Journal of Environmental Psychology 63 (2019) 139–147

Contents lists available at ScienceDirect

Journal of Environmental Psychology

journal homepage: www.elsevier.com/locate/jep

Green consumption does not make people cheat: Three attempts to replicate moral licensing effect due to pro-environmental behavior[☆]

Jan Urban[a,*], Štěpán Bahník[b], Markéta Braun Kohlová[a]

[a] Environment Centre, Charles University, Prague, Czech Republic
[b] Faculty of Business Administration, University of Economics, Prague, Czech Republic

ARTICLE INFO

Handling Editor: Florian Kaiser

Keywords:
Moral licensing
Green consumption
Environmental attitude
Cheating

ABSTRACT

A recent study (Mazar & Zhong, 2010) argued that green consumption triggers cross-domain moral licensing, which makes people engage in dishonest behavior. In two conceptual and one close replication of this study (total $N = 1{,}274$), we manipulated participants' level of green consumption. Three different validated tasks, which allowed participants to cheat for monetary profit, were used to measure dishonesty in the three experiments. We found no licensing effect of green consumption on subsequent dishonesty. Thus, policies which make people engage in pro-environmental behavior are less likely to trigger cross-domain licensing than previously thought.

1. Introduction

Making people engage in pro-environmental behavior is arguably one of the general goals of environmental psychology (e.g., Schultz, 2014). Recent evidence suggests, however, that engagement in pro-environmental behavior can produce unforeseen and often adverse effects on subsequent pro-environmental behavior and elsewhere. For instance, engagement in pro-environmental behavior was found to make people less likely to engage in subsequent pro-environmental behavior (Catlin & Wang, 2013; Garvey & Bolton, 2017; Geng, Cheng, Tang, Zhou, & Ye, 2016; Noblet & McCoy, 2018), diminish their subsequent prosociality (Hahnel et al., 2015; Susewind & Hoelzl, 2014), and make them outright dishonest and immoral (Mazar & Zhong, 2010).

In this work, we aimed to replicate a much-discussed empirical study showing that the purchase of green products triggers the moral licensing effect, which in turn makes people more likely to engage in dishonest behavior (Mazar & Zhong, 2010). Such cross-domain moral licensing, which links apparently distinct behaviors in different domains is important to study for several reasons. The possibility of cross-domain licensing would mean that environmental policies promoting pro-environmental behavior should be designed so that moral licensing processes do not undermine their efficiency or the efficiency of other policies. In addition, research on pro-environmental behavior should then focus on the study of processes central to theorizing on moral licensing (e.g., goal satiation, situation construal) so as to complement existing understanding of pro-environmental motivation (e.g., Kaiser, Byrka, & Hartig, 2010; Steg & Vlek, 2009). Finally, if cross-domain moral licensing existed, its study would provide invaluable insight into the compensatory dynamics of goal-shifting and self-regulation that may be obscured in within-domain effects by alternative mechanisms (Truelove, Carrico, Weber, Raimi, & Vandenbergh, 2014).

Despite its impact in the literature and its potential theoretical and practical implications, evidence regarding the cross-domain moral licensing effect due to pro-environmental behavior is scarce. The present study advances knowledge of environmental cross-domain moral licensing by (i) focusing on the link between pro-environmental behavior and dishonesty, addressed by Mazar and Zhong's (2010) study, but not by its subsequent replications (see Hahnel et al., 2015; Susewind & Hoelzl, 2014); (ii) providing evidence from highly-powered studies, and (iii) by systematically exploring the role of environmental attitude, one of the suspected moderators of moral licensing in the environmental domain (e.g., Hahnel et al., 2015; Mullen & Monin, 2016).

2. Compensatory and consistency effects of pro-environmental behavior

Engagement in pro-environmental behavior has been shown to

☆ We wish to thank Marek Vranka and anonymous reviewers for their suggestions and comments and Cliff McLenehan for his language support. This research was supported by the Czech Science Foundation (grant No. 16-25440S).

* Corresponding author. Environment Centre, Charles University, José Martího 407/2, 160 00, Prague 6, Czech Republic.
E-mail address: jan.urban@czp.cuni.cz (J. Urban).

https://doi.org/10.1016/j.jenvp.2019.01.011
Received 2 June 2018; Received in revised form 27 January 2019; Accepted 31 January 2019
Available online 01 February 2019
0272-4944/

affect engagement in subsequent pro-environmental behavior (e.g., Geng et al., 2016) as well as behaviors not considered pro-environmental, such as volunteering in research (Hahnel et al., 2015). The effects of one pro-environmental behavior on another are summarily denoted as *positive* or *negative spill-over* effects (for their review, see Nilsson, Bergquist, & Schultz, 2017; Truelove et al., 2014), depending on whether they result in consistency (i.e., more pro-environmental behavior) or compensatory (i.e., less pro-environmental behavior) effects. There is no general term for the effects of pro-environmental behavior on other types of behavior such as negative effects of green consumption on prosocial intention (e.g., Susewind & Hoelzl, 2014).

