Article

No Evidence of Within-Domain Moral Licensing in the Environmental Domain

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Abstract

Several studies have suggested that people might be less likely to engage in proenvironmental behavior subsequent to their prior engagement in proenvironmental behavior. We have conducted a preregistered replication of one such recent study of within-domain licensing in the area of environmental protection. Our replication was extended with an analysis of self-perception as a potential mediator of licensing and environmental attitude as its moderator. The results of our web-based experiment ($N = 1{,}765$) show that recollection of past proenvironmental behavior does not diminish subsequent support of a proenvironmental energy policy or proenvironmental intention, and that environmental attitude does not moderate licensing. We only found some evidence of an indirect effect of recollection on subsequent policy support and proenvironmental intention, mediated by self-perception; the pattern of mediation is, however, inconsistent with the licensing theory. We have not replicated the licensing effect observed in the original study.

Keywords

moral licensing, environmental attitude, proenvironmental behavior, Campbell paradigm, Bayesian analysis

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In their everyday lives, people make—almost continuously—choices which impact the environment, starting with whether they turn off the tap while brushing their teeth in the morning (e.g., Russell & Fielding, 2010) and deciding whether to turn off their heating for the night (e.g., Dietz et al., 2009). However, there are contradictory accounts of whether and how engagement in proenvironmental action affects subsequent proenvironmental behavior. Some studies show that initial engagement in proenvironmental behavior encourages further engagement in other proenvironmental actions (e.g., Kaida & Kaida, 2015; Steinhorst et al., 2015; Thøgersen & Noblet, 2012). Other studies have found that engagement in proenvironmental behavior has an inhibitory effect on subsequent proenvironmental behavior (e.g., Catlin & Wang, 2013; Garvey & Bolton, 2017; Geng et al., 2016; Noblet & McCoy, 2018; Tiefenbeck et al., 2013). Even though the nature of this inhibitory effect remains obscure (for a review of possible mechanisms, see, for example, Nilsson et al., 2017; Truelove et al., 2014), there have been attempts to link it to the process of moral licensing (e.g., Catlin & Wang, 2013; Garvey & Bolton, 2017; Geng et al., 2016; Noblet & McCoy, 2018).

Evidence of moral licensing remains ambiguous owing to the potentially small and heterogeneous effect size of licensing (Blanken et al., 2015; Simbrunner & Schlegelmilch, 2017) coupled with a large publication bias (Kuper & Bott, 2019), and a potentially large number of moderators of licensing (Mullen & Monin, 2016). Indeed, some recent studies have failed to replicate the licensing effect (Blanken et al., 2014; Urban et al., 2019). A further limitation of many licensing studies in the environmental domain is that they rarely focus on the underlying process by examining the theoretically expected mediators of licensing (for discussion, see Robitaille, 2014).

The purpose of this study is to bridge some of these gaps by conducting a highly powered preregistered replication of a recent licensing study in the environmental domain by Noblet and McCoy (2018). Further, we extend the study by Noblet and McCoy by exploring the role of self-perception as a candidate mediator of licensing (see, for example, Jordan et al., 2011) and by focusing on the role of environmental attitude as a potential moderator of licensing (e.g., Geng et al., 2016). Besides its theoretical importance, the practical implications of the licensing effect in the environmental domain would be far-reaching as policies, which typically aim to support a limited number of proenvironmental behaviors (e.g., Dietz et al., 2009; Vandenbergh et al., 2008), face the risk of backfiring by undermining other types of proenvironmental behavior.[1]

Licensing and Other Inhibitory Effects in the Environmental Domain

Several studies have recently shown that engagement in proenvironmental behavior has an inhibitory effect on subsequent proenvironmental behavior (e.g., Catlin & Wang, 2013; Garvey & Bolton, 2017; Geng et al., 2016; Noblet & McCoy, 2018; Tiefenbeck et al., 2013), subsequent prosocial behavior (e.g., Hahnel et al., 2015; Susewind & Hoelzl, 2014), or subsequent moral behavior (e.g., Mazar & Zhong, 2010; but see Urban et al., 2019). Multiple mechanisms have been proposed as a theoretical explanation for such an inhibitory effect (e.g., Nilsson et al., 2017; Truelove et al., 2014), including the rebound effect, driven by the economic processes of a changing demand structure (e.g., Sorrell & Dimitropoulos, 2008), the moral licensing effect, whereby engagement in a behavior which people perceive as moral gives them the "license" to subsequently behave immorally (e.g., Miller & Effron, 2010), and the single-action bias, where focusing on one proenvironmental behavior results in people neglecting other options of environmental protection (e.g., Weber, 1997). Of all the inhibitory effects, licensing has been probably most often proposed as the psychological explanation for inhibitory effects in the environmental domain.

