The Motivating Effect of Reasons on Pro-Environmental Behavior

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Abstract

The values-as-truism principle from Maio and colleagues (2001) has been applied to numerous values. This study takes this principle into account and applies it to biospheric values. It investigates the effect of cognitive support for biospheric values on pro-environmental behavior (PEB). Furthermore, it takes a look into whether locus of control moderates this relationship. Building on the values-as-truism principle, we hypothesize that participants who provide reasons for their biospheric values and thus provide cognitive support would provide greater PEB, as measured by their willingness to volunteer for a made-up litter-picking event. Furthermore, we hypothesize that locus of control moderates this effect. We conducted an online experiment with 66 participants who were either assigned to a reason-salient condition, the experimental condition, or a value-salient condition, the control condition. In the experimental condition, people had to write down reasons for why or why not biospheric values were important to them, whereas in the control condition they rated their feelings towards the value. Results from the independent samples t-test indicated that there was no statistically significant difference between the two groups. Additionally, the regression analyses indicated that locus of control did not significantly improve the model, since only a small percentage of the variance was explained by the model. These findings suggest that while cognitive support may theoretically increase pro-environmental behavior, the current evidence does not support its efficacy in increasing PEB or that locus of control plays a moderating role in this context. The study raises questions about the complexities of translating values into pro-environmental actions and highlights the need for further research to explore underlying factors influencing PEB.

Introduction

Climate change has been on researchers' minds and poses a threat to human existence (Stolberg & Jonas, 2021), and the effects could be sooner and more severe than before. If climate change were to continue at the current pace, this could have catastrophic consequences (Bartelmus, 2015). For a long time now, scientists have known that one of the main causes that increases Earth's temperature is human activities, such as fossil fuel combustion (Bergquist et al., 2022) and marine littering (Lincoln et al., 2022). People often view climate change as worrying, yet fail to recognize the importance of causes (Webber, 2006). This means that there is not enough done by humans to slow or even reverse the effects of climate change. For this to happen, it is relevant for our species to engage in pro-environmental behavior (PEB; Tian & Liu, 2022). PEB can be defined as any behaviour that is in accordance with reducing environmental issues and preserving environmental sustainability. It has been demonstrated that PEB can achieve this by lowering pollution emissions, minimising resource waste (e.g. by recycling) and lessening environmental harm. (Lee & Kahn, 2020).

There might be a way to encourage more pro-environmental behavior. Strongly endorsing biospheric values are linked to more pro-environmental behavior. Values are desired states or trans-situational goals that act as guidelines for individuals (Schwartz, 2012; Oyserman, 2000). Values therefore have the capacity to simultaneously affect a variety of beliefs, attitudes, and behaviors (Ponizovskiy et al., 2019). Schwartz (2012) found that values can be sorted in a circular matter, which are differentiated by their underlying motivation of goal. The elements are contrasted, you have openness to change across from conservation, and self-enhancement is across from self-transcendence (Schwartz, 2012). Humans have multiple values, and all endorse them to different extents.

Those of importance when it comes to pro-environmental behavior are biospheric values. Biospheric values refer to the intrinsic worth of the natural environment and its ecosystems (Steg & De Groot, 2012). Biospheric values encourage a perspective that respects and values the natural world, promoting actions that support environmental health and sustainability (Nguyen et al., 2016). Personal biospheric values frequently indirectly predict a range of pro-environmental behaviors (Schultz and Zelezny, 1999). De Groot and Steg (2009) found evidence for this as well. They offered two methods for encouraging consistent environmentally friendly behavior. The first method involves making altruistic and biospheric values more salient in particular contexts, which lessens the relative strength of egoistic values. The second method is by making "anti-environmental" egoistic ideals compatible with "pro-environmental" altruistic and biospheric values (De Groot and Steg, 2009).

However, values can act as truisms (Maio & Olson, 1998). When people think very strongly about a certain value, they should have enough reasons to support said value. Yet Rokeach (1973) mentioned that values are learned, and that this is done in an “all-or-none” manner. A result of this can be that people are taught that a certain value is important without conscious reasoning about the value. There is simply an assumption that the value is of importance. When this assumption is made, there is little to no cognitive support for the value. By this, it means that people are not actively thinking and reflecting on their values, and how their thoughts align with their values. In turn, when there is no cognitive support for a value, in our case the biospheric value, people are less likely to act according to their values, because they are not actively processing why these values are important. Therefore, there might be a value-behavior discrepancy (Maio et al., 2001).

