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Working Paper 2014-02

*June 17, 2014*

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# Save the planet for humans' sake: The relation between social and environmental value orientations

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The literature shows a significant correlation between people's concerns for others and their concerns for the environment. However, these social and environmental considerations were commonly measured by means of attitude questionnaires that were not incentivized and did not readily facilitate a direct comparison of the results. In the present experiment, we employed a consistent incentivized method to assess subjects' social value orientations (SVO) and their concerns for the environment and humanitarian aid. Subjects make real decisions with real consequences regarding the distribution of resources while the experimental design ensured comparability of subjects' social preferences and their willingness to make tradeoffs for different environmental and social causes. We found that social and environmental value orientations are intertwined to some extent, but that the nature of the association is not simple. Nonetheless the results clearly show that people are generally willing to pay more for the benefit of people in need, compared to abstract environmental causes. We conclude that interventions to nudge people towards environment-friendly behavior may have a greater impact if human suffering as resulting from global warming is made salient.

**Keywords:** Social Value Orientation (SVO), environmental attitudes, environmental behavior, individual differences, charitable giving, cooperation

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# 1 Introduction

## 1.1 The largest-scale social dilemma

One of the largest challenges humans face is global climate change and coordinating collective action to mitigate the environmental effects of large-scale industrialization. If humanity does not reduce consumption of fossil fuels and thereby the emission of greenhouse gases (e.g. carbon dioxide, methane, nitrous oxide), the global average temperature will increase dramatically, up to and perhaps more than 4°C by the end of the century (IPCC, 2013, p. 1037). The consequences of this scenario are severe and include the mean sea level rising up to 70cm, escalating frequency of destructive tropical storms, heat waves and wildfires, drought, the loss of other now habitable areas due to flooding, and the reduction in biodiversity via the extinction of many animal species. These consequences will have severe detrimental effects on societies, such as large-scale food and water shortages and further humanitarian crises due to extreme natural disasters, loss of agricultural and settlement areas, all of which may likely result in large-scale migration with far-reaching socio-economic consequences on a global scale. People have good reason to care about climate change, namely that we are all affected by it. In other words, humans should be motivated to save the planet not only for the sake of the planet *per se*, but for the sake of human well being. That is, proenvironmental and prosocial concerns are fundamentally intertwined.

It is now commonly acknowledged that anthropogenic climate change is an established scientific fact, and thus we have clear motivation to take action in order to prevent –or at least mitigate– the detrimental effects such as those listed above. Nevertheless, it seems very difficult for people to behave more environment-friendly for several reasons. First, the detrimental effects of climate change that we want to avoid lie several decades ahead. That is, people have to incur costs *now* to avoid higher costs *later*. Hence, the problem requires that people exert some self-control, which we know can be difficult due to people’s general tendency to be impatient and unwilling to delay gratification, a well studied phenomenon under the rubric of temporal discounting (see e.g. Frederick et al., 2002). Second, the benefits (i.e. the avoided costs) that would result in the future from successful climate change mitigation now, will likely not be enjoyed by the individuals who are incurring costs today, simply because they may not live long enough to reap these dividends. That is, mitigating the problem requires that people incur costs not for their own future benefits, but for the future benefits of other people, most of whom have not even been born yet. The good news is that there is clear evidence that people do care about the welfare of others and are willing to incur costs for the benefit of strangers (for reviews, see e.g. Andreoni, Harbaugh, & Vesterlund, 2007; Au & Kwong, 2004; Fehr & Fischbacher, 2003). However, these social preferences are generally bounded meaning that people are willing to make limited tradeoffs for other’s well being (see e.g. Murphy & Ackermann, 2014b; Murphy, Ackermann, & Handgraaf, 2011). Third, there is no guar-

antee that efforts to mitigate climate change will be successful. There is irreducible dubiety in this context and ameliorating the problem requires that people be willing to incur real costs for an uncertain good. Fourth and perhaps most important, the situation people are facing with respect to mitigating climate change is a social dilemma, because it is a setting where private interests are in conflict with collective interests (see e.g. Dawes, 1980; Kollock, 1998; Dawes & Messick, 2000). That is, if all people on earth would behave environmentally-friendly, the chances of achieving the goal of mitigating climate change would be very good. However, if everybody is behaving environmentally friendly, each individual would benefit unilaterally by not sacrificing. By choosing “defection,” an decision maker would not have to incur costs but would still garner the benefits arising from all the other people’s sacrifices. In other words, each individual has an incentive to free-ride and let the others contribute to the common good. However if everybody thinks like this, no one will behave environmentally-friendly, and climate change will not be mitigated. The view of identifying and modeling the environmental problem we are facing as a social dilemma has commonly been acknowledged today (see, for instance, Hardin, 1968; Milinski, Semmann, Krambeck, & Marotzke, 2006; Ostrom, 2014). The question then is whether we can draw upon what we know about the determinants of behavior in a social dilemmas for fostering environment-friendly behavior in individual decision makers.

To date, research has revealed several important determinants of cooperative behavior in experimental social dilemmas, such as a standard public goods game, for instance (see e.g. Chaudhuri, 2011; Ledyard, 1995). One of the most promising and well studied endogenous drivers of cooperation in these strategic interactions is the subjective weight people attach to the welfare of others in relation to their own welfare. This particular social preference, also known as social value orientation (SVO), has repeatedly been shown to be a reliable driver of cooperative decisions (e.g. Balliet, Parks, & Joireman, 2009; Murphy & Ackermann, 2014a). That is, many people take into account the welfare of others when making decisions in interdependent situations, and moreover are willing to forgo some of their own gains in order to increase other people’s payoffs. Contributions and cooperation in a public goods game are clear expressions of these positive other-regarding preferences. In the current paper, we focus on the question of how this particular causal factor of cooperation in social dilemmas, namely SVO, relates to proenvironmental behavior and attitudes, and shed light on ways to build upon people’s other-regarding preferences for fostering environment-friendly behavior.

## **1.2 SVO and environmental concerns**

Previous research on the relation between social preferences and environmental decision making has focused on commuting preferences in terms of using public transportation instead of one’s pri-

vate car (Van Vugt, Van Lange, & Meertens, 1996; Van Vugt, Meertens, & Van Lange, 1995). Although an effect was found in both studies, it was not very pronounced and in a more recent study, it could not be detected at all (Joireman, Van Lange, & Van Vugt, 2004). Further evidence for a potential direct relation between SVO and proenvironmental behavior is mixed as well. For instance, Van Lange, Bekkers, Schuyt, & Van Vugt (2007) found only a marginally significant relation between SVO and donations to environmental organizations, but a significant association between SVO and total number of donation decisions across a variety of different causes (i.e. third world organizations, charity organizations, health organizations, etc.). Furthermore, Cameron, Brown, & Chapman (1998) found no relation between SVO and preferences for an environmental program, but did isolate a relation between SVO and taking action when the program was personally supported. Also, they found that subjects with an individualistic SVO perceive the personal costs associated with proenvironmental behavior as higher compared to prosocial subjects, a finding that is consistent with results from Gärling, Fujii, Gärling, & Jakobsson (2001). The pattern of these findings suggests that SVO is related to proenvironmental behavior, at least indirectly through an interaction between SVO and beliefs about the consequences of proenvironmental behavior. This concordantly relates to evidence from Stern, Dietz, & Kalof (1993). Based on Schwartz's norm activation model (see Schwartz, 1970, 1975), Stern et al. developed an extended model of norm activation for proenvironmental behavior and could show that beliefs about the consequences of proenvironmental action for the self, for others, and for the biosphere, are all predictive of intentions to actually take proenvironmental action. Building on this work, Joireman, Lasane, Bennett, Richards, & Solaimani (2001) investigated whether SVO is associated with the perceived consequences of proenvironmental action for the well-being of others, which appears to be a reliable result. However, no relation was found between SVO and the perceived consequences of proenvironmental action for one's own well-being, although such a relation could be expected considering the results obtained by Stern et al. It could be the case, however, that the SVO measures that have commonly been employed were just not sensitive enough to detect important individual differences in SVO due to restriction of variance (i.e. dichotomous data). Nevertheless, Joireman et al. (2001) also found that SVO was directly related to intentions to take proenvironmental action, but not to actual proenvironmental behavior. To date, the strongest evidence for a direct relation between SVO and proenvironmental behavior is reported by Schuler (2012), who found a correlation of  $r = .43$  between SVO as assessed by means of the SVO Slider Measure (Murphy, Ackermann, & Handgraaf, 2011) and proenvironmental behavior as assessed by means of the General Ecological Behavior (GEB) scale (see e.g. Kaiser, 1998; Kaiser & Wilson, 2004). Taken together, the overall results regarding a relation between SVO and proenvironmental behavior are promising but are also mixed and leave room for additional studies.

