

The Motivating Effects of Reasons, in a Pro-Environmental Behavior Context

Jeremi Korver

s4730623

Department of Psychology, University of Groningen

PSB3E-BT15: Bachelor Thesis

Group number: 2425_1a_04

Supervisor: dr. Elliot Sharpe

Second evaluator: unknown

In collaboration with: Khaled Alkhatib, Rixt Bootsma,

Sophie Hofstra, Stijn Landewe, Aida Mamedova

February 09, 2025

Abstract

This study explores whether cognitive support (explicit reasoning) for biospheric values enhances pro-environmental behavior and whether agreeableness moderates this effect. This is a replication study based on Maio et al., (2010), in which they tested cognitive support for prosocial values and helpfulness. We hypothesized that participants who generate reasons for biospheric values would engage more in pro-environmental behavior than participants who rate their feelings about these values. We also expected that individuals who score higher in the personality trait agreeableness would respond more strongly to cognitive support, given its association with self-transcendent values. 72 participants were randomly assigned to an experimental condition (reasons salient) or control condition (value salient), and pro-environmental behavior was measured through donated time for a simulated litter-picking event. Results showed no significant difference between these conditions, and agreeableness was no moderator in this relationship. These findings suggest that generating reasons for biospheric values may not be enough to encourage action-taking. This highlights the complexity of translating biospheric values into pro-environmental behavior. Future research should explore additional mechanisms to better understand how to translate environmental values into meaningful, sustained action.

The Motivating Effects of Reasons, in a Pro-Environmental Behavior Context

There is a strong scientific consensus that changes in the climate of the world are mostly driven by human activities via greenhouse gas, and addressing environmental issues will require that we as humans have to do things differently (IPCC, 2015; IPCC, 2019). Given the global essence of the climate crisis, it is more and more important to examine the motivational drivers underlying pro-environmental behavior and action-taking. According to Steg and Vlek (2009), pro-environmental behavior entails behavior that minimizes the impact of one's actions on the world around them consciously, which often stem from a concern for protection of the environment. This behavior may be motivated by personal values, norms, or knowledge of the environment. These actions can include a wide range of activities, for example, reducing energy use, recycling, supporting environmental policies, and so on.

To seek change in pro-environmental behavior, we will take a look at the values because according to the Value-Belief-Norm Theory, it is implied that individual values influence beliefs about the environment, which in turn shape norms and pro-environmental behaviors (Stern, 2000). Schwartz (1992) defined values as desirable and transsituational goals that serve as guiding principles in a person's life. It is stated by Stern and colleagues (1995a) that values have both direct effects on behavioral intentions and indirect effects flowing through beliefs, which may be affected by selective attention to information about valued objects or by direct assimilation to values. Stern and colleagues (1995b) argued that environmental behavior is linked to values through a chain of intermediate variables. Values are seen as causally antecedent to beliefs and attitudes, which ultimately shape behavior.

Particularly biospheric values relate strong and consistently to environmental intentions and behavior. Schwartz's (1992) research states that there are three specific orientations, where the differentiation is made between biospheric concerns, altruistic concerns, and egoistic concerns. Schultz and colleagues (2005) also state that individuals with high biospheric values

are more supportive of environmental policies and initiatives, which show a stronger commitment to pro-environmental behavior that goes beyond personal interest. It is argued by Steg and Vlek (2009) that such values encourage people to take responsibility for their environmental actions and consider the long-term impact on the environment, which leads to sustainable behavior. Multiple studies such as the research from Karp (1996) as well as Davis and colleagues (2023) show that biospheric values are strongly correlated with pro-environmental behavior. By looking at people's "biospheric values", we want to see how people construct their reasoning behind their values, and how this influences their behavior.

Some values are often viewed as general truths, and it is emphasized by Rokeach (1973) that these values guide actions and judgements, creating a perspective on which individuals operate, where these values serve a foundational role in shaping behavior, judgements, and cultural expectations. Maio and Olson (1998) believe that the "non-contemplative" process in value formation is dominant, and that this process causes values to function much like truisms. Since values are generally shared and not questioned very often, this may cause people failing to build logical and convincing arguments to support their values. Rather than cognitive support, people typically depend on attaching strong, positive feelings to their values. The lack of cognitive support may cause the values to be more weak and vulnerable to change. This idea was empirically tested, where analyzing reasons, and thus increasing cognitive support, causes people to change their values (Maio & Olson, 1998). Karremans (2007) also supports this idea, by concluding that reasoning about values motivates people to behave in line with that particular value. This suggests that it is not just the salience of the value that increases the behavior, but the reasoning about the values predicts the behavior.