This value-behavior discrepancy can be decreased by providing cognitive support for a value. To increase cognitive support for values, Maio and colleagues (2001) investigated whether giving reasons to values would increase pro-value behavior. Giving reasons for a

value means that there is an increase in cognitive support for that value. By reasoning, people are actively thinking, processing, and reflecting on why or why not a value is important. In their research they found that when participants thought of either positive or negative reasons for the value 'helpfulness', it gave significantly better results for actually behaving helpful, measured with how much time participants were willing to help. This was especially true with participants giving mostly positive reasons for the value. Significant evidence was found for the effect of reasons. Making reasons for a value salient helped with people behaving according to their values.

Helpfulness is not the only value for which evidence was found. Karremans (2006) found results in line with Maio and colleagues for the values 'honesty' and 'loyalty'. He found that making these values cognitive salient, they engaged in more honest behavior. Furthermore, when it comes to health, which to people is often perceived as a highly important value, it is also true that people act more in line with their values when they make the value 'health' reason salient (Tapper et al., 2012). Therefore, there is significant evidence that giving cognitive support, by giving reasons for values, there is an increase in value congruent behavior. Based on this principle, we investigate if this is the same for biospheric values.

Something that could have a moderating effect in the possible relationship between cognitive support for biospheric values and PEB, is locus of control. Locus of control is an individual's perception about the underlying main causes of events in their life (Rotter, 1954). A person can lean more towards an internal or an external locus of control. Internal locus of control means that the person believes that they are in control and that they take responsibility for their own actions. For instance, when a person with an internal locus of control will believe that when they succeed at work, this is entirely due to their own skills and hard work. Yet on the other side, when they fail, they put blame on themselves and can be harsh on

themselves. With an external locus of control, a person is more likely to blame external forces for their own actions. An example for this is that when they fail a test, it was either because the test was too hard or because they did not have proper time to study, rather than saying that they did not put in enough effort to study for the test (Findley and Cooper, 1983)

These variations in locus of control may make a difference when it comes to the effect between cognitive support and PEB, where locus of control can play a moderating factor. Cleveland and colleagues (2005) found four different dimensions of environmental locus of control. Two of them relate to an external locus of control (biospheric benevolence and corporate skepticism), while the other two relate to an internal locus of control (individual recycling efforts and economic motive). Therefore, when it comes to pro-environmental behavior in the form of litter picking, people with an internal locus of control are probably more likely to take responsibility for their pro-environmental behavior when they provide cognitive support for the biospheric value and thus will provide more time to such an event. Whereas people with an external locus of control are more likely to not take responsibility when it comes to pro-environmental behavior. They will therefore provide less PEB while providing cognitive reasoning for biospheric values.

In the current study we will apply Maio and colleagues (2001) values-as-truism principle and apply this to biospheric values. We will partly replicate the study in order to investigate: do people increase pro-environmental behavior when they give cognitive support for biospheric values? And does locus of control moderate this effect?

With these questions in mind, we hypothesize that:

H1: when participants provide more cognitive support for biospheric values by providing reasons for these values, they will provide more pro-environmental behavior than those who do not provide reasons.

H2: Locus of control will moderate this effect, where the effect of providing reasons will be stronger when people have a more internal locus of control.

Methods

The current study aims to investigate the effect of cognitive support by providing reasons for biospheric values on pro-environmental behavior. It replicates findings from the paper by Maio and colleagues (2001), closely following its methodological approach.

Participants

Participants were selected by means of a convenience sample, mostly done through social contacts from the researchers at the Rijksuniversiteit Groningen. We first had 124 participants. Out of these, four participants were removed due to not consenting to the research. A further 52 participants were removed due to not completing the experiment. Two more participants were removed from the analysis due to responses that were unserious, meaning they were not related to the study and implemented as a joke. This left us with 66 participants. Out of the participants, 25 were male, 37 were female, 2 classified as other and 2 preferred not to say. When it comes to age, 52 participants were in the age category 18-25, 13 participants were in the age category 26-38, and one was in the age category 59-65. Furthermore, 40 participants were students, accounting for 60.6% of the participants. 28 participants were assigned to the experimental condition and 38 participants were assigned to the control condition by using random assignment.

Procedure

The study was submitted to the ethics committee's fast-track procedure after being carried out in accordance with ethical criteria. Here, it was confirmed that the study was according to the guidelines. Initially, the study was supposed to be a lab study, like the study of Maio and colleagues (2001). This was not possible due to unforeseen circumstances.