We see several reasons for why the existent literature on the relation between other-regarding

preferences and proenvironmental behavior is somewhat ambiguous. First, with one exception, the measures that had been used to assess SVO yielded only low-resolution output (e.g. categorical data), which restricts variance and thereby also the statistical power to detect effects (e.g. Cohen, 1983; MacCallum, Zhang, Preacher, & Rucker, 2002).

Second, the measures used to assess SVO and expressions of proenvironmental behavior did not have a common basis of valuation. That is, while SVO is measured in terms of monetary trade-offs between the own payoff and the payoff another person receives, proenvironmental behavior is usually measured by means of Likert-type scales where a person indicates the subjective importance or frequency of performing a particular proenvironmental act. Consequently, the degree of prosociality and the degree of proenvironmentalism within a person (or between people) can not be directly compared to each other as these are non-commensurate scales. This measurement practice obfuscates the relation between these factors and muddles results.

Third, and more importantly, specific criteria as diverse as commuting preferences, donations to environmental organizations, or being in support of a proenvironmental program, have been used as measures for proenvironmental behavior in general. It is thus no surprise that findings are mixed, because it is well documented that proenvironmental behavior can be expressed in a variety of ways, and that many people often show inconsistent behavioral patterns in this respect (e.g. Pickett, Kangun, & Grove, 1993; Stern & Oskamp, 1987). For instance, a person may invest considerable time and effort to recycle as much as possible and save energy at home, but at the same time use the private car extensively. It has been shown that several factors account for these inconsistencies, such as real and/or perceived personal costs (e.g. Steg & Vlek, 2009, p.311-313), social approval (e.g. McKenzie-Mohr, 2000), or direct observability of consequences (e.g. Faruqui, Sergici, & Sharif, 2010). Also, it has been repeatedly shown that measures of attitudes or preferences may not be highly reliable predictors of actual behavior (e.g. Ajzen & Fishbein, 1977; Diekmann & Preisendorfer, 1998; Schultz & Oskamp, 1996). Reviewing the literature on these topics is beyond the scope of this paper, but in light of the results obtained by Schuler (2012), it seems plausible that the detection of a relation between SVO and proenvironmental behavior is facilitated when the latter involves several different ways in which it can be expressed (i.e. when a measure involves a catalog of different kinds of environmentally relevant behavior – as employed by the GEB scale, for instance – the expression of which may be informative when summarized by an aggregate score). In this way environmental behavior can be considered broadly and measured concordantly.

### **1.3 A common basis of valuation**

We contribute to the existing literature by replicating and extending previous studies clarifying the relation between SVO and proenvironmental behavior, and do so by proposing a novel methodol-

ogy that circumvents the limitations of previous studies explicated above. We use a high-resolution measure of SVO that is employed in an incentive compatible way, such that subjects are making real trade-off decisions with real consequences. Furthermore, we use a consistent methodology (adopted from Ackermann, Fleiß, & Murphy, 2014) for assessing a person's degrees of proenvironmentalism as we use for assessing that person's degree of concerns for others (i.e. SVO), which ensures a common basis of valuation and comparability of the results.

Moreover, we assess a subjects' degree of proenvironmentalism in each of three domains, namely in a general domain (CO<sub>2</sub> compensation), and with respect to wildlife as separated into the domain of flora (rain forest preservation), and the domain of fauna (preservation of endangered animals). We will use the term environmental value orientation (EVO) to refer to the weight a subject attaches to supporting particular environmental causes (ECs) that correspond to these three environmental domains. As an additional (non-environmental) domain, we assess people's degrees of prosociality in terms of supporting people in need, which we will refer to as humanitarian value orientation (HVO) as opposed to social value orientation (SVO), which captures people's willingness to forego own gains for the benefit of a single unspecified anonymous other person. This domain is introduced to capture the detrimental effects that climate change is expected to have on humans as outlined above and it allows us to make several important comparisons. First, we can compare the weights people attach to the welfare of an anonymous other person to the weights people attach to the welfare of people in need. And second, we can compare the weights people attach to the welfare of people in need to the weights they attach to different proenvironmental causes.

Concretely, we have subjects allocate monetary resources between themselves and an anonymous other person on the one hand, and between themselves and different nonprofit organizations (NPOs) that support particular proenvironmental and humanitarian causes on the other hand. Importantly, for all these assessments we employ the same measurement method, which has repeatedly been shown to be a reliable and valid measure of the weight a person attaches to the benefit of another entity in relation to the own welfare. The idea of introducing external consequences in experiments by donations to charity was introduced in the context of a dictator game by Eckel & Grossman (1996) and then used in a number of subsequent experiments (e.g. Eckel & Grossman, 2003, 2004; Eckel et al., 2014). Donations to charity or NGOs as measures of environmental behavior in laboratory experiments were also used by Li et al. (2011) and Blanco et al. (2012). Furthermore, hypothetical donations to carbon offset organizations in the context of public good donations and normative expectations were recently used in a representative survey (see Interis & Haab, 2014). We conclude from this that the use of donation decisions as indicators of proenvironmental behavior is commonly accepted. Nevertheless, we measure subjects' general degrees of behavioral and attitudinal proenvironmentalism additionally by means of other well validated

scales in order to determine the extent of the proposed method's convergent validity.

## **2 Method**

The experimental procedure consisted of three experimental phases. In the first phase, subjects completed the SVO Slider Measure (Murphy et al., 2011) with standard instructions, such that we measure the tradeoffs people are willing to make between their own monetary gains and the monetary gains of some anonymous other person. In the second phase, subjects completed the Slider Measure again, but this time not for assessing their SVOs, but for measuring the tradeoffs they are willing to make between own monetary gains and monetary gains that are transferred to proenvironmental and social charitable organizations. In the third and final phase, subjects completed a number of questionnaires regarding behavioral and attitudinal environmentalism and social attitudes.

The experiment was programmed in z-Tree (Fischbacher, 2007) and conducted in a dedicated behavioral research laboratory at a Western European university. A total of 110 subjects participated in the experiment between March and April 2014 in eight experimental sessions, while the number of participants per session varied between 12 and 16. The participants were university students and were recruited via ORSEE (Greiner, 2004). This ensured that no subject participated in the experiment twice.

All parts of the experiment (except the third phase, i.e. the questionnaires) were conducted in a fully incentive compatible way. There was no deception used in this research. In the experiment, we used points as experimental currency units (ECUs) that were then converted into Euros at the end of the sessions at a rate of 100 points = 4 Euros. An experimental session lasted for about 50 minutes and subjects earned 9.8 Euros (min = 6.9 Euros, max = 12.0 Euros) on average.

### **2.1 Phase 1: Measuring Social Value Orientation**

Upon arrival at the laboratory, subjects were randomly assigned to computer workstations by drawing shuffled cards and were then asked to read the printed instructions that had been placed on their desks in advance. The instructions explained that they were about to answer fifteen questions of how to allocate monetary resources between themselves and an anonymous other person. They were also informed that one randomly selected decision would be relevant for payment, resulting in a real payoff for themselves and an anonymous other person. Subjects were further informed that there would be a second phase of the experiment, but they received no information about the tasks in the second phase at this point. After all subjects had finished reading the instructions they were given the opportunity to ask questions. After each subject indicated his or her understand-

ing of the instructions regarding phase 1 of the experiment, the subjects completed the SVO Slider Measure, which was implemented in the form of the z-Tree module developed by Crosetto, Weisel, & Winter (2012).