Moreover, Maio and colleagues (2001) also found that participants who generated reasons for a set of self-transcendent values (for example helpfulness) motivated pro-value behavior, because individuals become convinced that the value is 'rational' and not merely

ideological. This entails that generating reasons provide examples of why behaving consistently with this value is justified. In the study of Maio and colleagues (2001), the amount of pro-value behavior was directly correlated to the extent to which the measured value became more rational. In other words, as a result, this makes the value a more compelling guide for behavior.

Cognitive support might help people understand how their values can be expressed through specific actions, and function less as truisms. Maio and colleagues (2001) demonstrate that when people are presented with reasons that highlight how certain behaviors align with their values, they would be more likely to act in accordance with those values. This also aligns with the study from Karremans (2007), where he concluded that reasoning for a certain target value, increases behavior that aligns with this value and relating values. When looking at Pro-Environmental Behavior, cognitive support could involve salient reasons on why Pro-Environmental behavior is important, or how behaviors that work towards sustainable goals are explained or backed with evidence.

Steg and Vlek (2009) suggest that providing information which is concise on environmental benefits or specific actions would help people act according to their self-transcendent values, such as universalism or concern for the future generations. Individuals without cognitive support may fail to act upon their values since their reasoning would only be affective, and thus would fail to see a clear connection where the value is 'rational' to strive for. This suggests that providing cognitive support for biospheric values can help bridge the gap between abstract ideals and concrete actions. By highlighting the alignment between pro-environmental behavior and these values, individuals may begin to view their environmental attitude as actionable rather than abstract. Without such cognitive support, biospheric values may remain truisms, and then may fail to motivate behavior that addresses environmental concerns.

Biospheric values and prosocial values, which are subsets of self-transcendent values, emphasize the intrinsic worth of nature and prioritize the welfare of all people and of the natural

world over personal interests (Schwartz, 1992). In contrast to self-enhancement values, such as power and achievement, biospheric values are strongly associated with pro-environmental behavior, particularly when individuals are aware of the environmental impact of their actions (Schultz, 2001). It is shown by Schultz (2001) that biospheric values are associated strongly with Pro-Environmental Behavior when people are aware of their behavior and the effects on the environment. Providing cognitive support could make the reasons salient of these values, and encourage Pro-Environmental Behavior. Thus, the framework proposed by Maio and colleagues (2001) where they focused on prosocial values, which also fall under self-transcendent values, could be translated for encouraging Pro-Environmental Behavior by using cognitive support behind biospheric values for the study we will carry out. By focusing on biospheric values, cognitive support can help individuals prioritize environmental responsibility as an essential part of their value system, promoting consistency between values and action.

Agreeableness might serve as a moderator in the relationships between the cognitive support through salient reasons for biospheric values and Pro-Environmental Behavior. Schwartz (1994) shows that individuals who display higher levels of the trait agreeableness tend to be more empathetic and cooperative, and concerned with the well-being of others, which align closely to biospheric values that emphasize the importance of environmental protection for future generations and the world. High levels of the trait agreeableness is also positively correlated with altruistic concerns, and both altruistic concerns and biospheric concerns are part of self-transcendent values (Schultz, 2001). This suggests that individuals with high levels of the personality trait agreeableness are more likely to embrace these values due to their empathetic and cooperative nature.

Reflecting on reasons for biospheric values may have a particularly strong effect on individuals with higher levels of agreeableness, as their natural disposition towards altruism and concern of the welfare of others could increase the connection between these values and

behavioral outcome (Schultz, 2001). By examining this interaction, the current study aims to determine whether cognitive support for biospheric values can enhance pro-environmental behavior differently across different levels of agreeableness.