The term *licensing* is used to denote a group of psychological processes that share the rather vague notion that prior moral behavior (e.g., proenvironmental behavior) increases the chance of a subsequent immoral act (e.g., antienvironmental behavior). Two explanations have been proposed for the licensing effect (see Miller & Effron, 2010 for their discussion). The first explanation is that initial engagement in proenvironmental behavior allows the person to maintain a positive self-perception, even when subsequently engaging in antienvironmental behavior, which indirectly motivates antienvironmental behavior by weakening self-control (the so-called *credit model*, see, for example, Geng et al., 2016). Another explanation is that initial proenvironmental behavior establishes the credentials of a person as someone who protects the environment, which then facilitates his or her subsequent antienvironmental behavior, which would no longer be attributed to a lack of environmental motivation (the so-called *credential model*, see, for example, Monin & Miller, 2001). Unlike the credential model, under the credit model, a person is aware that she engages in "bad" behavior, which eventually diminishes her credits and thus also the licensing effect (see, for example, Merritt et al., 2010 for discussion). However, both models share the notion that licensing may be mediated by a boost to various aspects of self-perception (e.g., Jordan et al., 2011; Khan & Dhar, 2006).

Given the multitude of possible mechanisms that can be potentially responsible for the licensing effect, and the difficulties of some studies in replicating licensing (e.g., Blanken et al., 2014; Urban et al., 2019), the study of process variables mediating and moderating licensing can advance our knowledge of this potentially important phenomenon.

Process Variables

Self-perception has been proposed (e.g., Khan & Dhar, 2006; Sachdeva et al., 2009) but rarely tested (see Robitaille, 2014 for discussion) as a key mediator of licensing. Some aspects of self-perception were found to mediate licensing, such as prosocial identity (Khan & Dhar, 2006; but see Garvey & Bolton, 2017 for the mediation effect running in the opposite direction), moral identity (Cornelissen et al., 2013; Jordan et al., 2011; Kouchaki, 2011), or self-perception in terms of goal satiation (Garvey & Bolton, 2017). On the other hand, subsequent replications of these mediation effects were not successful (Robitaille, 2014). More importantly, there seem to be important inconsistencies in the literature: while some studies found that self-concept became more positive after prior moral behavior (e.g., Cornelissen et al., 2013; Khan & Dhar, 2006; Kouchaki, 2011), at least one study found this effect running in the opposite direction (Jordan et al., 2011; see also Robitaille, 2014 for discussion of other inconsistencies).

Inconsistencies in the licensing literature and the difficulty in replicating the licensing effect might be related to the presence of a potentially large number of moderators of licensing (see Mullen & Monin, 2016 for a review). Environmental attitude is a likely moderator in the environmental domain not least because people high in environmental attitude are known to be comparatively more committed to environmental protection regardless of external conditions (e.g., Kaiser & Wilson, 2004). However, evidence about the moderating role of environmental attitude remains mixed, with some studies finding that higher environmental attitude attenuates licensing (e.g., Geng et al., 2016; Susewind & Hoelzl, 2014), other studies finding the opposite effect (e.g., Hahnel et al., 2015), and other studies finding no moderation effect at all (e.g., Brügger & Höchli, 2019; Urban et al., 2019).

Both environmental attitude and self-perception seem to be important variables potentially influencing the relationship between two consecutive proenvironmental behaviors documented in the original study by Noblet and McCoy (2018), which we attempt to replicate in the remainder of this study.

Moral Licensing Effects in the Original Study

Noblet and McCoy's (2018) recent study provided evidence that recollection of a mixture of past pro- and antienvironmental behaviors had a negative effect on subsequent support for proenvironmental energy policies. This experimental study used a procedure from Lacasse (2015) to manipulate recollection of past pro- and antienvironmental behaviors by using different frequency adjectives to qualify past behavior (for details, see also the "Method" section of this article).

Three pieces of evidence regarding the licensing effect (or lack thereof) were presented by Noblet and McCoy (2018). First, the study found experimental evidence that recollection of pro- and antienvironmental behaviors (as opposed to no recollection of such behaviors) made people less likely to support a proenvironmental energy policy (henceforth referred to as *dose effect*). Secondly, the study did not find experimental evidence that recollection of past behavior as relatively more proenvironmental (as opposed to less proenvironmental) affected a person's subsequent support for a proenvironmental policy (henceforth referred to as *green intensity effect*). Finally, the study also found correlational evidence that those who recollected engaging in specific energy-related proenvironmental behaviors were subsequently less likely to support a proenvironmental energy policy (henceforth referred to as *domain effect*). However, the last of these effects was held only among participants with low levels of intrinsic environmental motivation.

While all three effects (i.e., dose effect, green intensity effect, and domain effect) could be driven by moral licensing, Noblet and McCoy's (2018) study did not examine process variables and thus could not rule out alternative explanations. It is not clear why the study found the dose and domain effects but not the green intensity effect. Previous studies found an effect of a similar experimental manipulation on self-perception (see Lacasse, 2015; for additional evidence obtained with similar manipulation of proenvironmental behavior, see, for example, Cornelissen et al., 2008; Lacasse, 2016; van der Werff et al., 2013b, 2014) and self-perception is a likely candidate as a mediator of licensing (Cornelissen et al., 2013; Khan & Dhar, 2006; Kouchaki, 2011; but see van der Werff et al., 2013a, for evidence that changing self-perception mediated consistency and not licensing). Finally, it is not clear why intrinsic environmental motivation moderated only the domain effect in Noblet and McCoy's (2018) study but not the green intensity and dose effects when intrinsic motivation is a known moderator of licensing (see Garvey & Bolton, 2017, for the moderating effect of intrinsic environmental motivation; and see Mullen & Monin, 2016,

for the evidence from other domains; but see Hahnel et al., 2015, for the opposite direction of the moderating effect of intrinsic environmental motivation).