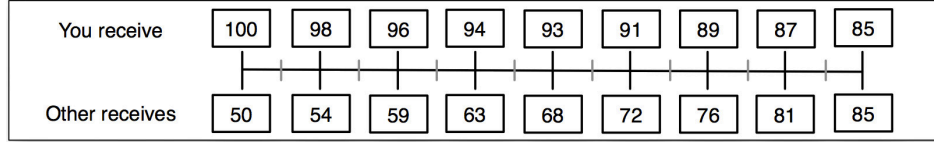


Figure 1: One exemplary item of the SVO Slider Measure

The SVO Slider Measure (Murphy et al., 2011) consists of six primary and nine secondary items. In each of these 15 items there is a well structured range of options of how to allocate resources (i.e. experimental currency units [ECUs]) between the decision maker and another entity (typically an anonymous other person). Figure 1 shows one of the 15 items as an example. From a decision maker's pattern of choices in the primary items, a continuous score of that person's SVO can be computed in terms of an angle ( $SVO^\circ$ ). A positive angular degree indicates a positive concern for the other's payoff (up to perfect prosociality where  $SVO^\circ = 45$ , or even altruism where  $SVO^\circ > 45$ ), while an exclusively selfish person would score an  $SVO^\circ = 0$ .<sup>1</sup> A negative angular degree indicates a negative concern for the other person's payoff (which indicates the willingness of a decision maker to give up resources in order to reduce the payoff of another person).  $SVO^\circ$  can be transformed (by taking its tangent) into the parameter  $\alpha$  which represents the weight the decision maker attaches to the payoff for another person in a simple social preference utility function  $U(\pi_s, \pi_o) = \pi_s + \alpha * \pi_o$ , where  $\pi_s$  is the payoff for the self (i.e. for the decision maker), and  $\pi_o$  is the payoff for the other person.

<sup>1</sup>More precisely, individualism is indicated by any value of  $SVO^\circ$  within the interval  $[-7.82, 7.82]$  (for further details, see Murphy et al., 2011).

## 2.2 Phase 2: Measuring orientations regarding the environment and people in need

At the beginning of the second phase of the experiment subjects were informed on their computer screens that they would again make distributive decisions, but this time the other party would be a nonprofit organization (NPO) supporting a particular cause. We selected four different causes and employed a within-subjects design, such that each subject completed the Slider Measure with respect to each of the four causes in randomized order. The four selected causes are the following:

1. *CO<sub>2</sub> compensation*  
(Condition:  $EC_1$ , Measure  $EVO_1$ )
2. *Rainforest preservation*  
(Condition:  $EC_2$ , Measure  $EVO_2$ )
3. *Preservation of endangered animals*  
(Condition:  $EC_3$ , Measure  $EVO_3$ )
4. *Medical humanitarian aid*  
(Condition:  $SC$ , Measure  $HVO$ ).

The first three causes cover environmental sustainability in a broader sense, while the fourth cause addresses social sustainability. For simplicity, we refer to the first three causes as Environmental Causes ( $EC_{1,2,3}$ ), and refer to the fourth cause as the Social Cause ( $SC$ ). The corresponding measures are referred to as assessments of Environmental Value Orientations ( $EVO_{1,2,3}$ ), and Humanitarian Value Orientation ( $HVO$ ), respectively. For assessing  $EVO_1$ ,  $EVO_2$ , and  $EVO_3$  subjects were informed that the resources allocated to the other party will be transferred to a qualified NPO enforcing “climate protection through projects to reduce carbon emissions” ( $EC_1$ ), “the preservation of the rainforest by means of buying forest areas” ( $EC_2$ ), and “the preservation of biodiversity by means of protecting endangered animals” ( $EC_3$ ), respectively. Finally, for assessing  $HVO$ , subjects were informed that the resources allocated to the other party will be transferred to a qualified NPO providing “medical aid for people affected by catastrophies” ( $SC$ ). The corresponding organizations were (1) Atmosfair, (2) Save the Rainforest (Rettet den Regenwald e.V.), (3) World Wildlife Fund (WWF) and (4) Doctors Without Borders. However, the names of the four NPOs were not revealed to the subjects at this point of the experiment. Subjects were only informed that all the organizations are active on a global scale and have a verifiable guarantee for how donated money is used. The names of the organizations were not revealed to the subjects in order to avoid biased responses from individuals with strong (positive or negative) feelings regarding a particular organization; the intention of this experimental design feature was to focus subjects’ attention on

the causes rather than the organizations. The four different causes were presented in random order to counter order effects.

After reading the instructions for the second phase of the experiment, subjects were shown the description of the first cause on their screen and asked to comment on what they thought about it. After making their comments, subjects filled out the six primary Slider Measure items with respect to the corresponding cause itself as the other party. After all subjects completed all decisions, they were presented with the next cause; this procedure continued until all the allocation decisions for all four of the different causes were made.

A total of 291.44 Euros were allocated to non-profit organizations by subjects in the randomly drawn decisions of phase 2 and money was then transferred to the corresponding organizations by the authors after data collection had been completed. As promised in the instructions, subjects received an email containing the confirmation and receipts of the transfers.

## **2.3 Phase 3: Questionnaires**

In the third and final phase of the experiment, subjects completed several questionnaires to assess their attitudes and behaviors with respect to environmental and social issues, as well as with respect to the causes they had been presented. Concretely, the subjects were first asked to rate the importance of each of the four causes and then to rank the four causes from most important to least important and do so without ties. Also, for each of the four causes subjects were asked to rate how effective they think it is to support the corresponding cause by means of monetary transfers. Further, the subjects were asked about their attitudes towards charitable giving and non-profitable organizations in general. Subsequently, the subjects were asked to complete the Environmental Attitude Scale (EnvAtt; Diekmann & Preisendörfer, 2001), the General Ecological Behavior Scale (GEB; Kaiser, 1998) and four subscales of the Sustainable Development Value Scale (SDV; Shepherd, Kuskova, & Patzelt, 2009), namely equality considerations (SDV<sub>equ</sub>), solidarity considerations (SDV<sub>sol</sub>), respect for nature (SDV<sub>nat</sub>), and shared responsibility considerations (SDV<sub>resp</sub>). Additionally, we used a scale by Stern, Dietz, & Kalof (1993) for measuring beliefs in adverse consequences (AC) for the self (AC<sub>ego</sub>), for others (AC<sub>soc</sub>), for the biosphere (AC<sub>bio</sub>), and also including a scale assessing the willingness to take political action for protecting the environment (AC<sub>polit</sub>).

Of the total 110 subjects participating in the experiment, 12 subjects showed an intransitive choice pattern in at least one of the five Slider Measures they had completed (i.e. in at least one of the five measures: SVO, EVO<sub>1,2,3</sub>, and HVO). We exclude those cases and base our analysis on those 98 subjects who showed fully transitive choice patterns in each of the conditions.