For these individuals higher in the trait agreeableness, salient cognitive support may reinforce the rationality and ethical importance of pro-environmental behavior, making such actions more congruent with their personality. These individuals who are inclined towards prosocial thinking, would generate reasons that would probably emphasize moral responsibility, emotional connection to nature, and the well-being of the collective (Milfont & Sibley, 2012). This would result in thinking of reasons, reinforcing their intrinsic motivation to act in pro-environmental ways, where moral reasoning and empathy drive pro-environmental behavior

Individuals who score lower on the personality trait agreeableness however, who may prioritize self-interest over collective concern, might require additional motivating factors to translate biospheric values into pro-environmental behavior (Milfont & Sibley, 2012). Moreover, reflecting on these values may lead to cognitive dissonance if the actions of these individuals do not align with pro-environmental behavior, which could potentially result in making justifications for not acting on pro environmental behavior (Festinger, 1957). Thus, agreeableness would moderate the effect of writing reasons for biospheric values on pro-environmental behavior, in a way that individuals high in the personality trait agreeableness are more likely to internalize these values and act accordingly, whereas individuals lower in the personality trait agreeableness may require external incentives or rationalizations to engage in behavior in similar degrees.

In the current study we will carry out an experiment, where we want to see if having cognitive support towards environmental values in the shape of salient reasons has an effect on Pro-Environmental Behavior. We will try to replicate the second study of the paper of Maio and colleagues (2001) by doing an experiment where we will ask participants in the experimental

group to do a survey, and ask to indicate their reasons for environmental values, thereby making salient the cognitive support for the value. The other participants will be asked to rate their feeling about the value, thereby making salient the value and its affective component. We will measure if the translation to Pro-Environmental Behavior by asking the participants after they have filled in the questionnaire, if the participants want to help with an initiative to help clean up the litter from the beach. This activity falls under the definition of Pro-Environmental Behavior, because according to for example Steg and Vlek (2009), this behavior entails behavior that minimizes the impact one's action on the world around them consciously, which often stem from a concern for protection of the environment. There is a wide range of activities that can fall under this definition, such as cleaning up litter, which we will measure.

We hypothesize that the experimental group which makes salient reasons for cognitive support engage more in Pro-Environmental Behavior (Hypothesis 1). Moreover, we also expect that participants who make salient reasons for cognitive support with higher scores in the trait agreeableness, will engage more in pro-environmental behavior. In other words, the effect of reflecting on reasons for pro-environmental behaviour will be stronger for those who are higher in agreeableness (Hypothesis 2).

Methods

Participants

Participants were selected by means of a convenience sample, mostly done through social contacts from the researchers at the Rijksuniversiteit Groningen. The total number of participants was 124, however 50 participants did not finish the questionnaire. Since these participants did not fill in all needed questions, their answers were not counted in the analysis we conducted. Two participants' answers were deleted because of troll-responses, where pop-culture memes were used as gender or as reasons. We decided as a group to see these answers as not credible and unserious entries. In total, 52 participants were removed. The working number of

participants ended up being 72. Table 1 presents an overview of the demographic characteristics of the participants we used in this study.

Table 1

The characteristics of the participants, including gender, age groups, and group assignment (N=72).

Characteristic	n	%
Gender		
- Female	28	38.9
- Male	40	55.6
- Other	2	2.8
- Preferred not to say	2	2.8
Age Group (years)		
- 18-25	57	79.2
- 26-38	14	19.4
- 59-65	1	1.4
Group assignment		
- Experimental Group	34	47.2
- Control Group	38	52.8

Participants were randomly assigned to either the experimental condition (cognitive support group) of which there were 34, or the control condition (affective rating group) of which there were 38. Ethical approval for the study was obtained from the university's ethics committee, and all participants provided informed consent prior to participation. This ethical approval was received through a fast-tracked review process, ensuring adherence to ethical guidelines while allowing for a timely review.

Design

The study employed a between-subjects experimental design, with two independent variables: the experimental condition (cognitive support through reasoning) versus control condition (rating feelings about the values). Agreeableness was measured as a moderator to assess its influence on the relationship between the conditions and pro-environmental behavior.

Materials

Agreeableness. Agreeableness was measured using the Mini-IPIP scale (Donnellan et al., 2006). The Mini-IPIP scale is a 5-item validated scale that assesses agreeableness on a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). Example items include “I sympathize with others’ feelings” and “I take time out for others.” Higher scores indicate greater agreeableness. The agreeableness scale showed a good internal consistency in this study (Cronbach’s $\alpha=.80$). The mean agreeableness score was 4.22 ($SD=0.63$), which indicates that participants in general rated themselves as high in agreeableness, with relatively low variability in responses.