Research Objectives

The purpose of this study was to conduct a high-powered replication of Noblet and McCoy's (2018) licensing study and examine processes underlying the inhibitory effect. We looked for the underlying mechanism of the three effects (i.e., dose effect, green intensity effect, and domain effect) by exploring the mediating role of self-perception (i.e., green self-perception, prosocial self-perception, and self-perception in terms of doing enough for the environment). As in the original study by Noblet and McCoy (2018), we also checked for the possible moderating effect of intrinsic environmental motivation but, unlike the original study, we conducted this test on all three potential inhibitory effects.

Method

Sample Size Determination

The sample size for this study was determined a priori based on power heuristics for replication studies as proposed by Simonsohn (2015). According to these heuristics, a replication study should use a 2.5 times larger sample size than the original study to have enough power to detect the effect reported in the original study, even if the original study was grossly underpowered. This means that if such a replication study fails to find the replicated effect then the true effect must have been so small that it is very unlikely that the original study could have detected it in the first place. Since the original study by Noblet and McCoy (2018) had $N = 668$, our replication required at least $N = 1{,}670$. Thus, we aimed for $N = 1{,}700$.[2]

In addition, we also conducted a Bayesian power simulation (see the preregistration of the study for details) to discover whether the power of our study would be sufficient to detect a small effect (Cohen $h = 0.2$) of behavioral recollection (no dose vs. dose conditions) on policy support. This power analysis revealed that with the sample size $N = 1{,}700$ the study would have sufficient power ($1 - \beta > .90$) to detect such an effect ($\alpha = .05$).

Participants

Participants were recruited from a large proprietary panel[3] of participants using quota sampling for age, education, and gender using quotas for the

general adult population (18–60 years) of the Czech Republic. A total of 1,934 participant accessed the questionnaire online and 1,792 (92.7%) participants completed it. The completion rate (c.r.) was similar in the no dose condition, c.r. = .94, dose-not green condition, c.r. = .91, and dose-green condition, c.r. = .93, $F(2, 1{,}932) = 1.75$, $p = .19$. Based on pre-registered exclusion criteria, we excluded 27 (1.5%) participants who indicated that they had accessed the study previously and five (0.3%) participants who failed to answer all the attitude items. The final sample ($N = 1{,}765$) consisted of dose-green condition ($n = 608$, 35%), dose-not green condition ($n = 552$, 31%) and no dose condition ($n = 600$, 34%), and was fairly variable in terms of gender (51% were males), age ($M = 39$, $SD = 12$), and education (35% had high-school education with a school-leaving exam and 14% had college-level education or higher).

Materials

The full wording of the materials can be found at https://osf.io/yjxfz.

Experimental manipulation. This study manipulated recollection of past engagement in proenvironmental behavior using a procedure adopted from Noblet and McCoy (2018). This procedure uses a technique developed by Lacasse (2015) which manipulates recall of proenvironmental behavior by alternating the frequency adverbs *frequently* and *occasionally* in statements describing a person's past pro- and antienvironmental activities. Participants are generally less likely to answer positively statements that feature the adverb *frequently* than statements that feature the adverb *occasionally* (Lacasse, 2015; Noblet & McCoy, 2018). By asking participants whether they have performed proenvironmental behaviors *frequently* and antienvironmental behaviors *occasionally*, one can theoretically make people recall their past behavior as comparatively antienvironmental. On the other hand, by asking people whether they have performed proenvironmental actions *occasionally* and antienvironmental behaviors *frequently*, one can theoretically make people recall their past behavior as comparatively proenvironmental. An example of a proenvironmental action statement is "I frequently/occasionally purchase organic or local produce"; an example of an antienvironmental action statement is "I frequently/occasionally drive to places I could easily walk or bike."

Participants in the *dose-not green condition* were given a list of eight proenvironmental statements qualified with the adverb *frequently* and eight antienvironmental statements qualified with the adverb *occasionally*; participants in the *dose-green condition* received the same statements, but proenvironmental

statements were qualified with the adverb *occasionally* and antienvironmental statements with the adverb *frequently*; participants in the *no dose condition* did not receive this task and did not indicate their past pro- and antienvironmental behaviors prior to the measurement of dependent variables.

Manipulation check. We conducted the same manipulation check as Noblet and McCoy (2018; see also Lacasse, 2015; this test was not preregistered). Essentially, this manipulation check compared the number of times participants answered positively questions of prior engagement in proenvironmental and antienvironmental behaviors. A positive answer to each question on proenvironmental engagement was scored as one and a negative answer was scored as zero, whereas a positive answer to each question on antienvironmental engagement was scored as zero and a negative answer was scored as one. By summing up all the responses provided by each participant, we computed his or her green recollection score ($M = 8.66$, $SD = 2.78$, KR20 = .61). As expected, participants in the dose-green condition had a higher population estimate of green recollection score, $\mu = 9.74$, $\sigma = 2.58$, than participants in the dose-not green condition, $\mu = 7.48$, $\sigma = 2.40$, $\Delta = 2.25$, 95% CI [1.96, 2.55], resulting in a large effect size, $d = 0.90$, 95% CI [0.78, 1.03].