### 3 Results

#### 3.1 Differences in distributions of social and environmental concerns

Figure 2 is a dense plot that shows much of the data from this study. It shows the distributions of SVO, the three EVOs, and HVO on the left side, and on the right side scatterplots displaying the relation between SVO on  $x$ -axes, and  $EVO_{1,2,3}$  as well as HVO on the  $y$ -axes. Descriptive statistics concerning the five distributions are reported in Table 1, while Table 2 reports non-parametric test statistics informing about the differences between the distributions. The distribution of SVO angles is not significantly different from the distribution of EVO angles, except for  $EVO_2$ . Concretely, the weights people attach to the cause of preserving the rain forest are higher than the weights they attach to the monetary benefit of an anonymous other person on the aggregate. However, the distribution of HVO angles is significantly different from the distribution of SVO angles as well, and moreover it is different from the distribution of both  $EVO_1$  and  $EVO_3$  angles. Concretely, the distribution of HVO angles is shifted to the right compared to the distributions of SVO and  $EVO_{1,3}$ . That is, people are willing to pay about as much (or –compared to  $EVO_2$ – slightly less) for the benefit of an anonymous other person as they are willing to pay for supporting environmental causes on the aggregate, but show a substantially higher willingness to pay for the cause of providing medical humanitarian aid in general. That is, the median of HVO angles is significantly higher than the median of SVO angles and higher than any of the three EVO angles’ medians (see Table 2). Also, the proportion of altruistic choice patterns is substantially higher in HVO (15.5%) as compared to  $EVO_{2,3}$  (8.2% in each),  $EVO_1$  (3.6%), and SVO (0%). On average, subjects are willing to give up .77 monetary units in order to increase the donation to medical humanitarian aid by one monetary unit, while they are only willing to give up between .46 and .62 monetary units in order to increase the donations to environmental causes –or increase an anonymous other person’s payoff– by one monetary unit (see Table 1). If we consider all decisions made by subjects in the Slider Measure, the average donation–had we paid out all decisions– in the SC condition is 71.5 ECUs, compared to the maximum average donation of 68.42 ECUs in the environment conditions (i.e.  $EC_2$ ). In other words, subjects’ donated 4.5% more in the CS condition than in the most “profitable” EC condition. This difference does not appear very large *per se*, but if we consider worldwide fund raising, a 4.5% increase would have a considerable impact.

#### 3.2 Relations between the different orientations and other scales

Table 3 shows the correlations among all the scales we have assessed in this study along with SVO,  $EVO_{1,2,3}$ , and HVO. As indicated in Table 3 and visualized in the scatterplots in Figure 2, SVO is significantly and highly correlated with all three EVOs, as well as with HVO. This

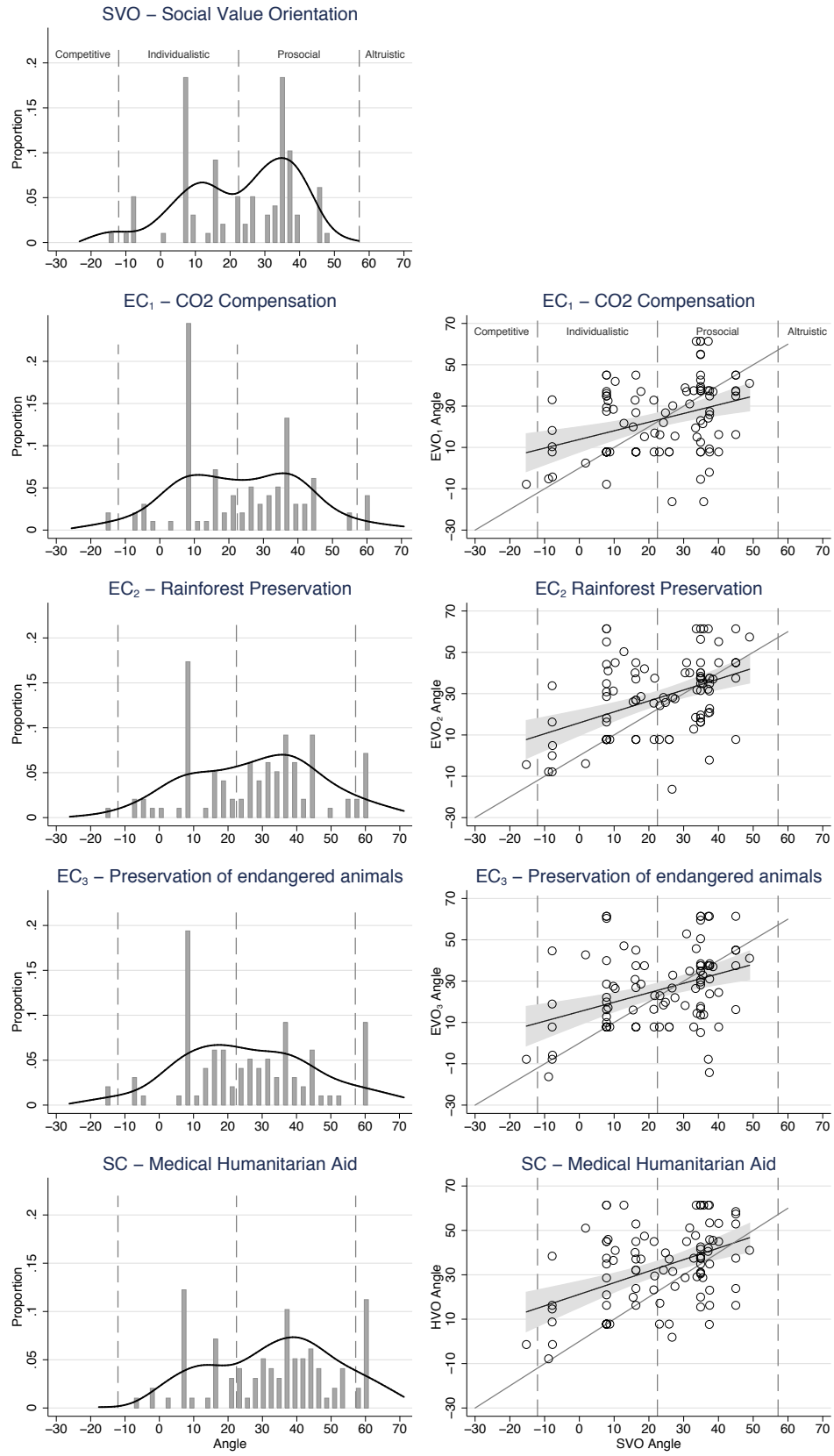


Figure 2: SVO, EVO<sub>1,2,3</sub>, and HVO

Table 1: Descriptive statistics of SVO, EVO<sub>1,2,3</sub>, and HVO angles

Condition	Median	Mean	Std.Dev.
SVO	25.8° (.48)	23.1° (.46)	15.3° (.32)
EVO <sub>1</sub>	23.6° (.44)	23.5° (.50)	17.9° (.45)
EVO <sub>2</sub>	29.7° (.57)	28.1° (.62)	18.6° (.51)
EVO <sub>3</sub>	25.5° (.48)	25.8° (.57)	18.7° (.51)
HVO	36.8° (.75)	33.2° (.77)	18.0° (.53)

*Note:* The values reported in parentheses are the corresponding descriptives of the weights  $\alpha$  which result from taking the tangent of the subjects' angles. These  $\alpha$  values facilitate the interpretation of how much weight is put on the benefit to the other party in relation to a DM's own welfare, i.e. what proportion of a unit of one's own monetary holdings would a decision maker be willing to give up in order to increase the other party's payoff by exactly one monetary unit.

Table 2: Results of K-S tests and Wilcoxon signed rank tests for differences between distributions and medians among the variables SVO, EVO<sub>1,2,3</sub> and HVO

	SVO	EVO <sub>1</sub>	EVO <sub>2</sub>	EVO <sub>3</sub>
SVO				
EVO <sub>1</sub>	.11			
EVO <sub>2</sub>	.21*	.13		
EVO <sub>3</sub>	.16	.08	.11	
HVO	.32***	.24**	.15	.24**

*Note:* D-statistics from K-S tests are reported. Levels of statistical significance are indicated as  $p^* < .05$ ,  $p^{**} < .01$ , and  $p^{***} < .001$ . Gray cells indicate significant differences (at least at  $p < .05$ ) in the median between the corresponding variables as indicated by Wilcoxon signed rank tests.

suggests that social and environmental values are closely related. Interestingly, the correlations between HVO and the three EVOs are higher –and remarkably so, even when we control for SVO as well as subjective ratings of cause importance and effectiveness– than the correlation between HVO and SVO. There are at least three possible explanations for this pattern of results. First, social and environmental concerns are fundamentally intertwined and can not be clearly disentangled. Second, people vary on a latent variable such as “general inclination to give for a charitable project”, or a “left-green political attitude”, which makes a subject roughly equivalently supportive of a range of different causes, including environmental and social issues. Or third, a combination of the two former possibilities is responsible for the high covariation among the variables.

