

Thinking of the Past to Change the Future:

Using the Ease of Retrieval Manipulation to Promote Pro-Environmental Behaviour

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Abstract

It is now more important than ever to reduce carbon emissions to combat climate change. This can only be achieved when individuals engage more in pro-environmental behaviour. However, behavioural change can be difficult; therefore, the current study investigated if environmentally friendly behaviour could be promoted subconsciously. Specifically, it was examined whether environmental self-identity and self-efficacy could be altered using the ease of retrieval manipulation to increase pro-environmental behaviour. The quantitative study was conducted at the University of Twente in the Netherlands ($n = 166$), using an online questionnaire. This study had a one-factor between participants design, with few (two) vs many (12) instances of energy-saving behaviour to retrieve in the ease of retrieval manipulation. Unfortunately, the results indicate that the manipulation did not work in the current study, as there was no difference between the two groups in their perceived ease of retrieval. PROCESS was used to test for multiple mediation effects. The manipulation did not influence environmental self-identity or self-efficacy, and environmental self-efficacy and self-efficacy did not predict pro-environmental behaviour. Moreover, environmental self-identity and self-efficacy did not mediate the effect of the manipulation on pro-environmental behaviour. Possible explanations for the failed manipulation are discussed, and recommendations for future research are suggested.

Keywords: pro-environmental behaviour, environmental self-identity, self-efficacy, ease of retrieval manipulation

Thinking of the Past to Change the Future: Using the Ease of Retrieval Manipulation to Promote Pro-Environmental Behaviour

It is now more important than ever to reduce carbon emissions to combat climate change. According to the Intergovernmental Panel on Climate Change (IPCC) compared to before the industrial revolution, the average temperature has risen by 1 degree Celsius and it is expected to exceed 1.5 degrees Celsius by the end of the 21st Century (Abrahamse, 2019; IPCC, 2018). This rapid and human-made climate change negatively impacts all life on Earth, as it results in more natural disasters (Zommers & Singh, 2014). Natural disasters, such as floods, drought, heavy rain or prolonged heatwaves, have been reported more often and with greater intensity, and inflict great damage to human lives, animals and their habitats (IPCC, 2018). Importantly, the current environmental problems are due to the impact of human behaviour, therefore, human behaviour (change) should then also be part of the solution (Abrahamse, 2019; Bamberg & Rees, 2015; Lee & Khan, 2020). The most important factor in combatting climate change is to collectively decrease carbon emissions, which can be done by adopting and changing current behaviours into more pro-environmental ones (IPCC, 2018).

Environmental behaviour change is needed. Indeed, there is an abundance of literature focused on pro-environmental behaviour, however, research has shown that *consciously* changing unsustainable behaviour can be difficult (Gifford, 2011; White et al., 2019); for example, individuals may experience feelings of resistance by being told what to do, or they might deny the problem of climate change in general. Moreover, habits and well-established routines may hinder adopting new pro-environmental behaviour, even if it is well intended (Ersche et al., 2017). Considering this, it might therefore be more effective to change behaviour *subconsciously*. Hence, the current study aims to add to the scarce literature on increasing pro-environmental behaviour by using the ease of retrieval manipulation. The research question is as follows: “To what extent can the ease of retrieval manipulation increase pro-environmental behaviour by altering the self-related judgement of the environmental self-identity and self-efficacy?”.

Theoretical Framework

Pro-environmental behaviour

Pro-environmental behaviour has many definitions and includes various acts of environmentally friendly behaviour, however, its general aim is to enhance the environment by acting environmentally consciously or to do as less damage as possible (Ateş, 2020; Krajhanzl, 2010; Sorrell et al., 2020). According to Stern (2000), there are three main categories of pro-environmental behaviour¹: Firstly, pro-environmental activism, for example organising or participating in demonstrations to raise awareness of climate change (Stern, 2000). Secondly, private-sphere environmentalism², for example, gardening to attract pollinators and butterflies, or to feed birds in winter (Stern, 2000). Thirdly, nonactivist behaviours in the public sphere, for example voting on a specific political party, collecting money for an environmental organisation, or donating time and/or money to promote environmental quality (Greenspan et al., 2012; Stern, 2000). The latter is also called environmental philanthropy. It encompasses the willingness to use time, skills, or money to benefit the environment (Betsill et al., 2021; Greenspan et al., 2012).

Self-efficacy

Lastly, to be able to carry out pro-environmental behaviour, one must have a certain amount of self-efficacy, which entails the feeling that they are capable to perform that certain behaviour (Bandura, 1977). It is not necessarily a perception that one *will* reach their goal, but rather that one thinks they *can* reach their goal. Research has shown that self-efficacy is influenced by past behaviour, and also influences future behaviour (Gallagher, 2012; Sitzmann & Yeo, 2013). In regards to pro-environmental behaviour, it was found that self-efficacy mediated the relationship between easy pro-environmental behaviour and difficult future pro-environmental behaviour (Lauren et al., 2016).