Moderator

Environmental attitude. Environmental attitude was assessed with the GEB scale (e.g., Byrka et al., 2017), a validated measure of environmental attitude (e.g., Arnold & Kaiser, 2018; Byrka & Kaiser, 2013) grounded in the attitude theory of the Campbell paradigm (Kaiser et al., 2010; Kaiser & Wilson, 2019), which infers attitude levels from 50 self-reports of proenvironmental behavior; an example of an item: "I use a clothes dryer." Participants indicated whether they had performed proenvironmental behaviors (18 items, response options *yes, no, I don't know/not applicable*) and how frequently they performed proenvironmental behaviors (32 items, response options *never, seldom, sometimes, often, very often, I don't know/not applicable*). The response option *I don't know/not applicable* was recorded as a missing value; polytomous items were recoded into dichotomous format to reduce measurement error (see Kaiser & Wilson, 2000, for justification of dichotomization of items) by merging the three lowest answer categories (*never, seldom, sometimes*) and by merging the highest two categories (*often, very often*). Some of the items were reverse coded so that higher values corresponded to proenvironmental responses. The environmental attitude score was estimated using the Rasch model for binary responses (see Bond & Fox, 2012, for details of the model). The reliability of the attitude scale was sufficient, $\alpha = .77$, separation reliability = .75.

Mediators

Green identity. Green identity was measured with the following three items taken from van der Werff et al. (2013b): "Acting environmentally friendly is an important part of who I am," "I am the type of person who acts environmentally friendly," and "I see myself as an environmentally friendly person." Participants indicated whether they agreed or disagreed that each of the statements described them using a seven-point scale with labeled endpoints (−3 = *completely disagree* and 3 = *completely agree*). The mean score was computed for each participant ($M = 1.27$, $SD = 1.19$, $\alpha = .87$).

Prosocial identity. Prosocial identity was measured with the following two items adopted from Garvey and Bolton (2017): "I am selfish" and "I am helpful." Participants indicated whether they agreed or disagreed that each of the statements described them using a seven-point scale with labeled endpoints (−3 = *completely disagree* and 3 = *completely agree*). The first item was reverse coded so that a higher score reflected a higher prosocial identity and the mean score was computed for each participant ($M = 1.44$, $SD = 1.16$, $\alpha = .42$).

Self-perception of having "done enough" for the environment. Self-perception in terms of whether a person has "done enough" for environmental protection was measured with the following three items: "I contribute to protection of the climate and the environment more than most other people," "I sufficiently contribute to protection of the climate and the environment," and "In everyday life, I succeed in protecting the climate and the environment." Participants indicated whether they agreed or disagreed that each of the statements described them using a seven-point scale with labeled endpoints (−3 = *completely disagree* and 3 = *completely agree*). The mean score was computed for each participant ($M = 0.46$, $SD = 1.18$, $\alpha = .83$).

Dependent variables

Support for a pro-climatic energy policy. Support for a pro-climatic energy policy was measured with a task adopted from Noblet and McCoy (2018). Participants were presented with a hypothetical policy scenario in which Czech policymakers would adopt a law increasing support for renewable resources and efficiency measures in the housing sector. This policy measure would, however, increase average monthly expenditure on electricity by 50 CZK (the equivalent of EUR 2) per capita. Participants were then asked whether they would support the adoption of such a policy measure with answer options of *yes* or *no*. Unlike Noblet and McCoy (2018), we elicited support for all renewable resources and did not vary the bid level for the increase in electricity expenditure to reduce the number of experimental conditions and increase

the statistical power of the study. Acceptance of the policy was coded as 1 and refusal as 0 (average acceptance was 51%).

Intention to proenvironmental behavior. Proenvironmental intention was measured with six items from Minton and Rose (1997). Each item presented a hypothetical situation in which a person could behave proenvironmentally, an example of an item: "I would be willing to sign a petition to support an environmental cause." Participants indicated whether they agreed or disagreed that each of the statements described them using a seven-point scale with labeled endpoints (−3 = *completely disagree* and 3 = *completely agree*). The mean score was computed for each participant ($M = 0.25$, $SD = 1.23$, $\alpha = .83$).

Quality control questions. According to the preregistration, quality control questions were mainly included for the purpose of a follow-up sensitivity analysis (not reported in Results). Two self-reports adopted from Ebersole et al. (2016) indicated that 98% of participants tried to answer the questions correctly and 96% of participants paid close attention to the instructions.