The results of an exploratory factor analysis show that SVO, EVO<sub>1,2,3</sub>, and HVO –and only these five variables– all load on the same rotated factor, while other scales aiming at measuring

Table 3: Correlations among all scales

	SVO	EVO <sub>1</sub>	EVO <sub>2</sub>	EVO <sub>3</sub>	HVO	EnvAtt	ACtot	ACego	ACsoc	ACbio	ACpolit	SDVtot	SDVequ	SDVsol	SDVnat	SDVresp	GEB
SVO	-																
EVO <sub>1</sub>	<b>0.36</b>	-															
EVO <sub>2</sub>	<b>0.44</b>	<b>0.64</b>	-														
EVO <sub>3</sub>	<b>0.37</b>	<b>0.64</b>	<b>0.69</b>	-													
HVO	<b>0.44</b>	<b>0.54</b>	<b>0.71</b>	<b>0.69</b>	-												
EnvAtt	0.12	<b>0.33</b>	<i>0.27</i>	<i>0.24</i>	0.14	-											
ACtot	0.09	<b>0.37</b>	<i>0.31</i>	<b>0.34</b>	0.16	<b>0.77</b>	-										
ACego	0.13	<b>0.26</b>	0.11	<i>0.24</i>	<i>0.23</i>	<b>0.36</b>	<b>0.56</b>	-									
ACsoc	-0.00	0.19	0.10	0.11	-0.04	<b>0.56</b>	<b>0.72</b>	0.25	-								
ACbio	0.04	0.17	0.22	<b>0.28</b>	0.07	<b>0.46</b>	<b>0.64</b>	0.13	<b>0.44</b>	-							
ACpolit	0.09	<b>0.37</b>	<b>0.34</b>	<i>0.31</i>	0.16	<b>0.71</b>	<b>0.84</b>	<b>0.36</b>	<b>0.45</b>	<i>0.29</i>	-						
SDVtot	0.07	<b>0.30</b>	<i>0.22</i>	<i>0.23</i>	<i>0.20</i>	<b>0.47</b>	<b>0.60</b>	<b>0.36</b>	<b>0.45</b>	<i>0.29</i>	<b>0.54</b>	-					
SDVequ	0.11	0.18	0.02	0.13	0.08	<b>0.34</b>	<b>0.45</b>	<i>0.26</i>	<b>0.33</b>	<i>0.29</i>	<b>0.37</b>	<b>0.76</b>	-				
SDVsol	0.13	<b>0.35</b>	<i>0.28</i>	<i>0.28</i>	<b>0.34</b>	<b>0.35</b>	<b>0.42</b>	<b>0.38</b>	<i>0.26</i>	<i>0.25</i>	<i>0.31</i>	<b>0.76</b>	<b>0.52</b>	-			
SDVnat	0.02	<i>0.22</i>	<i>0.21</i>	0.15	0.08	<b>0.53</b>	<b>0.61</b>	<i>0.27</i>	<b>0.51</b>	<i>0.26</i>	<b>0.60</b>	<b>0.80</b>	<b>0.45</b>	<b>0.45</b>	-		
SDVresp	-0.02	0.19	0.20	0.17	0.15	<i>0.25</i>	<b>0.38</b>	<i>0.23</i>	<i>0.27</i>	0.12	<b>0.39</b>	<b>0.79</b>	<b>0.41</b>	<b>0.47</b>	<b>0.54</b>	-	
GEB	0.18	<b>0.45</b>	<b>0.34</b>	<i>0.26</i>	<i>0.22</i>	<b>0.49</b>	<b>0.51</b>	<i>0.31</i>	<b>0.36</b>	0.13	<b>0.55</b>	<b>0.42</b>	<i>0.29</i>	<i>0.25</i>	<b>0.46</b>	<i>0.30</i>	-

*Note:* Statistical significance at the  $p \leq .05$ -level is indicated by *italicized* font, while significance at the  $p \leq .01$ -level is indicated by ***bold italicized*** font, and significance at the  $p \leq .001$ -level is indicated by **bold** font. The abbreviations indicate the following measures: SVO: Social Value Orientation; EVO<sub>1</sub>: CO<sub>2</sub> compensation; EVO<sub>2</sub>: Rainforest preservation; EVO<sub>3</sub>: Preservation of endangered animals; HVO: Humanitarian value orientation; EnvAtt: Environmental attitude; ACtot: All AC scales; ACego: Egoistic AC scale; ACsoc: Social AC scale; ACbio: Biospheric AC scale; ACpolit: Political AC scale; SDVtot: Complete SDV scale; SDVequ: SDV equality scale; SDVsol: SDV solidarity scale; SDVnat: SDV respect for nature scale; SDVresp: SDV shared responsibility scale; GEB: General ecological behavior scale.

proenvironmental concerns (such as EnvAtt, the AC scales, and GEB) load on a different factor (see Table 4). This result suggests that there is a latent variable that explains a significant proportion of variance shared by SVO, all three EVOs, and HVO together, which might indeed be interpreted as a “general inclination to give” or a “willingness to make individual sacrifices for collective goods”. But nevertheless, the variables EnvAtt, the total AC scale, and GEB –i.e. the variables we consider the benchmarks for environmental attitude measures in this study– show significant correlations of considerable magnitude with all three EVOs, while their correlations with SVO and HVO are substantially lower and often not statistically significant (see Table 3). Hence, there is evidence for the convergent validity of the three EVO assessments, even if they have differential loadings.

### 3.3 Importance and effectiveness ratings of the four causes

Along with the weight people attach to the four different causes (i.e. EVO<sub>1,2,3</sub> and HVO), we have also elicited the subjects’ opinions about the importance of these causes and how effective pecuniary support for these causes is perceived to be. Figure 3 shows the descriptive statistics in

Table 4: Factor analysis

	Varimax rotation			No rotation		
	Factor I	Factor II	Factor III	Factor I	Factor II	Factor III
SVO	0.50	0.03	0.02	0.38	-0.33	-0.02
EVO <sub>1</sub>	0.68	0.28	0.15	0.70	-0.26	-0.06
EVO <sub>2</sub>	0.84	0.21	0.04	0.73	-0.45	-0.13
EVO <sub>3</sub>	0.80	0.16	0.10	0.70	-0.43	-0.04
HVO	0.84	-0.04	0.18	0.64	-0.56	0.13
EnvAtt	0.14	0.79	0.19	0.64	0.45	-0.26
ACego	0.16	0.29	0.33	0.42	0.17	0.12
ACsoc	-0.05	0.61	0.24	0.42	0.50	-0.12
ACbio	0.12	0.40	0.16	0.38	0.21	-0.09
ACpolit	0.19	0.79	0.21	0.68	0.42	-0.24
SDVequ	-0.02	0.29	0.62	0.41	0.40	0.37
SDVsol	0.25	0.17	0.75	0.58	0.18	0.54
SDVnat	0.03	0.60	0.48	0.57	0.51	0.09
SDVresp	0.08	0.27	0.56	0.45	0.30	0.33
GEB	0.25	0.57	0.17	0.58	0.23	-0.17

*Note:* This table shows the results of an exploratory factor analysis based on maximum likelihood estimation. Reported are the factor loadings of all variables we have assessed given a structure of three factors that provides an acceptable model fit. The abbreviations indicate the following measures: SVO: Social Value Orientation; EVO<sub>1</sub>: CO<sub>2</sub> compensation; EVO<sub>2</sub>: Rainforest preservation; EVO<sub>3</sub>: Preservation of endangered animals; HVO: Medical humanitarian aid; EnvAtt: Environmental attitude; ACego: Egoistic AC scale; ACsoc: Social AC scale; ACbio: Biospheric AC scale; ACpolit: Political AC scale; SDVequ: SDV equality scale; SDVsol: SDV solidarity scale; SDVnat: SDV respect for nature scale; SDVresp: SDV shared responsibility scale; GEB: General ecological behavior scale.

this respect. Clearly, the cause that is rated as most important and most effective on the aggregate is medical humanitarian aid (i.e. the SC). In fact, the absolute majority of subjects (52.04%) indicated that medical humanitarian aid is the most important cause among the four causes under consideration by assigning it the first rank.