Therefore, we converted the study into an online study, with the exact same procedure as planned.

General procedure. Participants had to do the study online. In the consent form, participants were informed that the study was about measuring their cognitive ability. This was deceiving, since that is not what was measured in the study. We informed them about this, to ensure that participants did not figure out the true aim of the study. After the consent form, participants were asked to fill out preliminary questionnaires on Qualtrics. These questionnaires contained the subjects agreeableness, locus of control, and climate anxiety. After this, the participants had to do a filler task, whereby the participants highlighted all the adjectives of a neutral excerpt from a Harry Potter text. This was to eliminate priming effects. When someone is exposed to one stimulus, it might subconsciously affect how they react to another stimulus. This phenomenon is known as the priming effect. After the filler task, the participants were randomly assigned to either the experimental or the control condition. Here they either gave reasons for three values or rated their feelings towards these. When they had done either condition, they were presented with a flyer for a made up litter picking event, the dependent variable. The participants were able to select a time slot for how long they were willing to volunteer at such an event. They could pick either no time, 10 minutes, 30 minutes, 60 minutes, or 120 minutes. These times are the same as those used in the research of Maio and colleagues (2001). This is where the deception happened. It seemed as if the event was not related to our study, but just an ask after the study was done. Whereas actually, this was the dependent variable. After the dependent variable, participants had to rate their feelings and attitudes towards the litter picking initiative. This was done on a 7-point likert-scale. After this, the participants were debriefed and told about the true aim of the experiment.

Experimental condition. In the experimental condition, after the preliminary questionnaires and the filler task, the participants had to write down as many reasons they

could think of, of why or why not a certain value was important for them. Participants completed a survey prompting them to articulate reasons supporting biospheric values. This survey was adapted from Maio et al. (2001). These questions aimed to make cognitive support salient by encouraging participants to reflect on how their thoughts align with their values. We asked the participants to write reasons about biospheric values, traditional values, and the value of self-direction. The first value was tradition. This was a filler value. We added this value to decrease the chance of participants figuring out the goal of the experiment. We did not use the data from this value in our analysis. After this, we presented the target value, namely biospheric values. This is the value we used in our analysis. When the participants had written down their reasons for this value, we presented them with the last value, namely self-direction. Self-direction was again a filler value. When the participants were done with this, they were presented with the flyer to select a timeslot, and then debriefed.

Control condition. The control group followed the structure as well. First the participants had to fill out the preliminary questionnaires and after that the filler task. Then the control condition started. The participants were asked to indicate their feelings about the three values: tradition, biospheric values, and self-direction. They had to rate their feelings about the values on ten 7-point semantic differential scales (-3 to +3), a rating scale used to measure opinions and attitudes towards a subject, in this case the three values. The scale uses bipolar adjectives such as strong-weak. Participants in the control group rated their feelings about biospheric values, traditional values, and self-direction values, with the latter two based on Schwartz's value survey (Schwartz, 1992). This survey emphasized the affective component of the same values as in the experimental group. We presented the traditions rating first, then we presented the biospheric value, and self-direction last. When they had done so, they were presented with the dependent variable and debriefed.

The only difference between the control (value-salient) and experimental (reason-salient) is that they either rate their feelings about the values or if they give reasons. The experimental group provides cognitive support for the values by making them reason-salient. The control group is value-salient, and does not imply cognitive support for the values.

The dependent variable. The dependent variable in this study is the participants' willingness to volunteer for a made-up litter-picking activity. This event was chosen because of it being a pro-environmental act. We disguised the litter-picking event as an event that was presented by the Green Office of the University of Groningen. The participants had to choose from different time slots, based on the time slots provided in the study of Maio and colleagues (2001). The time slots were no time, 10 minutes, 30 minutes, one hour, and two hours.

Materials

To assess participants' levels of agreeableness, the study utilized the mini-IPIP (Donnellan et al., 2006). This measure included items rated on a 5-point Likert scale. To assess participants' locus of control, the study utilized Internal-external locus of control (IE-4 short; Nießen et al., 2022). To assess participants' level of climate anxiety, the study utilized the Climate change anxiety scale (Clayton & Karazsia, 2020). This is a 13-item questionnaire climate anxiety scale. For this paper, only the IE-4 is of importance since this is the moderator chosen.