Procedure

Participants were recruited from a proprietary panel of an opinion poll company and accessed the questionnaire online. After providing their informed consent, they were randomly assigned to one of three experimental conditions (*no dose, dose-not green*, and *dose-green* conditions). Participants in the dose-green and dose-not green conditions received the recall task. All participants then proceeded to a battery of eight items which assessed their self-perception (i.e., green identity, prosocial identity, and self-perception of "doing enough" for the environment); items were displayed in random order. Next, participants answered a policy support question and proceeded to the measure of proenvironmental intention. Next, participants answered 50 items of GEB scale and demographic questions (gender, age, education, household income, number of children, and adults in the household). All participants then answered quality control questions and one question on beliefs about the anthropogenic causes of global climate change (not used in the main analyses). Finally, participants were given the option to submit the questionnaire for processing or drop out of the study (in which case they could just close the window of their Internet browser). These participants were included among participants who did not complete the study.

Analysis

Statistical tests were conducted using Bayesian methods in *R, Stan* (*Rstan* package in *R*, see Stan Development Team, 2018) and *Jags* (*Rjags* package in

R, see Plummer, 2013). We opted for Bayesian analysis because it allowed us to directly assess the plausibility of hypothesized null effects (see, for example, Kruschke, 2015). We conducted Bayesian analogs of robust linear regression and logistic regression, independent-sample *t*-tests, and *F*-tests (see Appendix in the Online Supplemental Material for details of Bayesian analysis; the *R* script used for the analysis can be found in the preregistration).

Results

Dose Effect

Policy support and proenvironmental intention. The probability of policy support was similar in the no dose condition, $p = .52$, and in the dose condition, $p = .51$, $\Delta = -0.02$, 95% CI [−0.03, 0.06], and the effect size was practically equivalent to zero, $h = 0.11$, 95% CI [−0.06, 0.13]. Regression analysis revealed practically zero effect of experimental manipulation, $OR = 0.99$, 95% CI [0.80, 1.21], and practically zero moderation effect of environmental attitude, $OR = 1.05$, 95% CI [0.80, 1.35], but it also revealed the expected positive main effect of environmental attitude on policy support, $OR = 1.53$, 95% CI [1.21, 1.88].

Likewise, the population estimate of mean-centered score of proenvironmental intention was similar in the no dose condition, $\mu = 0.29$, $\sigma = 1.23$, and the dose condition, $\mu = 0.24$, $\sigma = 1.19$, $\Delta = 0.05$, 95% CI [−0.07, 0.18]. Importantly, the true effect size was practically equivalent to zero, $d = 0.04$, 95% CI [−0.06, 0.14].

Regression analysis revealed a practically zero main effect of experimental manipulation, $b = 0.05$, 95% CI [−0.06, 0.15], and no significant moderation effect of attitude, $b = -0.13$, 95% CI [−0.27, 0.02], but it also revealed the expected positive main effect of environmental attitude on proenvironmental intention, $b = 0.82$, 95% CI [0.71, 0.94].

Mediation by self-perception. Even though we did not find any direct dose effect on either support for environmental energy policy or proenvironmental intention, it is still possible that there is an indirect effect mediated by self-perception (see, for example, Hayes, 2018). Any such evidence has to be carefully evaluated because an apparent mediation effect can easily arise even when there is no true mediation effect (Fiedler et al., 2011). Since the three identity scores were correlated ($r = 0.32$–0.75), we shall consider mediation by each of the three identities separately (see Online Appendix for details).

Green identity. The green identity score was higher in the no dose condition, $\mu = 1.49$, $\sigma = 1.00$, than in the dose condition, $\mu = 1.24$, $\sigma = 1.00$, $\Delta = 0.25$,

95% CI [0.14, 0.36], resulting in a small effect size, $d = 0.24$, 95% CI [0.13, 0.34]. In addition, there was a small negative indirect dose effect, mediated by green identity, on policy support, $\beta = -.022$, 95% CI [−0.036, −0.009], and proenvironmental intention, $\beta = -.047$, 95% CI [−0.069, −0.024].

Prosocial identity. We also found that the prosocial identity was higher in the no dose condition, $\mu = 1.53$, $\sigma = 1.15$, than in the dose condition, $\mu = 1.41$, $\sigma = 1.15$, $\Delta = 0.13$, 95% CI [0.01, 0.24], even though the difference was small, $d = 0.12$, 95% CI [0.01, 0.21]. There was no indirect dose effect on policy support mediated by prosocial identity, $\beta = -.011$, 95% CI [−0.023, <0.001], but there appeared to be a small negative indirect effect on proenvironmental intention, $\beta = -.011$, 95% CI [−0.022, −0.001].

Self-perception of "doing enough for the environment". The score of self-perception of "doing enough for the environment" was higher in the no dose condition, $\mu = 0.60$, $\sigma = 1.06$, than in the dose condition, $\mu = 0.34$, $\sigma = 1.06$, $\Delta = 0.17$, 95% CI [0.05, 0.28], although the effect was rather small, $d = 0.16$, 95% CI [0.05, 0.27]. In addition, there was a small negative indirect dose effect, mediated by "doing enough" identity, on policy support, $\beta = -.013$, 95% CI [−0.025, −0.002], and proenvironmental intention, $\beta = -.028$, 95% CI [−0.050, −0.007].