Clearly people's higher willingness to pay for medical humanitarian aid as compared to environmental causes may be explained by higher subjective importance and effectiveness ratings. That is, the willingness to pay for a particular cause is dependent, at least in part, on how important and (especially) how effective monetary support for the corresponding cause is perceived to be (see Table 5 and Figure 4). However, even if we statistically control for the subjects' SVOs and their ratings of the four causes' importance and effectiveness, the subjects' willingness to pay for medical humanitarian aid is still significantly higher than their willingness to pay for any of the three environmental causes (see Table 6). Compared to the effect sizes of the control variables, the relative effect of the HVO dummy is rather small though.

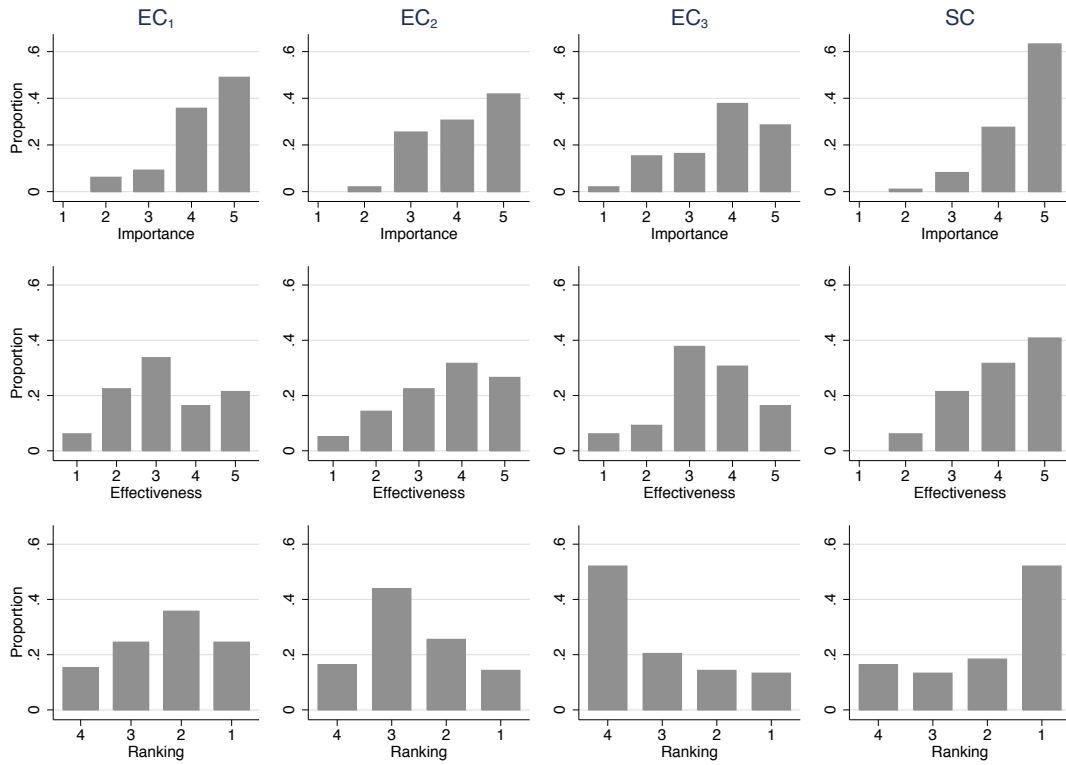


Figure 3: Subjective importance, effectiveness, and ranking of the four causes. Recall that EC<sub>1</sub> is CO<sub>2</sub> compensation; EC<sub>2</sub> is rainforest preservation; EC<sub>3</sub> is preservation of endangered animals; and SC is medical humanitarian aid.

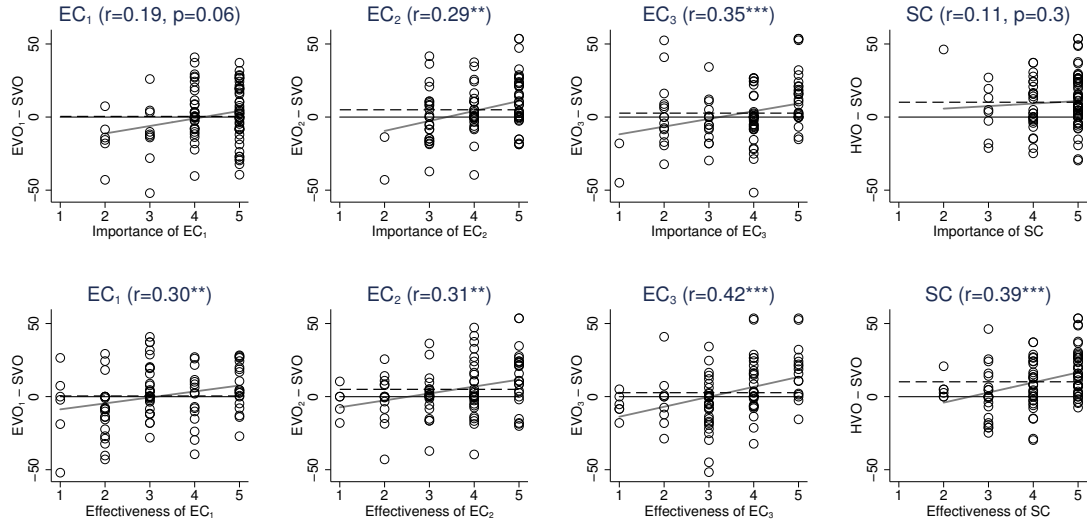


Figure 4: Spearman rank correlations between subjective importance / effectiveness, and shifts in angles. Levels of statistical significance are indicated as  $p^* < .05$ ,  $p^{**} < .01$ , and  $p^{***} < .001$ . The gray lines indicate the least square fit lines, and the dashed lines indicate the mean shifts. The positive slopes indicate that people who regard a particular cause as more important and effective also show a greater positive difference between their corresponding cause-specific value orientation (i.e.  $EVO_{1,2,3}$ , HVO) and their SVO.

Table 5: Subjective ratings of cause importance and effectiveness

	Importance of				Effectiveness of			
	EC <sub>1</sub>	EC <sub>2</sub>	EC <sub>3</sub>	SC	EC <sub>1</sub>	EC <sub>2</sub>	EC <sub>3</sub>	SC
EVO <sub>1</sub>	0.17	0.15	-0.02	-0.15	0.41	0.35	0.13	0.17
EVO <sub>2</sub>	0.14	0.35	0.04	-0.15	0.21	0.45	0.32	0.20
EVO <sub>3</sub>	0.00	0.15	0.29	-0.12	0.20	0.30	0.39	0.18
HVO	-0.03	-0.02	0.01	0.13	0.23	0.27	0.18	0.41

*Note:* This table shows the Spearman rank correlations between the ratings of importance and effectiveness with respect to each of the four causes on the one hand, and the cause-specific value orientation angles (EVO<sub>1,2,3</sub> and HVO) we have assessed on the other hand. Gray cells indicate significant correlations at least at the  $p < .05$  level.

Table 6: HVO impact when controlling for SVO, and ratings of importance and effectiveness

	CVO angles
SVO	.36***
Cause importance	.13*
Cause effectiveness	.33***
SC dummy	.06*
$R^2$	.33

*Note:* This table shows the results of an OLS regression with the angles from all the four conditions (i.e. EVO<sub>1,2,3</sub> and HVO) together as the dependent variable –here labeled as Cause-specific Value Orientation angles [CVO angles]. The predictors used here are SVO, cause effectiveness, cause importance, and a dummy for the SC condition (i.e. the condition in which HVO was assessed). Standardized beta values are reported. The model uses robust standard errors clustered on subjects as the independent units of observation. Levels of statistical significance are indicated as  $p^* < .05$ ,  $p^{**} < .01$ , and  $p^{***} < .001$ .