¹ Note: this categorisation of pro-environmental behaviour is not definite as there exist many other ways to classify pro-environmental behaviour, it is only used to make a distinction between certain behaviours.

² Note: this category is further categorised into (1) purchase of major household goods or services, (2) use and maintenance of environmentally important goods, (3) waste disposal, and (4) green consumerism (Stern, 2000).

Environmental self-identity

Behaviour and identity are closely intertwined as they are a two-way interaction (Simons, 2021). Moreover, an individual's identity is made up of multiple identities (Simons, 2021), for example personal, social, or environmental. In specific, a self-identity is defined as a label to describe oneself which relates to a particular behaviour (Van der Werff et al., 2013b). In this respect, the environmental self-identity is defined as seeing oneself as an environmentally friendly person who engages in environmentally friendly behaviour (Ateş, 2020). Thus, this means that *past* pro-environmental behaviour shapes the environmental self-identity, and the environmental self-identity influences *future* pro-environmental behaviour (Lacasse, 2016; Van der Werff et al., 2013b). Moreover, the intensity of the environmental self-identity is linked to the amount of pro-environmental behaviour; that is, the stronger the individual's environmental self-identity, the more likely they will act environmentally friendly (Van der Werff et al., 2013b).

Importantly, research has found that identity can be manipulated to some extent; Fanghella et al. (2019) and Cornelissen et al. (2008) found that individuals' environmental self-identity could be strengthened by reminding them of their past environmental-friendly actions. Moreover, they found that the higher environmental self-identity was positively correlated with pro-environmental behaviour (i.e. participants donated more money to a conservation organisation, Fanghella et al., 2019; choosing the less attractive but recycled notepad over a normal one and decreased one's handwriting, Cornelissen et al., 2008). Thus, reminding participants of their past pro-environmental behaviour, strengthened their environmental self-identity, which resulted in increased pro-environmental behaviour.

Biospheric values

Biospheric values are regarded as the *core* of the environmental self-identity (Van der Werff et al., 2014). Individuals with biospheric values tend to intrinsically value nature and care about the environment, which will be a motivation to act environmentally friendly (Ateş, 2020). Moreover,

previous research has found that environmental self-identity mediated the relationship between biospheric values and pro-environmental behaviour (Van der Werff et al., 2013b; Wang et al., 2021). However, there is a distinct difference between values and identity; values are abstract and general goals in life, whereas identity reflects how you see yourself (Van der Werff et al., 2013b). Hence, while biospheric values and environmental self-identity are related, they can be inconsistent with each other (Martin & Czellar, 2017). For example, an individual might have strong biospheric values as they care a lot about nature and changing climate. However, they may not identify strongly with the environmental self-identity (barriers such as money/time/thinking it will be solved by technology) and therefore act less environmentally friendly.

Ease of Retrieval

Implementing more sustainable and environmentally friendly behaviour can be difficult; individuals must deliberately make behavioural adjustments and may face many barriers doing so. Therefore, the current study will use a manipulation to make the environmental self-identity more salient in a subconscious way to induce pro-environmental behaviour. This manipulation is called the ease of retrieval, which was introduced in a study by Schwarz et al. (1991); they found that the perceived ease or difficulty of recalling instances influenced self-related judgements, rather than the content of the memories themselves. The participants needed to list either six or 12 (low-high paradigm) instances of their behaviour when they acted assertively. Notably, participants had a hard time listing 12 behaviours, whereas listing six was evaluated as relatively easy. After the task, participants evaluated their degree of assertiveness.

Results showed that the participants with only six instances to retrieve rated themselves as more assertive than the participants who had to retrieve 12 (Schwarz et al., 1991). This was against expectations, as one, according to the availability heuristic (Tversky & Kahneman, 1973) using recalled content, would rate themselves higher in assertiveness when thinking about 12 versus six instances of assertive behaviour. However, this experiment was designed in such a way that participants were not focused on the *content* of the memories, but rather on the *ease* with which the

memories were generated. As a result, participants were influenced by the perceived ease in their self-related judgement. Many other scientific areas have used the ease of retrieval manipulation in their studies (e.g. likelihood estimation, stereotyping, interpersonal closeness, health risk, self-doubt, persuasion, and attitude strength to name a few) and have demonstrated that subjective ease can "override" the amount of information that comes to mind (Tormala et al., 2007).

Present study

The current study aims to bridge the literature gap by using the ease of retrieval manipulation in a pro-environmental behaviour study, by altering the perceived environmental self-identity and self-efficacy. The study will examine the effect of the ease of retrieval manipulation on the environmental self-identity and self-efficacy, and consequently on pro-environmental behaviour. More specifically, it is hypothesised that:

H1: The environmental self-identity will be higher when recalling fewer instances in the ease of retrieval manipulation compared to recalling many instances.

H2: A high degree of environmental self-identity will have a positive effect on pro environmental behaviour.

H3: The environmental self-identity has a mediating role on the effect of the ease of retrieval on pro-environmental behaviour.