Multiple mechanisms have been hypothesized to drive consistency as well as compensatory effects (e.g., Nilsson et al., 2017; Truelove et al., 2014). For instance, negative spill-over effects can be explained by the rebound effect driven by the economic processes of a changing demand structure (Sorrell & Dimitropoulos, 2008), by the moral licensing effect, whereby engagement in a behavior which people perceive as moral gives them a "license" to subsequently behave immorally (Miller & Effron, 2010), and by the single action bias, where focus on one pro-environmental behavior makes people neglect other options of environmental protection (e.g., Weber, 1997).

To complicate things further, multiple theoretical explanations have been proposed for the same compensatory phenomena. For instance, the moral licensing effect has been sometimes explained through the *moral credit* model postulating that a history of moral behavior allows a person to keep positive moral self-perception, even when engaging in immoral behavior, which indirectly motivates immoral behavior by weakening self-control (e.g., Sachdeva, Iliev, & Medin, 2009). An alternative explanation, the *moral credential* model, hypothesizes that past moral behavior establishes the moral credential of a person, which facilitates future immoral behavior that is no longer attributed to the immorality of the person (Monin & Miller, 2001). Recently, a third potential explanation has been proposed, which argues that once people achieve *saturation of their goals*, such as environmental protection, they are likely to turn to other, logically independent and competing goals, thus inhibiting the commitment to the goal of environmental protection (e.g., Geng et al., 2016).

Another difficulty in the study of consistency and compensatory effects is due to the fact that they are hypothesized to arise in the same situation depending on the presence of, often subtle, moderators. For instance, the purchase of green products has been reported to decrease as well as increase the intensity of subsequent pro-environmental behavior, depending on whether participants evaluated their progress in environmental protection or their commitment to environmental protection after they had made the purchase (Geng et al., 2016). For instance, compensatory effects, rather than consistency effects, are more likely in situations in which initial behavior is framed as goal progress (rather than goal commitment) and people do not deeply identify with the target behavior (see Mullen & Monin, 2016 for a review of moderators). Environmental attitude, in particular, seems to be an important moderator of licensing in the environmental domain (e.g., Garvey & Bolton, 2017; Hahnel et al., 2015), probably due to the fact that people with a high level of environmental attitude are more committed to the goal of environmental protection (e.g., Kaiser & Wilson, 2004).

3. Cross-domain moral licensing

Whereas several studies have examined the inhibitory effect of one pro-environmental behavior on the probability of subsequent environmental behavior (e.g., Catlin & Wang, 2013; Geng et al., 2016; Tiefenbeck, Staake, Roth, & Sachs, 2013) or pro-environmental intention (e.g., Garvey & Bolton, 2017; Geng et al., 2016; Noblet & McCoy, 2018), cross-domain moral licensing as a result of pro-environmental behavior is much less documented. The possibility of moral licensing being triggered by pro-environmental behavior is related to the fact that pro-environmental behavior is inherently prosocial behavior (Kaiser & Byrka, 2011) and it is therefore perceived as moral by external observers (e.g., Mazar & Zhong, 2010).

One of the few studies demonstrating cross-domain moral licensing due to initial engagement in pro-environmental behavior is a study by Mazar and Zhong (2010). In their study, Mazar and Zhong (2010) conducted two laboratory experiments in which they manipulated participants' pro-environmental behavior by having them choose products from a store which featured predominantly conventional products (control condition) or from a store which featured predominantly green products (pro-environmental condition). This manipulation affected the probability of choosing green products and subsequently led participants to make lower offers in the dictator game, answer dishonestly in a cheating task, and steal money from researchers.

Only two studies have replicated these cross-domain licensing experiments. A study by Hahnel et al. (2015, Study 3) conducted a conceptual replication of the original study and found that participants in the green condition were less prosocial (i.e., less willing to volunteer in unrelated research and completing a lower number of questionnaire pages). This study also found that environmental attitude moderated moral licensing, which was strongest in people with high levels of environmental attitude, and thus the moderation effect of attitude ran in the opposite direction than in other licensing studies (see, e.g., Mullen & Monin, 2016).

Another conceptual replication by Susewind and Hoelzl (2014) found that the effect of the store task on the intention to behave prosocially was moderated by store task framing. Participants who rated their prior shopping in the green store in terms of progress to environmental protection, and thus framed the shopping situation as goal progress, manifested moral licensing. On the other hand, participants who rated their commitment to the goal of environmental protection, and thus used goal-commitment framing, manifested consistency. Findings of goal commitment as a moderator of environmental moral licensing provide further rationale for our exploration of the role of environmental attitude as a potential moral licensing moderator.