Filler task. Participants completed a neutral filler task to minimize priming effects. They were asked to highlight adjectives in a one-page excerpt from a Harry Potter text displayed on the screen. This task would last approximately two minutes. If participants had gone straight into the experimental task, their responses might have been influenced by unintended cognitive biases from the questions they answered in the beginning of the experiment about climate anxiety. The neutral nature of the filler task made sure that participants did not start with the following task with biases or thoughts about the environment, or Pro-Environmental Behavior.

Independent variable. The independent variable was cognitive support, which was manipulated by asking participants to either generate reasons for biospheric values (experimental condition) or rate their feelings about biospheric values (control condition)

Experimental condition. After the filler task, the participants in the experimental condition were asked to type reasons in a text box for the importance of biospheric values (target value) and a filler value (tradition). This filler value was used to mask the intent of the study, of measuring the relationship between biospheric values and action-taking in pro environmental behavior. Firstly the participants were asked to write reasons for the value tradition with the prompt “Please use the textbox below to explain why you consider respecting tradition, humbleness, accepting one's portion in life, devotion, modesty either important or unimportant as guiding principles in your life. Be as detailed and specific as possible and provide as many reasons as you can”. After they completed this task, the participants were asked to write reasons for biospheric values with the prompt “Please use the textbox below to explain why you consider preventing environmental pollution, protecting the environment, respecting nature, and being in unity with nature either important or unimportant as guiding principles in your life. Be as detailed and specific as possible and provide as many reasons as you can”. The goal was to make cognitive support salient by requiring participants to articulate their reasoning actively.

Control condition. Participants in the control condition rated their feelings about the same two values on a 7-item semantic differential scale (e.g., good-bad, important-unimportant). This ensured that the values were salient but did not involve explicit reasoning, allowing for comparing it with cognitive support in the light of pro-environmental behavior. Some examples of the statements used for the biospheric value items are “preventing environmental pollution”, “respecting nature”, “protecting the environment”, and “being in unity with nature”. This was chosen to conceptually replicate Maio and colleagues’ (2001) study as close as possible.

Dependent variable. The dependent variable was the amount of time participants committed to a simulated litter-picking event (operationalized as 0 minutes, 10 minutes, 30 minutes, 1 hour, or 2 hours). Participants’ willingness to help was measured in minutes, representing the amount of time they were willing to dedicate to the litter-picking event

($M=36.48$, $SD=34.18$). These operationalized amounts were chosen to conceptually replicate the study from Maio and colleagues (2001) as close as possible.

Procedure

Participants completed the study entirely online through the online survey platform Qualtrics. The procedure was as follows:

All participants completed online versions of the Mini-IPIP (agreeableness), Climate Change Anxiety Scale, and the IE-4 (Locus of Control). Participants completed the neutral filler task by identifying adjectives in an online text excerpt. In the experimental condition, participants were presented a question to write reasons about the values shown. They were able to write in text boxes under these questions, about tradition and biospheric values. Participants were asked to type as many reasons as possible for these values, one at a time for which they had five minutes each. In the control condition, participants were presented with three sets of semantic differential scales, one for each value (tradition, biospheric values). They rated their feelings about each value on seven semantic scales (e.g., good-bad, important-unimportant) with the question to rate their feelings on a scale from -3 to +3, with 0 being neutral.. After completing the ratings for one value, the screen transitioned to the next, with a question alike, but with different semantic words.

After completing the task for the second value (biospheric values), a page with the poster of the simulated litter-picking event with sign-up form was shown. The form included a standardized explanation of the event and five time slots (0 minutes, 10 minutes, 30 minutes, 1 hour, or 2 hours), which were chosen to replicate the study from Maio and colleagues (2001). Participants were asked to select one time slot. The selected option was recorded as the dependent variable. At the conclusion of the study, participants were shown that they were part of a deception study through a debriefing page where the actual purpose of the study was shown. This was important since the poster was given in the name of the green-office of the

Rijksuniversiteit Groningen, to see how many people were willing to sign up for a litter picking event as if the poster was from a third party. All participants were debriefed containing detailed information about the study's purpose and the fictitious nature of the litter-picking event.