Green Intensity Effect

Policy support and environmental intention. The probability of policy support was similar in the dose-not green condition, $p = .49$, and the dose-green condition, $p = .53$, $\Delta = -0.04$, 95% CI [−0.10, 0.02], and the effect size was practically equivalent to zero, $h = -0.11$, 95% CI [−0.20, 0.03]. Regression analysis revealed no main effect of experimental condition, $OR = 1.18$, 95% CI [0.90, 1.47], with a credible interval overlapping considerably with the region of practical equivalence for the null effect (0.7, 1.44), and no moderating effect of environmental attitude, $OR = 1.13$, 95% CI [0.80, 1.51], but it found the expected positive main effect of environmental attitude on policy support, $OR = 1.50$, 95% CI [1.18, 1.88].

Likewise, the mean-centered score of proenvironmental intention was similar in the dose-not green condition, $\mu = 0.20$, $\sigma = 1.16$, and the dose-green condition, $\mu = 0.28$, $\sigma = 1.22$, $\Delta = -0.07$, 95% CI [−0.16, 0.04]. Importantly, the true effect size was practically equivalent to zero, $d = -0.06$, 95% CI [−0.18, 0.05]. Regression analysis revealed no main effect of experimental manipulation on proenvironmental intention, $b = 0.05$, 95% CI [−0.07, 0.18], and no moderation of this effect by environmental attitude, $b = 0.04$, 95% CI

[−0.11, 0.21]; this analysis revealed also the expected positive main effect of environmental attitude on proenvironmental intention, $b = 0.67$, 95% CI [0.55, 0.79].

Mediation of green intensity effect by self-perception

Green identity. As expected, the green identity score was lower in the dose-not green condition, $\mu = 1.14$, $\sigma = 1.12$, than in the dose-green condition, $\mu = 1.31$, $\sigma = 1.15$, $\Delta = -0.14$, 95% CI [−0.31, −0.03], even if the resulting effect size of the manipulation was rather small, $d = -0.15$, 95% CI [−0.28, −0.03]. In addition, there appeared to be a small positive indirect green intensity effect, mediated by green identity, on policy support, $\beta = -.014$, 95% CI [<0.001, 0.028], and proenvironmental intention, $\beta = .028$, 95% CI [0.003, 0.055].

Prosocial identity. We found no difference in the prosocial identity score between the dose-not green condition, $\mu = 1.38$, $\sigma = 1.12$, and the dose-green condition, $\mu = 1.43$, $\sigma = 1.17$, $\Delta = -0.06$, 95% CI [−0.19, 0.08]. Thus, experimental manipulation had practically zero effect size, $d = -0.04$, 95% CI [−0.16, 0.07]. There was no indirect green intensity effect, mediated by prosocial identity, on policy support, $\beta = .005$, 95% CI [−0.008, 0.018], or proenvironmental intention, $\beta = .005$, 95% CI [−0.008, 0.018].

Self-perception of "doing enough for the environment." We found that the score of self-perception of "doing enough for the environment" was smaller in the dose-not green condition, $\mu = 0.37$, $\sigma = 1.04$, than in the dose-green condition, $\mu = 0.49$, $\sigma = 1.10$, $\Delta = -0.12$, 95% CI [−0.25, 0.01]. It was highly probable that this effect was different from zero ($p = .961$), despite the fact that its 95% credible interval contained zero, $d = -0.11$, 95% CI [−0.24, 0.01], and overlapped with the interval for practically zero effect (−0.2, 0.2). There appeared to be no indirect intensity effect, mediated by "doing enough" self-perception, on either policy support, $\beta = .010$, 95% CI [−0.002, 0.025] or proenvironmental intention, $\beta = .021$, 95% CI [−0.004, 0.048].

Domain Effect

Out of the total of 1,760 participants who answered the questions on their previous engagement in pro- and antienvironmental behaviors, 740 (42.0%) indicated that they had engaged in at least three of the four energy-related behaviors included in the behavioral battery. The probability of supporting the environmental energy policy was similar in the group that had not previously engaged in energy-conserving behaviors, $p = .507$, and those who had,

$p = .508$, $\Delta = -0.001$, 95% CI [−0.08, 0.06], resulting in a negligible effect that was practically equivalent to no effect, $h = 0.004$, 95% CI [−0.13, 0.12].

Mediation analysis revealed a small positive indirect domain effect, mediated by green identity on policy support, $\beta = .023$, 95% CI [0.011, 0.038], and proenvironmental intention, $\beta = .048$, 95% CI [0.026, 0.070], as well as a small positive indirect effect mediated by "doing enough" identity on policy support, $\beta = .022$, 95% CI [0.009, 0.035], and proenvironmental intention, $\beta = .046$, 95% CI [0.023, 0.068]. However, we found no such indirect effect mediated by prosocial identity on either policy support, $\beta = .001$, 95% CI [−0.010, 0.011], or proenvironmental intention, $\beta = -.001$, 95% CI [−0.010, 0.011].

Regression analysis revealed no main effect of experimental condition, $OR = 0.79$, 95% CI [0.60, 1.01], and no moderation effect of environmental attitude $OR = 0.86$, 95% CI [0.58, 1.16], even though the credible intervals for these effects did not fall in the interval of practically zero effects. Regression analysis also revealed the expected main effect of environmental attitude on policy support, $OR = 1.87$, 95% CI [1.37, 2.44].

