in a questionnaire measuring social value orientation (Messick & McClintock, 1968; Van Lange, Otten, De Bruin, & Joireman, 1997).

Then two scales of the Environmental Attitudes Inventory (Milfont & Duckitt, 2006) were also filled in. Based on the results of our first study we concentrated on the scale resulting noteworthy effects, namely the Conservation Motivated by Anthropocentric Concern scale. We also applied the Ecocentric Concern scale, the opposite of the previously mentioned one to widen the measurement. We used the original ten version form of the scales.

Expanding the scope of our first study we applied a new concept in the second examination. The concept of Connectedness to Nature reveals affective connection between one's self and the environment. To measure Connectedness to Nature our questionnaire contained the Inclusion of Nature in Self scale adapted by Schultz (2001). In this item participants are asked to sign the extent of their interconnectedness with nature from varying degrees of overlapping circles labelled with "nature" and "self".

Finally participants made their decision in connection with the effectiveness of pro-environmental messages. Pro-environmental messages were evolved to promote reduction of packaging in domestic waste. In a short statement we attracted participants' attention to the huge extent of domestic waste coming from packaging, and the messages contained further information about two variables. Messages can imply the efficacy of people's contributions to environmental protection (low or high perceived criticality) and can also imply the aspects of environmental attitudes (eco or anthropocentric) referring to the party enjoying the result of environmental protection. Thus four different versions of the message were created by the two dichotomous variables emphasizing different aspects of reducing packaging in domestic waste. The messages were evaluated by both paired comparisons and ranking.

Ninety-five Hungarian school-leaver pupils took part in the experiment from Tóth Árpád Secondary Grammar School, Debrecen in February 2010.

### ***Results of the second study***

In the first hypothesis we expected proself people to be more sensitive to messages with high perceived criticality and anthropocentric aspects of environmental protection. Testing our expectations the impact of social value orientation was examined on the evaluation of the messages from the ranking task. Social value orientation had main effect in case of message emphasizing anthropocentric aspects of environmental protection and high perceived criticality ( $F(1; 73)=4,39; p<0,05$ ): It was considered more effective by proself than prosocial people. In case of message emphasizing ecocentric aspect of environmental protection and low perceived criticality social value orientation proved to be a significant determinant of the evaluations too ( $F(1; 73)=5,47; p<0,05$ ): Proself people tended to rate it less effective.

Data of paired comparisons permitted more detailed analysis, namely Thurstone's model for paired comparisons which allow examining the effect of different aspects of messages separately from each other. According to the results messages emphasizing anthropocentric aspects of environmental protection and high perceived criticality were found to be more effective. Adding individual differences (social value orientations and connectedness to nature) to the analysis it was revealed that both proselfs and people connected less to nature and proself less connected people evaluated more effective pro-environmental messages emphasizing high perceived criticality, and evaluated less effective messages with low perceived criticality. Univariate analysis showed that the effect of social value orientation and connectedness to nature were significant in case of messages with low and high perceived criticality ( $F(3)=3,46; p<0,05$ ); post-hoc analysis revealed significant effect between less connected proself and more connected prosocial people ( $p<0,05$ ).

### **Pro-environmental behavior (The third study)**

In the third experiment we examined the role of previously confirmed determinants of pro-environmentally focused issues in a field study. The number of the observed variables of the first and second studies (social value orientation, environmental attitudes and connectedness to nature) was extended with the concept of temptation (the reasons for not behaving pro-environmentally) and the effects of the variables were examined on both pro-environmental behaviour and pro-environmental behavioural intention.

### ***Methods of the third study***

We conducted our experiment in connection with two pro-environmental events by organizing and/or promoting them. On the one hand we encouraged the employees of the University of Debrecen to leave their cars home for one day and use other kinds of transportation, and on the other hand we invited the students of the University of Debrecen to clean up the surrounding of the University by collecting litter. We examined the role of certain psychological determinants of joining a pro-environmental event with a questionnaire among 88 persons.