Results

To test whether participants in the experimental condition (reasons salient) engaged more in pro-environmental behavior than those in the control group (rating feelings), an independent samples T-Test was conducted. Participants in the cognitive support (experimental) condition ($n=34$) volunteered an average of 30.88 minutes ($SD=29.99$) for the litter-picking event, compared to an average of 41.62 ($SD=38.04$) minutes in the rating feelings (control) condition. The difference was not significant, $t(70)=1.313$, $p=.194$. The 95% confidence interval for the mean difference (-5.577, 27.055) included zero, which supports the non-significant result. This would suggest that there was no meaningful difference in the amounts of time that participants wanted to donate for the litter-picking event between the experimental and control conditions. The calculated effect size was small (Cohen's $d=.312$; 95%CI: -0.158 to 0.779), and since the confidence interval includes 0, the difference is not statistically significant. This means that the experimental manipulation had minimal impact on participants' readiness to help. These findings do not support the initial hypothesis that the experimental group (reasons salient) would donate more time to the litter-picking event than the control group (values salient).

To assess whether agreeableness moderates the effect of cognitive support a multiple regression with an interaction term is done to test if agreeableness moderates the relationship between the experimental condition (reasons salient) and the donated time for the litter-picking event. The overall model was not significant, $F(3, 68)=1.727$, $p=.170$, which indicates that the combination of level of agreeableness in the experimental condition did not significantly explain the variance in donated time. The interaction effect between the experimental condition (reasons salient) and agreeableness was also not significant, $B=9.105$, $t=0.659$, $p=.512$. These results

would indicate that agreeableness did not influence the relationship between writing down reasons for biospheric values, and the amount of time donated for the litter-picking event. Thus the moderation hypothesis was not supported.

Discussion

This study investigated whether cognitive support for biospheric values increases Pro-Environmental Behavior and whether agreeableness moderates this effect. However, contrary to our hypothesis, participants who generated reasons did not engage significantly more in Pro-Environmental Behavior than the participants who rated their feelings about biospheric values. Moreover, agreeableness did not moderate the relationship between cognitive support and Pro-Environmental Behavior, which is also contrary to our second hypothesis. These findings contrast with previous studies, such as the study we tried to replicate from Maio and colleagues (2001).

Our first hypothesis stated that participants that generated reasons for biospheric values, would donate more time for the litter-picking event than the participants who rated their feelings about biospheric values. Participants in the cognitive support group donated an average of 30.88 minutes, compared to 41.62 minutes in the rating feelings group. This difference was not statistically significant ($p=.194$). This suggests that generating reasons for biospheric values did not lead to increased engagement in pro-environmental behavior compared to rating feelings about biospheric values.

This contradicts our hypothesis that cognitive support would enhance the willingness to partake in pro-environmental behavior. Maio and colleagues (2001) stated that reasoning about values makes them appear more rational and internally justified, which then would strengthen the influence of these values on behavior. In our study however, this did not occur. A possible explanation is that biospheric values function differently from prosocial values which were measured in the study of Maio and colleagues (2001). While they found that reasoning about

helpfulness led to increased prosocial behavior, pro-environmental behavior may be more abstract. Since we have tried to conceptually replicate this study as closely as possible, the translation from the target-value to target-behavior might seek different interpretations.

Previous studies have shown that biospheric values predict environmental concern and policy support (Schultz et al., 2005; Steg & Vlek, 2009). While the studies of Schultz and colleagues (2005) and from Steg and Vlek (2009) show that individuals with stronger biospheric values engage more in pro-environmental behavior, it is not demonstrated that increasing cognitive salience of these values through reasoning necessarily leads to immediate behavioral change. Stern (2000) argues that values influence behavior indirectly through a chain of beliefs and norms, rather than values directly leading to action. This suggests that just generating reasons for biospheric values does not necessarily activate the full chain required for action in the time of the study.