General Discussion

The aim of this study was to replicate the within-domain licensing effect of recollection of past proenvironmental behavior on subsequent support for environmental policy found in a recent study (Noblet & McCoy, 2018). Furthermore, we also aimed to extend this replication by examining the mediating role of self-perception and moderation of the licensing effect by environmental attitude.

We did not replicate any of the direct licensing effects on policy support reported in the study by Noblet and McCoy (2018). Similar to the original study, we also did not find any evidence of the direct green intensity effect on either support for a green energy policy or proenvironmental intention. Finally, we also did not corroborate moderation by the environmental attitude of the (direct) domain effect (for similar results, see, for example, Brügger & Höchli, 2019; Urban et al., 2019).

Indirect Effects Mediated by Identity Constructs

Even though we did not replicate licensing effects on policy support or proenvironmental intention, we found what appears to be an indirect negative dose effect, mediated by green, prosocial, and "doing enough" identities, on policy support and proenvironmental intention; this indirect effect runs in the same direction as the licensing effect found in Noblet and McCoy's (2018)

study. However, this indirect negative dose effect cannot be interpreted as the licensing effect because it is driven by self-perception becoming more negative (whereas licensing theory would expect a positive effect on self-perception, for example, Khan & Dhar, 2006).

We also found a positive green intensity effect on some aspects of self-perception (for similar results, see Cornelissen et al., 2008; Lacasse, 2015, 2016; van der Werff et al., 2013b, 2014) as expected by licensing theory (e.g., Khan & Dhar, 2006). However, this green intensity effect did not result in licensing in our study (the indirect effect was positive in our study and could be best interpreted as a *consistency effect*) or in Noblet and McCoy's (2018) study.

Interestingly, we also found a positive indirect domain effect, mediated by green and "doing enough" identities, on policy support and proenvironmental intention. Whereas the green identity has been studied as a potential mediator of licensing (see, for example, van der Werff et al., 2013a), the self-perception of "doing enough for the environment" capturing another suspected mediator of licensing—perceived goal satiation in the environmental domain (viz. Garvey & Bolton, 2016)—has not been studied previously.

Even though mediation analyses could be potentially revealing regarding the mechanism of licensing effect, findings of indirect experimental effects, when there are no total experimental effects, provide relatively weak evidence of mediation; spurious mediation effects can easily arise simply due to a high correlation between the moderator and the dependent variable (see Fiedler et al., 2011). On the other hand, lack of total experimental effect does not automatically invalidate findings of indirect experimental effects because indirect effects can have—somewhat paradoxically—a higher statistical power than tests of direct effects (Kenny & Judd, 2014). Thus, we urge readers to read our mediation analyses with caution.

Alternative Explanations for the Lack of Replication

Effect size and statistical power. Our study was designed to have sufficient statistical power ($>.9$) to detect the small licensing effect (see power simulation in preregistration) observed in some licensing studies (e.g., Blanken et al., 2015; Simbrunner & Schlegelmilch, 2017). In addition, our study had a 2.5 times larger sample size than the original study by Noblet and McCoy (2018) and thus was sufficiently powered to replicate the effects observed in the original study (Simonsohn, 2015).

Culture-specific moderators. Another explanation for why our study did not replicate the findings of Noblet and McCoy's (2018) study may lay in the

cultural moderation of licensing (Simbrunner & Schlegelmilch, 2017). The reasons for such cultural moderation could be related to how people in different cultures connect their past, present, and future actions (e.g., de la Fuente et al., 2014) and to cultural differences in morality (e.g., Haidt, 2013). However, since no specific cultural moderators of licensing have been directly observed, cultural moderation remains only a speculative explanation for why our study, conducted in a Central European country, did not replicate the results of Noblet and McCoy's (2018) study.

Methodological features of the original study. Discrepancies between the original study by Noblet and McCoy (2018), our study, and the existing body of literature could have been also due to some of the methodological features of the original study. The original study did not find evidence of the green intensity effect, but—instead—found evidence of the dose effect, in contrast with previous studies which found licensing due to the green intensity effect (e.g., Conway & Peetz, 2012; Cornelissen et al., 2013; Jordan et al., 2011) and a lack of studies which would find the dose effect. The domain effect, which seems to be the strongest evidence of licensing provided by Noblet and McCoy's (2018) study, is limited by its correlational nature and by the fact that measures of past pro- and antienvironmental behaviors used different thresholds (i.e., the adverbs "occasionally" and "frequently") in the two conditions. Thus, the same engagement score means different things in the two experimental conditions. In addition, the use of the problematic median split technique (see, for example, McClelland et al., 2015), and differences in dropout rate between experimental conditions (viz. differences in monthly energy bills between experimental conditions), could have also affected outcomes of the original study.