H4: The perceived self-efficacy has a mediating role on the effect of the ease of retrieval on pro-environmental behaviour.

Lastly, the study takes an explorative approach by incorporating biospheric values. Research has shown that environmental self-identity mediates the relationship between biospheric values on

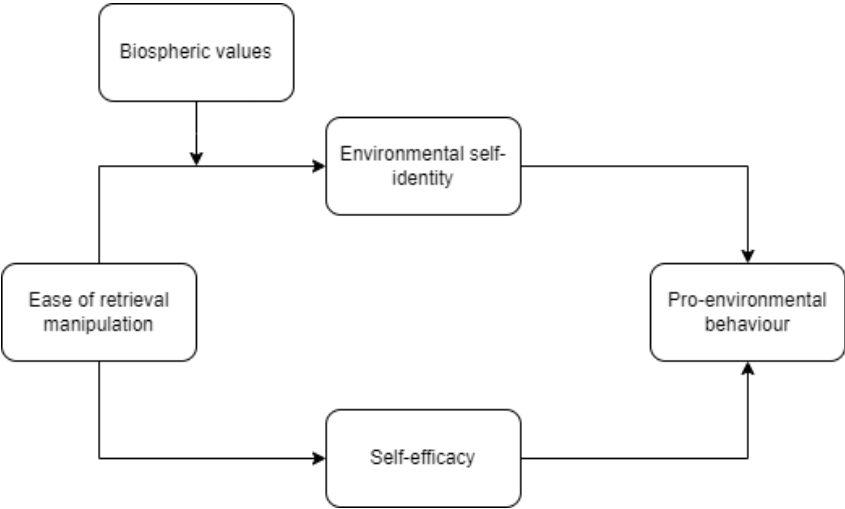
pro-environmental behaviour (Van der Werff et al., 2013b; Wang et al., 2021). However, it is expected in the current study that the biospheric values moderate the effect of the ease of retrieval on environmental self-identity.

H5: The degree of biospheric values will have a moderating effect on the ease of retrieval manipulation on environmental self-identity.

The hypotheses are summarised in Figure 1.

Figure 1

Conceptual model



Method

Participants and Design

The study was conducted at the University of Twente from the Netherlands and used convenience sampling. Students were able to participate in return for course credits. Participants

recruited through convenience sampling were given no incentive. There were 36 and 37 participants removed from the sample after failing to answer right on a control question, and not filling in any answers in the Ease of retrieval manipulation, respectively. In total, 107 women (64.5%) and 59 men (35.5%) participated in the current study ($n = 166$). The age ranged from 18 to 77 years old ($M = 30.07$, $SD = 12.99$), and the majority reported to be of Dutch (48.5%) and German (25.3%) nationality. Lastly, the majority of the participants reported to live in a place of their own with a partner and/or family (40.4%), living in a student house (16.7%), and having a place of their own living alone (16.7%).

A t-test confirmed that there were no significant differences between the groups' demographic characteristics and Biospheric Values. This study had a one-factor between participants design, with few (two) vs many (12) instances to retrieve in the Ease of retrieval manipulation. The study used the Ease of Retrieval manipulation as the independent variable, Biospheric values as continuous moderator, environmental self-identity and self-efficacy as mediators, and pro-environmental behaviour as the dependent variables.

Procedure

The participants were informed about the aim of the study, namely that they would complete a questionnaire to have a better understanding of environmentally friendly behaviour in students, which was slightly deceptive as to protect the original aim of the study. Participants were informed that they could quit the questionnaire whenever they wanted or could withdraw from the study afterwards by informing the researcher.

After the participants gave their consent to have their data used for analyses and filled in their demographic information, they first made a questionnaire measuring the biospheric values. This was followed by an assignment, which was the Ease of retrieval manipulation. Firstly, participants received an explanation about what pro-environmental behaviour entails (i.e. to improve the environment, or to harm it as little as possible), and were presented with examples of pro-environmental behaviour (e.g.

using reusable bags when doing groceries). Importantly, none of the examples contained energy-saving behaviour. Participants were then randomly assigned to one of the two conditions; the participants were expected to remember and to write down either few (two) or many (12) instances of energy-saving behaviour in the last two weeks. The number of instances for the "few" condition was adapted to fit the current study; energy-saving behaviour is quite specific behaviour, so two instances should be easier to come up with compared to the original study of Schwarz et al. (1991) who used six instances to remember in the "few" condition. Subsequently, the participants were presented with a manipulation check consisting of two questions. The next part of the questionnaire consisted of two scales to measure the degree of self-efficacy of energy-saving behaviour, and the environmental self-identity. The last part of the questionnaire measured the degree of pro-environmental behaviour by presenting a choice to donate money to Greenpeace if they were chosen to receive 50 euros in the form of a gift card. Afterwards, the participants would be debriefed about the true aim of the study (and students were rewarded their study points).