Table 7: OLS with SVO and awareness of consequences as independent variables

IVs	Dependent variables					
	EVO <sub>1</sub>	EVO <sub>2</sub>	EVO <sub>3</sub>	HVO	EnvAtt	GEB
SVO	0.35	0.44	0.36	0.43	0.07	0.18
ACego	0.20	0.05	0.18	0.20	0.20	0.23
ACsoc	0.09	-0.01	-0.07	-0.14	0.41	0.31
ACbio	0.09	0.20	0.28	0.10	0.25	-0.05
SVO*ACego	0.11	0.12	0.18	0.10	-0.16	0.15
SVO*ACsoc	-0.01	-0.04	0.06	0.08	0.00	-0.03
SVO*ACbio	-0.03	0.02	-0.06	-0.12	0.01	-0.02

*Note:* This table shows the results of six OLS regressions, and reports standardized beta weights. Gray cells indicate statistical significance of regression coefficients at least at the  $p < .05$  level.

### 3.4 SVO and awareness of consequences

Previous studies (e.g. Gärling et al., 2001; Joireman et al., 2001) have found an interaction effect between SVO and awareness of environmental consequences on proenvironmental behavior. Although addressing this issue is not the primary focus in this paper, our data allow us to test for such interaction effects. Table 7 shows the results of regressions where different measures of environmental behavior or attitudes (plus HVO as a point of reference) serve as the dependent variables, while we use SVO together with the AC scales as well as the interaction between the two as independent variables. In our study, we find no interaction effect between SVO and awareness of environmental consequences on measures of environmental behavior or attitude.

## 4 Discussion and conclusion

The present study aimed at clarifying the relation between social value orientations, behavioral and attitudinal proenvironmentalism, while also measuring social and environmental concerns by means of a consistent method in order to ensure a common basis of measurement. Furthermore, the study addressed the question whether, and if so to what extent, people are willing to pay relatively more for social and environmental causes.

We found that social (i.e. SVO & HVO) and environmental (i.e. EVO<sub>1,2,3</sub>) value orientations are strongly related to each other. However, we found no correlation of SVO *per se* with measures of proenvironmental attitudes and behavior apart from those assessed by means of the same method. In other words, evidence for the proposed method’s construct validity –i.e. assessing proenvironmental concern by means of the Slider Measure, or donation tasks in general– is mixed.

On the one hand, EVOs are significantly (and often highly) correlated with other measures of proenvironmental attitudes and behavior, indicating convergent validity. On the other hand, EVOs appear to be more closely related to SVO and HVO –two measures of concerns for other humans– than to other measures of proenvironmental attitudes and behavior, indicating a lack of discriminant validity. Our results indicate that when using donation tasks as a measure of proenvironmentalism, there may be confounding (method variance) effects insofar as these measures do not likely only capture proenvironmentalism, but also the subjects' general inclinations to give –or contribute to common goods–, which will generally be independent of the type of cause a particular donation is supporting –as long as it is something that is generally deemed a worthy goal– which is consistent with the findings from Van Lange et al. (2007). This does not invalidate the method *per se*, but it may severely obfuscate covariation with variables that are theoretically associated with the *cause-specific* donation decisions.

In this sense, we were only somewhat successful at clarifying the relation between social and environmental value orientations. The structure of the relation between social values on the one hand, and environmental values and behavior on the other hand, is still not completely clear. Generally, the pattern of results suggests that social and environmental concerns are intertwined to a considerable extent, yet the nature of the relation between the two concerns is not straightforward. The results of our study reveal parts of the reason why evidence for the relation between social and environmental concerns from other studies are mixed, namely because the two concerns do have a common source of variation, but that this source of variation itself is not strongly related to general ecological behavior or environmental attitudes as measured by Likert-type survey scales, but we conjecture more closely related to a general inclination to do good and contribute to the commons.

Finally, there is one notable and very clear finding, namely that people rate both the importance and effectiveness of humanitarian aid highest when compared to the environmental causes, and assign it the first rank. Moreover –and partially as a result of this supremacy–, the distribution of HVO angles is shifted to the right compared to the three EVO distributions, i.e. people are willing to pay more for humanitarian aid than they are willing to pay for environmental causes aiming at mitigating climate change (i.e.  $EC_{1,2}$  in our study). This has very important practice implications. It means that the proximate suffering of people in the present has a higher impact on the willingness to pay for a prosocial cause, compared to the consequences of global warming for climate, flora, and fauna.

Directly contributing resources to ameliorate the suffering of people is considered more attractive, more important, and more effective than contributions to environmental causes. This rank ordering of peoples' preferences would appear to have an anthropocentric structure (first humanitarian, then plants, animals, and inanimate and abstract qualities like  $CO_2$  levels). Rather than debate if this ranking is morally justified or proper, policy makers may be well advised to tune

their message to be concordant with these extant preferences. Rather than promote abstract benefits, or improvements to plant diversity and animal life, environmental issues should be couched in terms of mitigating immediate human suffering. Rather than show pictures of smoke stacks or a sad looking polar bear on a diminishing ice shelf, people may be more effectively motivated to make contributions by reminding them of the real human cost of climate change.<sup>2</sup> Recasting environmental goals as humanitarian undertakings builds on peoples' intrinsic prosocial preferences and establishes a direct pathway to promote and foster cooperative action. This change in viewpoint provides an opportunity for designers of campaigns or advertisements addressing environmental issues insofar as it may be far more effective to highlight and show the negative consequences of global warming *for humans* rather than showing ominous pictures of myriads of smokestacks, deforested areas, or sad-looking animals. Such a reorientation may promote cooperative behavior by bringing distant consequences to proximate awareness, thereby making the victims more salient (in this respect, see also Small & Loewenstein, 2003; Small, Loewenstein, & Slovic, 2007). People want to mitigate climate change not primarily for the sake of the planet, but first and foremost for the sake of humans, and it may thus be wise to highlight the end of saving humans rather than the means of saving the planet, therewith altering the perception of how effective it is to act environment-friendly while drawing upon people's endogenous social preferences.

## References

- Ackermann, K. A., Fleiß, J., & Murphy, R. O. (2014). Reciprocity as an individual difference. *Journal of Conflict Resolution*, *forthcoming*.
- Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, *84*, 888–918.
- Andreoni, J., Harbaugh, W., & Vesterlund, L. (2007). Altruism in experiments. In Durlauf, S and Blume, L (Ed.) *New Palgrave dictionary in economics*. Macmillan, 2 ed.
- Au, W., & Kwong, J. (2004). Measurements and effects of social-value orientation in social dilemmas: A review. In R. Suleiman, D. Budescu, I. Fischer, & D. Messick (Eds.) *Contemporary Psychological Research on Social Dilemmas*, (pp. 71–98). New York: Cambridge University Press.

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<sup>2</sup>As of June 2014, the [earthday.org](http://earthday.org) website shows several rotating pictures of the following images: a modern cityscape, a rain forest canopy, a herd of Asian elephants, sunflowers in a field, and an Indian temple in silhouette against a body of water. It is hard to find the human element in any of these images and this disconnect may undermine the intended goals of the proenvironmental organization, by focusing viewers' attention upon non-human consequences of climate change.