In this study, the moderation effect of locus of control was taken into account with the internal-external locus of control, IE-4 (short; Nießen et al., 2022). This questionnaire has its origins in Germany, but was adapted to an English version. The IE-4 is a short form (four items) to measure whether or not a person has an internal or an external locus of control, based on research by Rotter (1966). The first two items regard for an internal locus of control, with items such as "I am my own boss", and the third and fourth item regard for an external

locus of control, with items such as “fate often gets in the way of my plans”. Because of this, the last two items were reversed for the data processing. Higher scores on the last two items became lower scores and vice versa. With this being done, all four items on the IE-4 now measured to an internal locus of control. Participants had to rate indicate their feelings on a 5-point likert scale ranging from does not apply to applies completely. The mean score of the IE-4 with reversed items was (M = 3.572, SD = .652). The findings indicate that, overall, participants tend to believe that their actions and decisions are responsible for their outcomes, rather than external circumstances, which aligns with an internal locus of control orientation. This is reflected in the participants' slightly above-average scores on the internal locus of control scale, which could rate from 1-5. Cronbach’s alpha was calculated after reverse scoring the items to investigate internal reliability. Here Cronbach’s alpha (α = .465) indicates a low internal consistency.

For the dependent variable, a litter-picking event was made-up. The time slots chosen by participants are recorded as quantitative data to measure the extent of their pro-environmental behavior. The time slots are no time, 10 minutes, 30 minutes, one hour and two hours. In the control condition, there is a mean of M = 41.32 (SD = 37.57). In the experimental condition, there is a mean of M = 33.21 (SD = 30.92). This indicates that people in the control condition were willing to spend more time on the litter-picking event than those in the experimental condition. Overall, there was a mean of M = 37.88 (SD = 34.89). This means that on average, participants were willing to spend around 38 minutes at the litter picking event.

Results

All analyses were done in SPSS. The assumptions of normality, homoscedasticity, and linearity were met.

The effect of cognitive support on pro-environmental behavior

H1: when participants provide more cognitive support for biospheric values by providing reasons for these values, they will provide more pro-environmental behavior than those who do not provide reasons.

An independent samples t-test was conducted to assess whether the experimental manipulation affected the amount of time that participants volunteered for the litter picking event. This resulted in $t(64) = 0.931$, $p = .822$, $d = 0.23$, 95% CI [-25.48, 9.27]. The high p-factor ($p = .822$) shows that the findings were statistically insignificant, since it is significantly higher than the common alpha level of .05. This means that there is no statistically significant difference between the groups being compared. The t-value of 0.931 suggests that the means of the groups are close to each other. The effect size (Cohen's d) of 0.23 indicates a small effect, meaning that any difference, if present, is likely negligible. It also suggests a low probability of detecting an effect with a sample size of 66. The 95% confidence interval ranges from -25.48 to 9.27, which includes zero, further reinforcing the conclusion that there is no meaningful difference between the groups.

The moderating effect of locus of control

H2: Locus of control will moderate this effect, where the effect of providing reasons will be stronger when people have a more internal locus of control.

To investigate the moderating effect of locus of control on cognitive salience and pro-environmental behavior, a multiple regression was conducted. We first took a look at the effect without locus of control as a moderating variable. A regression was performed, resulting in $R^2 = .017$. This indicates that only 1.7% of the variance in the dependent variable can be explained by locus of control and cognitive salience as combined factors in the model. It suggests a very weak relationship between the variables and implies that the model does not

fit the data well, as the majority (98.3%) of the variance remains unaccounted for by the model. After this, an interaction effect was calculated. This resulted in $R^2 = .020$. This again indicates a very weak effect, with 2% of the variance explained by the model. The results indicate that the model including the moderator ($R^2 = .02$) explains very little additional variance in the dependent variable compared to the model without the moderator ($R^2 = .017$). The interaction effect had an overall model of $R^2 = .02$, $F(3, 62) = .413$, $p = .744$. The F-statistic ($F(3, 62) = 0.413$) and p-value ($p = 0.744$) suggest that the overall model, including the moderator, is not significantly different from a model without it.

Discussion

The current study aimed to explore the impact of cognitive support for biospheric values on pro-environmental behavior. Furthermore, it investigated the moderating effect of locus of control. Our findings do not support either hypothesis.