Measures

All the scales used in this study used a 7 point-Likert scale from *strongly disagree* to *strongly agree*, unless described otherwise. The informed consent and questionnaire can be found in Appendix A.

Biospheric values

To measure biospheric values, the Environmental Portrait Value Questionnaire (E-PVQ) containing 16 items was used (Bouman et al., 2018), consisting of four sub-scales; biospheric, altruistic, hedonic, and egoistic. Notably, only the four items of the subscale *biospheric* were used. Moreover, the formulation of the original items was changed from second person to first person (e.g. "It is important to me to prevent environmental pollution" instead of "It is important to [him/her] to prevent environmental pollution"). Internal consistency was good ($\alpha = .77$).

Perceived ease of retrieval

To measure the manipulation effectiveness, there were two manipulation check questions asked after the manipulation: "I found it difficult to recall instances where I performed energy-saving behaviour" (reversed), and "I was able to think of energy-saving behavioural instances fairly easily". Internal correlation was found to be positively strong, $r(154) = .75, p \leq .00$.

Self-efficacy

To measure the participants' degree of self-efficacy in performing energy-saving behaviour, the subscale self-efficacy of the Risk Behavior Diagnosis Scale (RBDS) was used (Witte et al., 1996) using a 5 point-Likert scale from *strongly disagree* to *strongly agree*. The scale was adapted to fit the current study; therefore, the items were rewritten to measure the self-efficacy of performing energy-saving behaviour concerning climate change (e.g. "I am able to save energy to combat climate change"). Internal consistency was found to be good ($\alpha = .76$).

Environmental self-identity

The degree of environmental self-identity was measured using the Environmental Self-Identity scale (Van der Werff et al., 2013a) consisting of three items (e.g. "Acting environmentally friendly is an important part of who I am"). Internal consistency was found to be high ($\alpha = .87$).

Pro-environmental behaviour³

The degree of pro-environmental behaviour was measured offering the participant a choice to donate an amount of money to Greenpeace if they were selected to receive 50 euros. The higher the amount of money they wanted to donate, the higher the pro-environmental behaviour value. This donation was fictional.

Results

An independent sample t-test was performed to examine whether the manipulation worked. Unfortunately, the results indicate that the manipulation failed in the current study, as there was no

³ Note: due to an error and time constraint, the pro-environmental behaviour measurement was changed to one item. This change will be discussed in the discussion.

significant difference found in the perceived ease of retrieval between the Few group ($M = 4.18$, $SD = 1.68$) and Many group ($M = 4.35$, $SD = 1.80$), $t(147) = -.60$, $p = .55$. Notably, both groups found the assignment not particularly difficult or easy.

Moreover, a Pearson correlation test was run with the demographic characteristics and scale measures. Descriptive statistics and correlations are reported in Table 1. Most notably, a very weak and negative correlation was found between Biospheric values and self-efficacy. Moreover, a positive weak correlation was found between the Perceived ease of retrieval and environmental self-identity, and self-efficacy. In addition, a weak to moderate positive correlation was found between environmental self-identity and self-efficacy. Lastly, a positive weak correlation was found between self-efficacy and pro-environmental behaviour. However, no correlational relationship was found between the Ease of retrieval manipulation and Perceived ease of retrieval.

Table 1

Descriptive Statistics and Correlations

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Age	166	30.07	12.99	-	.01	-.16	-.03	-.01	.03	-.19	.15
2. Gender	166	1.64	0.48	.01	-	.03	-.05	.11	.18	-.01	-.13
3. Biospheric values	166	4.38	1.18	-.16	.03	-	-.00	-.15	.01	-.04	.29
4. Ease of retrieval manipulation	158	1.49	0.50	-.03	-.05	-.00	-	.05	.01	.12	.21
5. Perceived Ease of retrieval	156	4.32	1.73	-.01	.11	-.15	.05	-	.32	.19	.01
6. Environmental self-identity	155	4.91	1.08	.03	.18	.01	.01	.32	-	.36	.18
7. Self-efficacy	155	3.57	0.73	-.19	-.01	-.04	.12	.19	.36	-	.30
8. Pro-environmental behaviour	44	35.84	17.82	.15	-.13	.29	.21	.01	.18	.30	-

Note. Gender was labelled as man = 1, woman = 2; Ease of retrieval manipulation was labelled as few = 1, many = 2; $p < .05$.