Our second hypothesis was that agreeableness moderates the relationship between cognitive support and pro-environmental behavior. However, our analysis suggests that agreeableness did not significantly affect the relationship between cognitive support and pro-environmental behavior ($B=9.105$, $p=.512$). This would suggest that individuals that have higher levels of the personality trait agreeableness did not respond with significantly different engagement in pro-environmental behavior, in contrast to people who score lower on the personality trait agreeableness. The interaction effect we were expecting was not observed.

This contradicts our hypothesis that individuals who are more agreeable would be more likely to act on their biospheric values when cognitive support is added. Agreeableness is associated with altruism, empathy, and concern for others (Schwartz, 1992; Milfont & Sibley 2012). These associations align closely with self-transcendent values, of which biospheric values are a part of. Maio and Olson (1998) argue that values often function as “truisms”, which means that people would endorse them without critically reflecting on their practical implications.

Rather than strengthening the rationalizing justification for action, people high in agreeableness might continue to rely on affective associations with their values. This would align with research showing that agreeableness is strongly linked to emotional concern rather than rational cost-benefit decisions in decision making (Milfont & Sibley, 2012).

Milfont and Sibley (2012) say that there is a positive correlation between agreeableness and environmental concern, while we did not find agreeableness to be a moderator in our study. Steg and Vlek (2009) emphasize that pro-environmental behavior is strongly influenced by external and situational factors. Individuals higher in agreeableness may be more likely to engage in more pro-environmental behavior in social settings where there is visible accountability or social reinforcement. Our study did not have any public commitment or group influence, thus agreeableness was possibly not a motivator for action-taking, since there were no external or situational factors affecting it.

One key limitation of this study is that participants completed the tasks online rather than writing down reasons on paper, which may have affected the depth of the engagement of the participants with biospheric values. The study from Maio and colleagues (2001) which we tried to replicate was done with paper and hand, which we were not able to do because of a limited time to conduct the research. Morehead and colleagues (2019) suggest that writing information by hand leads to deeper cognitive processing compared to typing. If participants typed their responses quickly without active deliberation, they might not have engaged enough with their values for cognitive support to strengthen the relationship between biospheric values and pro-environmental behavior. This could be an explanation why our study was not able to show a significant effect of cognitive support on the relationship between biospheric values and pro-environmental behavior.

Another limitation of this study is that the online format could have influenced the participants' focus and engagement compared to a laboratory setting in which the participant

was alone with the researcher. Unlike an environment like a controlled lab, where distractions are minimized, participants may have been doing other things while doing the study, or might not have been concentrating on the study. They also might not have felt the need to write as many reasons as possible, since they might have felt less accountable without the presence of a researcher. Future studies could address this limitation by conducting the experiment in an environment which is controlled.

To conclude, this study explored whether getting people to think more deeply about their biospheric values would lead to more pro-environmental behavior and if agreeableness played a role in this relationship. Although the results did not confirm the hypotheses, they contribute to the broader understanding of value-based behavior and offer important considerations for future research and intervention design. Encouraging pro-environmental behavior is complex, and understanding how to translate values into behavior remains an important bridge to cross. Ultimately, a bridge is only useful if people are able to cross it, and our findings highlight the need to better understand how to facilitate that journey towards meaningful environmental action.

Reference list

- Clayton, S., & Karazsia, B. T. (2020). *Climate change anxiety scale [Dataset]*. In *PsycTESTS Dataset*. <https://doi.org/10.1037/t79337-000>
- Climate Change 2014 - Synthesis Report*.
(2015b). <https://doi.org/10.59327/ipcc/ar5-9789291691432>
- Davis, A. C., Arnocky, S., & Stroink, M. L. (2022). Biospheric Values Predict Ecological Cooperation in a Commons Dilemma Scenario. *Ecopsychology*, *15*(2), 172–183.
<https://doi.org/10.1089/eco.2021.0067>
- Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The Mini-IPIP Scales: Tiny-yet-effective measures of the Big Five Factors of Personality. *Psychological Assessment*, *18*(2), 192–203. <https://doi.org/10.1037/1040-3590.18.2.192>
- Festinger, L. (1957). A Theory of Cognitive Dissonance. In *Stanford University Press eBooks*. <https://doi.org/10.1515/9781503620766>
- Karp, D. G. (1996). Values and their Effect on Pro-Environmental Behavior. *Environment And Behavior*, *28*(1), 111–133. <https://doi.org/10.1177/0013916596281006>
- Karremans, J. C. (2006). Considering reasons for a value influences behaviour that expresses related values: an extension of the value-as-truisms hypothesis. *European Journal Of Social Psychology*, *37*(3), 508–523. <https://doi.org/10.1002/ejsp.371>
- Maio, G. R., & Olson, J. M. (1998). Values as truisms: Evidence and implications. *Journal of Personality and Social Psychology*, *74*(2), 294–311.
<https://doi.org/10.1037/0022-3514.74.2.294>
- Maio, G. R., Olson, J. M., Allen, L., & Bernard, M. M. (2001). Addressing Discrepancies between Values and Behavior: The Motivating Effect of Reasons. *Journal of Experimental Social Psychology*, *37*(2), 104–117. <https://doi.org/10.1006/jesp.2000.1436>