For the first hypothesis, H1: when participants provide more cognitive support for biospheric values by providing reasons for these values, they will provide more pro-environmental behavior than those who do not provide reasons, no support was found. When examining the results, the independent samples t-test revealed no statistically significant difference between the willingness to volunteer at the litter-picking event and the independent variable. The p-factor was too large to have a significant result. The t-value of suggests that the means of the groups are close to each other. The effect size indicates a small effect. The 95% confidence interval includes zero. There was no significant difference between participants who provided reasons and thus had cognitive support for biospheric values and those who did not. These findings suggest that, contrary to the expectations formed on previous research from Maio and colleagues (2001) as well as Karremans (2006) and Tapper and colleagues (2012), simply providing reasons for biospheric values does not necessarily translate to an increase in pro-environmental behavior.

For our second hypothesis, H2: Locus of control will moderate this effect, where the effect of providing reasons will be stronger when people have a more internal locus of control, we again did not find significant results. The regression analyses revealed a very weak relationship between locus of control, cognitive salience, and pro-environmental behavior. Only a very small percentage of the variance was explained by the variables. We did not find a strong effect in the moderation. Again, only a very small percentage of the variance was explained by the variables. This suggests that locus of control does not moderate on the relationship between cognitive support for biospheric values and pro-environmental behavior.

In our study we found several limitations. First, we did not end up replicating Maio et al (2001) study the way we had planned on. Because we could not do our study in person, we believe that this has influenced our results. People are more likely to comply with the research due to the authority of the experimenter (Tyler & Jackson, 2014; Bushman, 1984). Dickinson and colleagues (2022) found that authority can directly influence people's behavior by enhancing their perceived legitimacy. These findings can reflect back to our study as well. Since there was no authority while the participants were doing the experiment, the experiment may have been perceived as less legitimate. Therefore, it is possible that participants took the experiment as less serious.

Secondly, participants had to write down their answers on a laptop instead of writing them down with a pen and paper. Mueller and Oppenheimer (2014) found that students performed worse on conceptual questions than those who wrote things down. They found that using a laptop resulted in shallower processing. This was not only due to either distraction or difficulties with multitasking (Kay & Lauricella, 2011). This could have an influence on our study as well. It can be possible that students had shallower processing of the questionnaires than they would have had if they were to actually write it down on paper. Shallow processing

of the questionnaires may indicate less cognitive salience when typing their reasons. Therefore, it is possible that less cognitive support was provided in the reason salient group, and thus the results not being in line with the existing research.

Lastly, our study had a small sample size. Preliminary, it seemed sufficient, but it limited our statistical power to identify significant results. Any future studies should aim for a larger sample size in order to find significant findings.

Further research implications can include the study we were intended to do. By following the steps taken by Maio and colleagues (2001) in their research, it is possible to get significant results for biospheric values. Because we were unable to do a laboratory study, we faced some challenges. Because of the online study, there was limited authority and a chance of shallow processing due to doing the experiment on a computer. In further research, the study of Maio and colleagues (2001) could be better replicated in order to possibly find significant results for the relationship between cognitive support for biospheric values and pro-environmental behavior.

Furthermore, this study raises questions about whether providing reasons for biospheric values is enough to make people act more in line with their values. We did not find significant results when it comes to providing cognitive support for biospheric values and PEB. This calls for additional research into alternative methods of enhancing cognitive support. Further research could investigate different types of cognitive support, such as emotional appeals which are associated with biospheric values. It could be interesting to see whether this impacts pro-environmental behavior more substantially.

Nevertheless, the current study contributes to the understanding of the relationship between cognitive support for biospheric values and pro-environmental behavior. Despite our study not having significant results, the results do highlight the complexity of how we can

influence behavior, specifically pro-environmental behavior. It suggests that by providing cognitive support by providing reasons might not be enough to increase pro-environmental behavior.

Additionally, the results point to a potential disconnect between values and behavior. This suggests that there is a need for interventions that not only strengthen biospheric values but also transfer this into actual behavior. Such interventions can be through education.

To conclude, this study is a partial replication of the study done by Maio and colleagues (2001). In our study, we took the value-as-truism principle and applied it to biospheric values. We hypothesized that by providing cognitive support for values by thinking of reasons for these, people would engage in more pro-environmental behavior. Furthermore, we hypothesize whether the locus of control moderates this effect, where the effect of providing reasons will be stronger when people have a more internal locus of control. We did not find significant results for both hypotheses. The independent t-test indicated that there was no difference between the reason-salient group and the value-salient group. The regression analysis indicated that locus of control did not have a significant effect as a moderator, with a minimal variance of pro-environmental behavior explained by the model. Nevertheless, The study highlights the complexities involved when it comes to translating values into behavior.

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