First we measured pro-environmental behavioural habits, and determinants (e.g. the extent of temptations – the reasons for not joining the pro-environmental event) of both pro-environmental behaviour itself and intention to behave pro-environmentally. Then to distinguish participants social value orientation the previously mentioned decomposed game questionnaire was filled in (from Van Lange, Otten, De Bruin & Joireman, 1997). Finally environmental attitudes were measured with two scales of Environmental Attitude Inventory by Milfont and Duckitt (2006) also used in the second study, just like Inclusion of Nature in Self scale by Schultz (2001).

### ***Results of the third study***

First we hypothesized that both the attendance at the pro-environmental events and the propensity to participate will be affected by behavioural habits and past behaviour. In order to examine it we conducted Two-Independent-Samples Tests involving pro-environmental behavioural habits and attending the pro-environmental event. The result of the analysis shows that the connection between the frequency of previous pro-environmental behaviour as behavioural habit and pro-environmental behaviour is significant ( $Z=-6,425$ ;  $p<0,001$ ). The more frequent previous pro-environmental behaviour is, the more likely to join the pro-environmental event.

Regarding to temptation, in our second hypothesis we predict that the presence of temptations (the number of reasons for not joining the pro-environmental event) will affect the participants' decisions about attending or not attending the event. According to the results of Linear Regression the applied variables explained 45% of the variance ( $F(1)=57,23$ ;  $p<0,001$ ) of behavioural intention. The strongest predictor was behavioural habits ( $\beta=0,67$ ;  $p<0,001$ ), while marginally significant effect of the extent of temptation was supported ( $\beta=-0,12$ ;  $p<0,1$ ). The effect of temptation became significant ( $\beta=-0,28$ ;  $t=-2,41$ ;  $p<0,05$ ) in case

of excluding pro-environmental behavioural habit from the analyses and concentrating on the psychological determinants of pro-environmental behavioural intention ( $F(1)=5,81$ ;  $p<0,05$ ).

Finally, we assumed in the third hypothesis that people's sensitivity to temptation (as an extrinsic motive) can be differentiated by their social value orientation. Presumably prosocials' decision about joining the pro-environmental event will be independent from their other responsibilities, while proself people will rely their decision on this reason. In order to examine it we split the database by the variable of social value orientation. Both the effect of cooperative choices and number of temptation was significant or nearly significant. But confirming out previous results in case of proself people these variables explain the 68% of the variance of pro-environmental behavioural intention ( $F(5)=3.40$ ;  $p<.1$ ), while in case of prosocials just 20% of it is explained ( $F(5)=2,14$ ;  $p<0,1$ ).

### **Summary of the results**

The dissertation discusses pro-environmental behaviour and examines the role of certain kind of psychological determinants applying different theoretical frameworks and methods.

In our examinations we managed to establish the impact of social value orientation on decision-making in social dilemmas, on evaluating the effectiveness of pro-environmental messages and also on joining pro-environmental events. According to our results, decisions of proself people are affected more by external motives, namely perceived criticality in the first and second study and the extent of temptation in the third study, than prosocials. We also have to mention that relationship between social value orientation and environmental attitudes, namely the more cooperative orientation someone has, the less likely to support anthropocentric aspects of environmental protection.

Besides the specific effect of different kinds of social value orientation on pro-environmental behavior, we can draw some practical conclusion by the results which can be useful for developing of pro-environmental campaigns.

### **Published publication related to the dissertation**

**Medvés, D., Kovács, J.** (2012). The role of individual differences in promoting pro-environmental behavior. In Kabisch, S., Kunath, A., Schweizer-Ries, P., Steinführer, A. (szerk.), *Vulnerability, Risks, and Complexity: Impacts of Global Change on Human Habitats. Advances in People and Environment Studies, IAPS, Vol. 3.* (pp. 231-242.). Göttingen: Hogrefe.

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## **Publications besides the dissertation**

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