Survey administration mode. Another potential explanation for why we did not replicate Noblet and McCoy's (2018) study could be related to differences in survey administration mode and respondents: while Noblet and McCoy's study was conducted through paper questionnaires mailed to residents, our study was conducted as a web-based experiment on a panel of participants. Web-based experiments, as was ours, have been used to study licensing in the past (e.g., Blanken et al., 2014; Ebersole et al., 2016; Hahnel et al., 2015). The quality of data seemed to be better in our web-based experiment than in the original study in terms of non-responses (more than 92% of participants who assessed our questionnaire completed it vs. a 30%–33% response rate in the study by Noblet & McCoy, 2018) and also because of the response quality control which we employed (we could detect and exclude participants who failed attention checks and who accessed the questionnaire repeatedly). Thus, we do not think that our study introduced additional biases due to its survey mode.

Moderation by environmental motivation. Our measure of environmental motivation has been used and validated in a number of studies (e.g., Arnold et al., 2018; Kaiser et al., 2010, 2013), including as a licensing moderator (Hahnel et al., 2015; but see Urban et al., 2019). Thus, the lack of the moderating effect in the current study was probably not caused by poor psychometric properties of this measure. Nonetheless, future studies should try to replicate the moderating effect with the measure of environmental motivation (Goplen, 2014) used in Noblet and McCoy's (2018) study.

Confounding by mediator measures. Our study, unlike the original study by Noblet and McCoy (2018), included measures of self-perception as potential mediators of licensing. Since these measures were included between the experimental manipulation procedure and the measures of dependent variables, they could have theoretically attenuated the licensing effect; we acknowledge this possibility but do not think it is very likely. First, the majority of licensing mediation studies used the same design and still found licensing mediation (e.g., Jordan et al., 2011; Khan & Dhar, 2006; Kouchaki, 2011). Second, there is also evidence that including mediators before or after the dependent variable does not affect whether licensing takes place or not (Robitaille, 2014).

Practical Implications

Our study suggests that recollecting one's previous engagement in environmental conservation is unlikely to undermine an individual's commitment to further environmental protection. This result is quite consistent with some recent theories of environmental motivation, notably with the theory of the Campbell paradigm (e.g., Kaiser et al., 2010), which suggests that a propensity to protect the environment is a remarkably stable trait-like tendency (Kaiser et al., 2014). As such, it should not be too surprising to find, as we did, that the tendency to protect the environment was positively associated both with policy support and proenvironmental intention. It also should not be of surprise that the mere recollection of past engagement in proenvironmental behavior did little to change proenvironmental intention (which should be—ultimately—reflective of such a trait-like conservation tendency).

As expected, we also found that making people recollect their past behavior as comparatively more proenvironmental made them more likely to perceive themselves as more proenvironmental and as having done more for the environment. These effects can be interpreted through the lens of self-perception theory (Bem, 1972) as instances of learning about one's self from a

record of past activity (see, for example, Cornelissen et al., 2008; Lacasse, 2015, 2016; van der Werff et al., 2013b, 2014). However, since these effects were small in magnitude, we think that they have only limited practical significance and are unlikely to result in a substantial change in proenvironmental behavior (for similar results see Brügger & Höchli, 2019; Fanghella et al., 2019; van der Werff et al., 2013a, 2014; but see Cornelissen et al., 2008 for the evidence of a positive effect of green identity manipulation on proenvironmental behavior).

Limitations

Even though our study was a relatively close replication of Noblet and McCoy's (2018) study, there was an important difference in that the original study focused on several renewable energy policy scenarios considered in Maine, USA. Our study focused on a more general renewable policy scenario that included the adoption of a mix of renewable resources. We think that this made the scenario sufficiently realistic for Czech participants as the Czech Republic is obliged, being a member state of the European Union, to increase its share of renewables in total energy consumption from the current 15% to 32% by 2030 (European Council, 2018). This cannot be achieved through the adoption of a single renewable technology. Indeed, the average acceptance rate of the policy scenario among our participants (51%, similar to the 41%–52% reported by Noblet & McCoy, 2018), suggests that participants viewed our policy scenario as realistic.

Conclusion

We conducted a close replication of a recent licensing study (Noblet & McCoy, 2018) and found that recollection of proenvironmental behavior affects self-perception but does not diminish subsequent support for environmental policies and the intention to engage in proenvironmental behavior. Thus, we were not able to replicate the within-domain licensing effect reported in the original study.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. All measures, manipulations, and exclusions are disclosed. No data analysis was undertaken before the end of data collection. Pre-registration of this study, as well as materials, data, analysis scripts and tests of all pre-registered hypotheses can be found at the following link: https://osf.io/yjxfz/. The study has been approved, as a part of a series of moral licensing experiments, by the IRB of Charles University Environment Center.
2. Note that the final sample was larger than originally planned because the external opinion poll company overshot collecting the data. The overshoot was anticipated in the preregistration protocol and the company only had information about the demographic characteristics of participants but was blind to the research hypotheses and did not have access to the data. Moreover, the exclusion of participants was done based on preregistered criteria and is fully disclosed in this study.
3. The panel, comprising about 40,000 participants, is highly variable in terms of sociodemographic characteristics and regional coverage. The management of the panel abides by ISOMAR and ESOMAR standards for the maintenance of participant panels. Participants volunteer for each study after receiving an invitation and are rewarded for their participation. Participants can take part in a maximum of 10 studies per year.

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