Regression analyses

Multiple mediation analyses

Ease of retrieval manipulation. To test the hypotheses, PROCESS (Hofmann & Hayes, 2019) model 4 was used in SPSS to test whether the environmental self-identity and self-efficacy mediated the effect of Ease of retrieval manipulation on pro-environmental behaviour. The independent variable was the Ease of retrieval manipulation (X), the dependent variable pro-environmental behaviour (Y), and the mediation variables environmental self-identity (M_1) and self-efficacy (M_2). The outcomes show that (H1) the environmental self-identity was not higher when recalling fewer instances, $B = -0.05$, $Bse = .36$, $t = -.14$, $p = .89$. Moreover, (H2) there was no significant positive effect of environmental self-identity on pro-environmental behaviour, $B = 7.97$, $Bse = 8.69$, $t = 0.92$, $p = .36$. In sum, (H3) the environmental self-identity did not have a mediating role between the effect of the Ease of retrieval on pro-environmental behaviour, $B = -4.50$, $Bse = 5.06$, $t = -0.89$, $p = .38$. Lastly, (H4) the perceived self-efficacy did not have a mediating role between the effect of the Ease of retrieval on pro-environmental behaviour, $B = -8.74$, $Bse = 7.62$, $t = -1.15$, $p = .26$. However, there was a direct effect of the Ease of retrieval manipulation on pro-environmental behaviour, $B = 56.39$, $Bse = 26.83$, $t = 2.10$, $p = .04$. The results show that the Few group was likely to donate less money than the Many group. The findings are presented in Figure 2.

Figure 2

Multiple mediation model

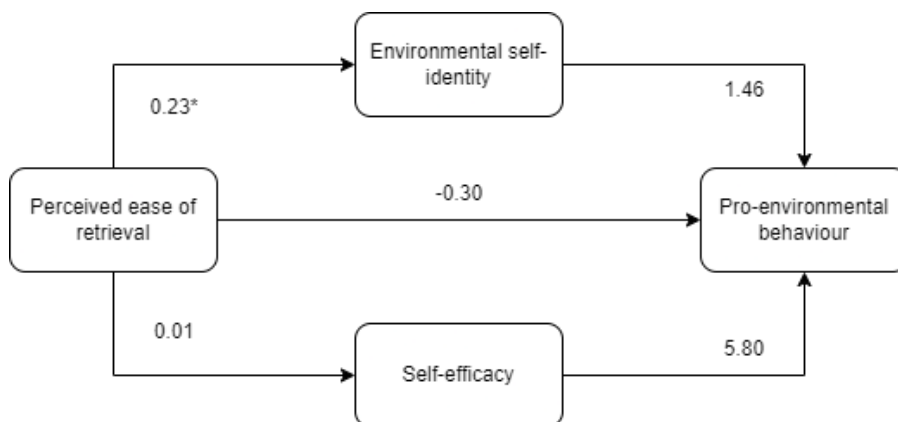


Note: * $p < .05$.

Perceived Ease of retrieval. Secondly, PROCESS model 4 was run again, however, this time using the Perceived ease of retrieval as an independent variable as the Perceived ease of retrieval significantly correlated with the environmental self-identity and self-efficacy. SPSS was used to test whether the environmental self-identity and self-efficacy mediated the effect of the Perceived ease of retrieval manipulation on pro-environmental behaviour. The independent variable was the Perceived ease of retrieval (X), the dependent variable pro-environmental behaviour (Y), and the mediation variables were environmental self-identity (M_1) and self-efficacy (M_2). The Perceived ease of retrieval significantly predicted environmental self-identity, $B = 0.23$, $Bse = 0.10$, $t = 2.41$, $p = .02$, meaning that the easier the task was perceived, the higher the participants rated themselves on environmental self-identity. However, the degree of environmental self-identity did not predict pro-environmental behaviour, $B = 1.46$, $Bse = 2.57$, $t = 0.57$, $p = .57$. Moreover, environmental self-identity did not mediate the effect of Perceived ease of retrieval on pro-environmental behaviour, $F(1, 39) = 0.17$, $p = .67$. In addition, Perceived ease of retrieval did not predict self-efficacy, $B = 0.01$, $Bse = 0.07$, $t = 0.11$, $p = .91$, nor did self-efficacy predict pro-environmental behaviour, $B = 5.80$, $Bse = 3.51$, $t = 1.65$, $p = .11$. Lastly, self-efficacy did not mediate the effect of Perceived ease of retrieval on pro-environmental behaviour, $F(1, 39) = 1.00$, $p = .32$. Findings are presented in Figure 3.

Figure 3

Multiple mediation model



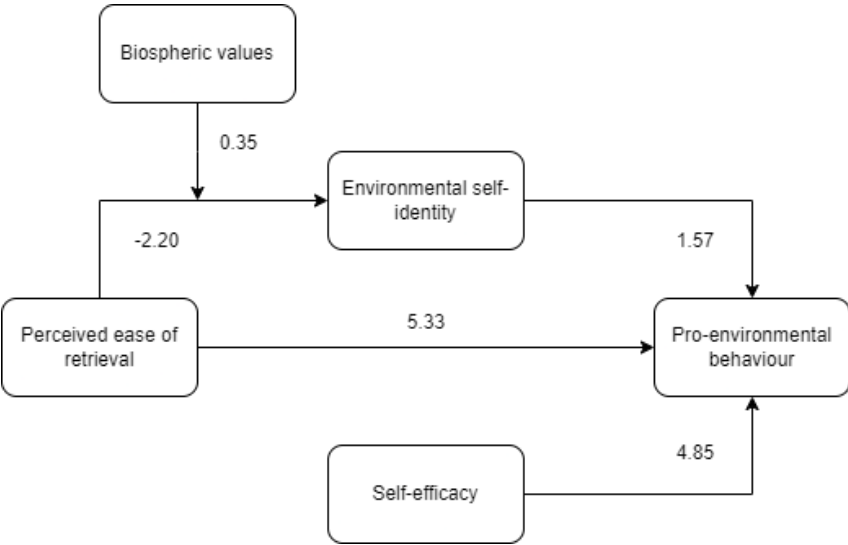
Note: * $p < .05$.