- Masson-Delmotte, V., Zhai, P., Pörtner, H., Roberts, D., Skea, J., Priyadarshi, R., Pirani, A., Moufouma-Okia, W., Péan, C., Pidcock, R., Connors, S., Matthews, J. R., Chen, Y., Zhou, X., Gomis, M., Lonnoy, E., Maycock, T., Tignor, M., & Waterfield, T. (2019). *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.*
<http://www.vliz.be/en/imis?module=ref&refid=323552>
- Nießen, D., Schmidt, I., Groskurth, K., Rammstedt, B., & Lechner, C. M. (2022). The Internal–External Locus of Control Short Scale–4 (IE-4): A comprehensive validation of the English-language adaptation. *PLoS ONE*, *17*(7), e0271289.
<https://doi.org/10.1371/journal.pone.0271289>
- Milfont, T. L., & Sibley, C. G. (2012). The big five personality traits and environmental engagement: Associations at the individual and societal level. *Journal Of Environmental Psychology*, *32*(2), 187–195. <https://doi.org/10.1016/j.jenvp.2011.12.006>
- Morehead, K., Dunlosky, J., & Rawson, K. A. (2019). How Much Mightier Is the Pen than the Keyboard for Note-Taking? A Replication and Extension of Mueller and Oppenheimer (2014). *Educational Psychology Review*, *31*(3), 753–780.
<https://doi.org/10.1007/s10648-019-09468-2>
- Rokeach, M. (1973). *The nature of human values.* <http://ci.nii.ac.jp/ncid/BA0511975>
- Schultz, P. W. (2001). THE STRUCTURE OF ENVIRONMENTAL CONCERN: CONCERN FOR SELF, OTHER PEOPLE, AND THE BIOSPHERE. *Journal of Environmental Psychology*, *21*(4), 327–339. <https://doi.org/10.1006/jevp.2001.0227>
- Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P., & Franěk, M. (2005). Values and their Relationship to Environmental Concern and Conservation Behavior.

Journal of Cross-Cultural Psychology, 36(4), 457–475.

<https://doi.org/10.1177/0022022105275962>

Schwartz, S. H. (1992). Universals in the Content and Structure of Values: Theoretical advances and empirical tests in 20 countries. In *Advances in experimental social psychology* (pp. 1–65). [https://doi.org/10.1016/s0065-2601\(08\)60281-6](https://doi.org/10.1016/s0065-2601(08)60281-6)

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, 50(4), 19–45.

<https://doi.org/10.1111/j.1540-4560.1994.tb01196.x>

Steg, L., & Vlek, C. (2008). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, 29(3), 309–317.

<https://doi.org/10.1016/j.jenvp.2008.10.004>

Stern, P. C. (2000). New Environmental Theories: Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3), 407–424.

<https://doi.org/10.1111/0022-4537.00175>

Stern, P. C., Dietz, T., & Guagnano, G. A. (1995b). The new Ecological Paradigm in Social-Psychological Context. *Environment And Behavior*, 27(6), 723–743.

<https://doi.org/10.1177/0013916595276001>

Stern, P. C., Kalof, L., Dietz, T., & Guagnano, G. A. (1995a). Values, Beliefs, and Proenvironmental Action: Attitude Formation Toward Emergent Attitude Objects1. *Journal Of Applied Social Psychology*, 25(18), 1611–1636.

<https://doi.org/10.1111/j.1559-1816.1995.tb02636.x>