- Balliet, D., Parks, C., & Joireman, J. (2009). Social Value Orientation and Cooperation in Social Dilemmas: A Meta-Analysis. *Group Processes & Intergroup Relations*, 12(4), 533–547.
- Blanco, E., Lopez, M. C., & Coleman, E. A. (2012). Voting for environmental donations: Experimental evidence from Majorca, Spain. *Ecological Economics*, 75(0), 52 – 60.
- Cameron, L. D., Brown, P. M., & Chapman, J. G. (1998). Social value orientations and decisions to take proenvironmental action. *Journal of Applied Social Psychology*, 28(8), 675–697.
- Chaudhuri, A. (2011). Sustaining cooperation in laboratory public goods experiments: a selective survey of the literature. *Experimental Economics*, 14, 47–83.
- Cohen, J. (1983). The cost of dichotomization. *Applied Psychological Measurement*, 7(3), 249–253.
- Crosetto, P., Weisel, O., & Winter, F. (2012). A flexible z-Tree implementation of the social value orientation slider measure (Murphy et al. 2011) – manual –.
- Dawes, R. M. (1980). Social dilemmas. *Annual Review of Psychology*, 31, 169–193.
- Dawes, R. M., & Messick, D. M. (2000). Social dilemmas. *International Journal of Psychology*, 35(2), 111–116.
- Diekmann, A., & Preisendorfer, P. (1998). Environmental behavior – Discrepancies between aspirations and reality. *Rationality and Society*, 10(1), 79–102.
- Diekmann, A., & Preisendörfer, P. (2001). *Umweltsoziologie: Eine Einführung*. Rowohlt's Enzyklopädie. Rowohlt-Taschenbuch-Verlag.
- Eckel, C. C., & Grossman, P. J. (1996). Altruism in anonymous dictator games. *Games & Economic Behavior*, 16(2), 234–243.
- Eckel, C. C., & Grossman, P. J. (2003). Rebate versus matching: does how we subsidize charitable contributions matter? *Journal of Public Economics*, 87(3-4), 681 – 701.
- Eckel, C. C., & Grossman, P. J. (2004). Giving to secular causes by the religious and nonreligious: An experimental test of the responsiveness of giving to subsidies. *Nonprofit and Voluntary Sector Quarterly*, 33(2), 271–289.
- Eckel, C. C., Herberich, D., & Meer, J. (2014). A field experiment on directed giving at a public university. Manuscript in preparation.

- Faruqui, A., Sergici, S., & Sharif, A. (2010). The impact of informational feedback on energy consumption – A survey of the experimental evidence. *Energy*, 35(4), 1598–1608.
- Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature*, 425(6960), 785–791.
- Fischbacher, U. (2007). z-tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, 10(2), 171–178.
- Frederick, S., Loewenstein, G., & O'Donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of Economic Literature*, 40(2), 351–401.
- Gärling, T., Fujii, S., Gärling, A., & Jakobsson, C. (2001). Moderating effects of social value orientation on determinants of proenvironmental behavior intention. *Journal of Environmental Psychology*, 23(1), 1–9.
- Greiner, B. (2004). An online recruitment system for economic experiments. In K. Kremer, & V. Macho (Eds.) *Forschung und wissenschaftliches Rechnen 2003. GWDG Bericht 63*, (pp. 79–93). Göttingen: Ges. für Wiss. Datenverarbeitung.
- Hardin, G. (1968). The tragedy of the commons. *Science*, 162(3859), 1243–1248.
- Interis, M. G., & Haab, T. C. (2014). Norms, self-sanctioning, and contributions to the public good. *Journal of Environmental Psychology*, 38(in progress), 271 – 278.
- IPCC (2013). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
- Joireman, J., Lasane, T., Bennett, J., Richards, D., & Solaimani, S. (2001). Integrating social value orientation and the consideration of future consequences within the extended norm activation model of proenvironmental behaviour. *British Journal of Social Psychology*, 40, 133–155.
- Joireman, J., Van Lange, P., & Van Vugt, M. (2004). Who cares about the environmental impact of cars?: Those with an eye toward the future. *Environment and Behavior*, 36(2), 187–206.
- Kaiser, F. G. (1998). A general measure of ecological behavior. *Journal of Applied Social Psychology*, 28, 395–422.
- Kaiser, F. G., & Wilson, M. (2004). Goal-directed conservation behavior: The specific composition of a general performance. *Personality and Individual Differences*, 36, 1531–1544.
- Kollock, P. (1998). Social dilemmas: The anatomy of cooperation. *Annual Review of Sociology*, 24, 183–214.

- Ledyard, J. (1995). Public goods: a survey of experimental research. In J. Kagel, & A. Roth (Eds.) *Handbook of Experimental Economics*. Princeton University Press, Princeton.
- Li, S. X., Eckel, C. C., Grossman, P. J., & Brown, T. L. (2011). Giving to government: Voluntary taxation in the lab. *Journal of Public Economics*, 95(9-10), 1190–1201.
- MacCallum, R., Zhang, S., Preacher, K., & Rucker, D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods*, 7(1), 19–40.
- McKenzie-Mohr, D. (2000). Promoting sustainable behavior: An introduction to community-based social marketing. *Journal of Social Issues*, 56(3), 543–554.
- Milinski, M., Semmann, D., Krambeck, H.-J., & Marotzke, J. (2006). Stabilizing the earth's climate is not a losing game: Supporting evidence from public goods experiments. *PNAS*, 103(11), 3994–3998.
- Murphy, R., Ackermann, K., & Handgraaf, M. (2011). Measuring social value orientation. *Judgment and Decision Making*, 6(8), 771–781.
- Murphy, R. O., & Ackermann, K. A. (2014a). Explaining behavior in public goods games: How preferences and beliefs affect contribution levels. Manuscript submitted for publication.
- Murphy, R. O., & Ackermann, K. A. (2014b). Social value orientation: Theoretical and measurement issues in the study of social preferences. *Personality and Social Psychology Review*, 18(1), 13–41.
- Ostrom, E. (2014). A polycentric approach for coping with climate change. *Annals of Economics and Finance*, 15(1), 71–108.
- Pickett, G. M., Kangun, N., & Grove, S. J. (1993). Is there a general conserving consumer? a public policy concern. *Journal of Public Policy & Marketing*, 12(2), 234–243.
- Schuler, J. (2012). *Von der Schwierigkeit des Studiums prosozialen Verhaltens: Weinstein et al. revisited*. Master's thesis, University of Mannheim.
- Schultz, P. W., & Oskamp, S. (1996). Effort as moderator of the attitude-behavior relationship: General environmental concern and recycling. *Social Psychology Quarterly*, 59(4), 375–383.
- Schwartz, S. (1970). Moral decision making and behavior. In J. Macauley, & L. Berkowitz (Eds.) *Altruism and helping behavior*. New York: Academic Press.
- Schwartz, S. (1975). The justice of need and the activation of humanitarian norms. *Journal of Social Issues*, 31, 111–136.

- Shepherd, D. A., Kuskova, V., & Patzelt, H. (2009). Measuring the values that underlie sustainable development: The development of a valid scale. *Journal of Economic Psychology*, 30(2), 246 – 256.
- Small, D. A., & Loewenstein, G. (2003). Helping a victim or helping the victim: Altruism and identifiability. *Journal of Risk and Uncertainty*, 26(1), 5–16.
- Small, D. A., Loewenstein, G., & Slovic, P. (2007). Sympathy and callousness: The impact of deliberative thought on donations to identifiable and statistical victims. *Organizational Behavior and Human Decision Processes*, 102(2), 143–153.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behavior: An integrative review and research agenda. *Journal of Environmental Psychology*, 29, 309–317.
- Stern, P., Dietz, T., & Kalof, L. (1993). Value orientation, gender, and environmental concern. *Environment and Behavior*, 25(3), 322–348.
- Stern, P. C., & Oskamp, S. (1987). Managing scarce environmental resources. In D. Stokols, & I. Altman (Eds.) *Handbook of Environmental Psychology*, vol. 2, (pp. 1043–1088). Wiley, New York.
- Van Lange, P., Bekkers, R., Schuyt, T., & Van Vugt, M. (2007). From games to giving: Social value orientation predicts donations to noble causes. *Basic and Applied Social Psychology*, 29(4), 375–384.
- Van Vugt, M., Meertens, R., & Van Lange, P. (1995). Car versus public transportation? The role of social value orientations in real-life social dilemmas. *Journal of Applied Social Psychology*, 25(3), 258–278.
- Van Vugt, M., Van Lange, M., P. A., & Meertens, R. M. (1996). Commuting by car or public transportation? A social dilemma analysis of travel mode judgements. *European Journal of Social Psychology*, 26, 373–395.