Moderated mediation analysis

Lastly, PROCESS model 7 was run to answer the exploratory hypothesis (H5) whether Biospheric values would moderate the effect of the Ease of retrieval on environmental self-identity. The independent variable was the Ease of Retrieval manipulation (X), the moderator variable Biospheric values (W), the dependent variable pro-environmental behaviour (Y), and the mediation variable environmental self-identity (M), using self-efficacy as the covariate. The results indicated that Biospheric values did not moderate the effect of the Ease of retrieval on environmental self-identity, $B = 0.35$, $Bse = 0.34$, $t = 1.01$, $p = .32$. Findings are presented in Figure 4.

Figure 4

Moderated mediation model



Note: * $p < .05$.

Discussion

The current study aimed to expand existing literature regarding influencing the environmental self-identity with the ease of retrieval manipulation, and its effect on pro-environmental behaviour. It

was investigated whether making people recall few items (two) versus many items (12) to retrieve would influence their environmental self-identity and self-efficacy, and consequently increase pro-environmental behaviour.

Two multiple mediation process tests were performed, one with the ease of retrieval manipulation, and the other with the perceived ease of retrieval as the independent variable. Moreover, in an exploratory regard, another moderated mediation process test was performed to examine whether biospheric values would moderate the effect of the ease of retrieval on environmental self-identity.

Ease of retrieval manipulation

Two points need to be discussed first. Firstly, the ease of retrieval manipulation did not work in the current study. There was no significant difference between the Few and Many group in how difficult they rated the assignment, that is, the perceived ease of retrieval. Moreover, both groups rated the assignment as “not particularly difficult or easy”. It was expected for the Few group to experience a higher ease in retrieving instances than the Many group, as it did in the study of Schwarz et al. (1991). However, the *perceived* ease of retrieval did influence the environmental self-identity, indicating that when the participants perceived the task as easy, they rated themselves higher on the environmental self-identity scale. Thus, the degree of environmental self-identity was due to the experienced ease when retrieving instances, however, this was not a result of retrieving few or many instances of pro-environmental behaviour.

Secondly, the ease of retrieval manipulation did not work as intended. There was a direct effect of the ease of retrieval manipulation on pro-environmental behaviour, that is, donating money. However, it was not the Few group who were likely to donate more money, but the Many group, meaning that the participants who had to retrieve more instances of when they performed pro-environmental behaviour were more willing to donate money to charity. The study of Ratliff et al. (2017) found that positive attitudes towards the prototype of an environmentalist predicted that participants were more likely to donate to an environmental charity. Regarding this, it might be

possible that participants were creating an in-favour attitude toward an environmentally friendly person prototype during the manipulation, especially the Many group as they had to retrieve 12 instances, which had a direct impact on the pro-environmental behaviour. This might explain why the environmental self-identity was not affected by the manipulation.

General discussion

Hypotheses one and two were rejected; the environmental self-identity was not predicted by the ease of retrieval manipulation, and the degree of the environmental self-identity did not predict more or less pro-environmental behaviour, respectively. The current findings are in line with the results of the recently conducted study by Leßke (2022) who also used the ease of retrieval manipulation to influence the environmental self-identity and pro-environmental behaviour, but also did not find predictive power of the ease of retrieval on environmental self-identity and pro-environmental behaviour. A small difference, however, was that their study used six versus 12 items to retrieve (compared to two versus 12) because their manipulation was a free recalling assignment (compared to recalling energy-saving specific behaviour). Moreover, similar to their study, the participants in the current study misunderstood the assignment and listed different behaviours instead of naming different instances where participants carried out energy-saving behaviours. It was allowed to name the same type of behaviour in the assignment, however, on different occasions. This partially explains why the manipulation failed in the current study as the assignment, inducing ease of retrieval, was not made by participants as it was intended. This might also explain why there was no correlation found between the manipulation and the manipulation check and the other variables.

In addition, hypothesis three was rejected as the environmental self-identity did not mediate the effect of the manipulation on pro-environmental behaviour. Not finding predictive power of the manipulation on environmental self-identity, and consequently of environmental self-identity on pro-environmental behaviour is contrary to recent studies (Cornelissen et al., 2008; Fanghella et al., 2019). Results of recent studies found evidence that altering the environmental self-identity did positively

affect pro-environmental behaviour. In particular, Fanghella et al. (2019) found that reminding participants of their past pro-environmental behaviour led to a higher environmental self-identity, which related to higher donations to charity. However, the aforementioned studies did not use the ease of retrieval manipulation, as they used different wording in their questionnaire to cue participants' environmental self-identity (Cornelissen et al., 2008; Fanghella et al., 2019). Studies that used the ease of retrieval manipulation, for example in altering the perceived assertiveness (Schwarz et al., 1991) or altering the of estimation of bicycle use (Aarts & Dijksterhuis, 1999) did find evidence of the manipulation effect.

Hypothesis four was rejected; self-efficacy did not mediate the effect of the ease of retrieval manipulation on pro-environmental behaviour. The research of Lauren et al. (2016) found that self-efficacy mediated the effect of easy past pro-environmental behaviour on difficult future pro-environmental behaviour. However, in the current study, participants rated the assignment as not particularly easy or difficult, and donating money is not particularly a difficult task. Moreover, past behaviour did not influence self-efficacy, and self-efficacy did not influence future behaviour. This is in contrast with previous literature, as self-efficacy is reported to be influenced by past behaviour and to influence future behaviour (Gallagher, 2012; Sitzmann & Yeo, 2013). Regarding the absence of a mediation effect, it was at least expected to find self-efficacy to be predicted by past behaviour, or to predict future behaviour. Lastly, hypothesis five was rejected, as biospheric values did not moderate the relation between the ease of retrieval manipulation and environmental self-identity.

Limitations and recommendations

Measuring pro-environmental behaviour

There were some unfortunate series of events that led to the measurement of pro-environmental behaviour being sized down to one item in the questionnaire. Initially, the experiment was designed to measure pro-environmental behaviour in two questionnaires a week apart. The participants were asked to write down what pro-environmental behaviours were performed each day.

For each week, the sum of pro-environmental behaviours was used to indicate whether participants performed more, less, or equally environmentally friendly. Using two questionnaires, the study aimed to measure pro-environmental behaviour and spillover as well. Due to a technical error, the initial sample was unusable. However, it was not feasible due to time constraints to iterate the experiment. Therefore, the measurement of pro-environmental behaviour was changed to one item, asking how much money the participant wanted to donate. It is recommended for future research that the questionnaire contains more items that measure pro-environmental behaviour.

Moreover, it is recommended, if a donation is used to measure pro-environmental behaviour, to let participants choose an organisation themselves to donate to, as individuals are more likely to donate to an organisation close to their own values (Kesberg & Keller, 2021). However, Greenspan et al. (2012) argue that environmental philanthropy should be theorised differently than other pro-environmental behaviour. Therefore, future research should keep in mind to include more variety in behaviours to measure instead of only donating behaviour.

In addition, the assignment might have been more challenging than it was intended by focusing on one specific type of pro-environmental behaviour, and thus not focusing on the *ease* of retrieving instances, but on the *content* of the retrieved instances. This might also explain why the manipulation and the perceived ease of retrieval did not correlate at all. It is therefore recommended to alter the manipulation in a free recalling assignment about pro-environmental behaviour, as this might have made the participants not focus on the ease, but rather on the content of the recalled instances.

Lastly, due to the scope of the study, other demographic factors (e.g. family size, income, type of housing) or psychological factors (e.g. moral licensing, attitudes, habit forming) have not been included in the current research. Future research should try to identify and disentangle the factors that influence pro-environmental behaviour.

Environmental self-identity

In addition, the environmental self-identity was measured as broad and generic, however, the current study did not consider specific self-identities which are related to specific (pro-environmental) behaviours (Van der Werff et al., 2014). For example, someone who identifies as a *recycler* will

recycle their waste more diligently than a person who identifies as an *energy-saver*. Thus, someone may consider themselves to have a (high) generic environmental self-identity, but they may only relate to a specific type of environmental self-identity. Hence, they perform specific pro-environmental behaviour linked to the self-identity. In that same regard, donating behaviour could be more specific to an environmental philanthropy identity. This might mean that participants who do not particularly relate to this identity would be less willing to donate, even if they would rate themselves as a generic environmentally friendly person. Future research should keep these specific self-identities in mind when designing the experiment or keep it as generic as possible.

Ease of retrieval manipulation

A possible factor of the manipulation failing could be the description of the assignment itself. The instructions of the assignment were most likely not clear to the participants, allowing for other interpretations than was intended. In the current study, the instructions were "*Now that you know what pro-environmental behaviour is, try to remember instances of when you engaged in pro-environmental energy-saving behaviour in the last 2 weeks, and describe 2/12 of those instances and the corresponding behaviour:*". To prevent ambiguity in the future, it is recommended to add instructions along the following lines: "please note that you can write down the same type of behaviour, as long as they were performed in different instances".

Conclusion

The current study aimed to answer the question "To what extent can the ease of retrieval manipulation increase pro-environmental behaviour by altering the self-related judgement of the environmental self-identity and self-efficacy?". The results indicate that the manipulation did not work as intended. As a result, all the hypotheses were rejected. It is most recommended to replicate the current study, keeping its limits in mind, and altering the design accordingly. Past research has laid a foundation for finding predictors of pro-environmental behaviour. The current study has added to scarce existing literature using the ease of retrieval manipulation altering the environmental self-identity and self-efficacy to influence pro-environmental behaviour. Future research should aim to take

it a step further and try to examine and disentangle the causal relationships that influence pro-environmental behaviour, because we need to change our behaviour to combat climate change. It is now, or never.

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Appendix A - Questionnaire

Informed consent

This page contains important information about the aim of the study, as well as your rights as a participant. Please read this page carefully!

With the current climate crisis and the need for sustainable behaviour, this study aims to examine environmental friendly behaviour amongst students.

You will complete a few questionnaires and small assignment today.

Requirements: You will only need a working device (laptop, tablet, or smartphone) and a stable internet connection to participate in this study. Moreover, you must be ≥ 18 years old, and fluent in English. It is important that you finish the questionnaire in one go if you are able to.

Anonymity: Participants are linked to a randomised number to ensure anonymity, and data will only be used for research purposes.

Your rights: You participate on a voluntary basis. You have the right to withdraw from the study at any given moment without having to give an explanation. This will have no negative consequences for you personally. If you wish to withdraw from the study after you already completed the questionnaire, please contact me (see contact details at the bottom of the page).

Risks: There are no foreseeable factors in this research that would pose any risks to the participant, such as extent of strain, potential risks, or feelings of discomfort.

If you have any questions or remarks, you can contact me via email:

Tinka van den Hazel

t.s.vandenhazel@student.utwente.nl

Please tick the box below if you wish to participate in this study:

- I consent and I understand all the points mentioned above.
-

Thank you for participating! Firstly, we start with some questions about your demographic information:

What is your age?

What is your gender?

- Woman
- Man
- Other

What is your nationality?

- Dutch
- German
- Other, namely ...

What study do you follow?

- Psychology

- Social Sciences
- Other, namely ...

What is your living situation? (If you have multiple, pick the one that is most applicable)

- I have a place of my own, living alone
- I have a place of my own, living with a partner
- I live in a student house
- I live with my caregiver(s)
- Other, namely ...

This questionnaire contains questions about your values. Please rate the following statements from strongly disagree to strongly agree:

(Randomised order:)

1. It is important to me to prevent environmental pollution.
2. It is important to me to protect the environment.
3. It is important to me to respect nature.
4. It is important to me to be in unity with nature.
5. Please rate this statement with strongly disagree. (control question)

In the next part, you will make a small assignment.

You are going to list a few occasions at which you performed some type of behaviour.

In specific, environmental friendly behaviour.

It is of great importance that you read the instructions very carefully!

Please, take your time and make sure you can focus on the task at hand by minimising distractions.

If possible, make this assignment in one go.

Assignment:

Due to human impact, climate change has caused the average temperature to rise, resulting in more frequent and impactful natural disasters; prolonged heatwaves, drought, or rainfall to name a few, are every year more common. This does not only impact humans, but it also wildlife and vegetation.

To combat climate change, people perform all kinds of behaviours that benefit the environment or harm it as little as possible. This behaviour is also called **pro-environmental behaviour**. Pro-environmental behaviour can vary between using a reusable bottle and installing solar panels on your property.

Other examples of pro-environmental behaviour are

- repairing shoes and clothes first rather than throwing them away
- recycling plastic, glass, or paper

- deliberately not eating meat or animal produce a few times a week, or having a vegan/vegetarian lifestyle
- growing vegetables or herbs in your garden or indoors for consumption
- having plants and flowers on your property for butterflies and pollinators
- using reusable bags when doing groceries

Thus, the essence of pro-environmental behaviour is to improve the environment or to harm it as little as possible. It does however **not** count as pro-environmental behaviour if it underlies another motive, such as riding your bike more often to save gas as a result of rising gas prices.

The following question is about **energy saving behaviour**.

Now that you know what pro-environmental behaviour is, try to remember instances of when you engaged in pro-environmental energy saving behaviour in the last 2 weeks, and describe 2/12 of those instances and the corresponding behaviour:

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

1.
2.

11.
12.

Please rate the following statements about the assignment you just did from strongly disagree to strongly agree:

1. I found this task difficult.
 2. I think that the answers came pretty easily to me.
-

This page contains statements about how you evaluate yourself. Please rate the following statements from strongly disagree to strongly agree:

- Acting environmentally friendly is an important part of who I am.
 - I am the type of person who acts environmentally friendly.
 - I see myself as an environmentally friendly person.
-

This last question is about climate change and energy saving behaviour. Please rate the statements from strongly disagree to strongly agree.

- I am able to save energy to combat climate change.
- Saving energy is easy to combat climate change.
- Saving energy to combat climate change is convenient.

Thank you for taking part in this study!

In collaboration with the BMS lab and Greenpeace, I will randomly select someone who will receive 50 euros in the form of a gift card.