Two related studies are also interpretable as examples of cross-domain moral licensing. These found that the mere act of rating environmentally friendly sunscreen (Hahnel et al., 2015) and organic food (Eskine, 2012), rather than their purchase, was sufficient to decrease subsequent prosociality (but see Mazar & Zhong, 2010, for opposite findings).

4. Research goals

The initial goal of this study was to conduct a conceptual replication of Mazar and Zhong's (2010) study, while focusing on environmental attitude as a potential licensing moderator. More specifically, we conducted a replication of the licensing effect of green consumption on subsequent dishonesty. After failing to replicate licensing in Study 1, we conducted two additional pre-registered studies with high statistical power and a neutral control group to further examine our results. Whereas Study 2 was still a conceptual replication, Study 3 was a close replication of Mazar and Zhong's (2010) study. Thus, across three studies, we tested the hypotheses that green consumption triggers moral licensing and leads to dishonesty, and that licensing is moderated by environmental attitude.

5. Study 1

Study 1[1] attempted to conceptually replicate the cross-domain licensing effect of pro-environmental behavior on dishonesty using the

[1] Materials, data, and analysis scripts for the pilot and the three studies, and preregistrations of Studies 2 and 3, as well as tests of all pre-registered hypotheses can be found here: https://osf.io/jxqra.

procedure of Mazar and Zhong (2010) to manipulate pro-environmental behavior.

5.1. Method

5.1.1. Participants

A non-representative sample of 507 Czechs from a proprietary Internet panel of a survey company accessed the first questionnaire online. Twenty-eight (5.5%) participants who did not finish the questionnaire and 62 (12.2%) participants who did not pass all three attention checks were excluded. The remaining participants were invited two weeks later to an ostensibly unrelated study, but only 320 (63.5%) participants accessed the second questionnaire, 94 (18.5%) did not complete it, and another four (0.8%) participants wished to be excluded from the study after the debriefing. The completion rate was similar in the two experimental conditions, $\chi^2(1,\ N = 320) = 0.26$, $p = .61$, $\varphi = 0.03$. We also excluded two participants with extreme completion times (more than three *SD* from mean) and five participants who had guessed the focus of the study (honest behavior).

The final sample ($N = 215$) was variable in terms of socio-demographics (45.1% were females, 7.0% of participants had primary, 62.3% secondary, and 30.7% tertiary education, $M_{age} = 42.0$, $SD_{age} = 18.8$).

5.1.2. Materials

Manipulation of pro-environmental behavior. The study used Mazar and Zhong's (2010) procedure to manipulate pro-environmental behavior. Participants in the green experimental condition selected products they would wish to obtain from a store with a majority of green products (nine out of 12 products), whereas participants in the conventional condition selected from a store with a majority of conventional products (nine out of 12 products). A pilot of the store task items revealed that Czech participants perceived consumption of green products as more moral than consumption of conventional products (see Appendix A for details).

The store task, framed as shopping in an online store, featured real products available on the Czech market and instructed participants to make their choice of products carefully because they would receive these products if they were drawn in a raffle. Products closely matched those used in Mazar and Zhong's (2010) study. The package sizes and actual market prices of product substitutes used in the two conditions were equal or very similar. Each store featured small pictures of the products, their descriptions, and price tags. Participants could click on the products to see detailed product descriptions. Environmental attributes were included in the names of the products (e.g., “green”, “ecological”, “organic”) and in the detailed descriptions. The stores themselves were not labeled.

The main difference between our store task and the one used by Mazar and Zhong (2010) was that participants in our study could choose any number of each product to a total value of 450 Czech Crowns (CZK), equivalent of €17.5 or $20.7, and were informed that “several participants” would be randomly drawn at the end of the study to actually receive selected products, whereas the original study allowed participants to choose only one product of each kind and one in 25 participants was randomly chosen and received products.

Measure of subsequent honesty. Honesty was measured with a task from Fischbacher and Föllmi-Heusi (2013) in which participants rolled a fair six-sided die (either their own, or one of the listed virtual dice available online) to determine their reward. The payoff value (in CZK) equaled the number rolled on the die multiplied by 100, except when participants rolled a six, in which case the payoff value was zero. The task was preceded by eight practice rounds, the outcomes of which were recorded by participants, but not used to determine their payoff, to facilitate dishonesty (Shalvi, Dana, Handgraaf, & De Dreu, 2011). With a theoretically known distribution of payoff values in random throws, $P_{uniform} = .167$, $E(\text{payoff}) = 250$ CZK, this measure assessed the group-level tendency to cheat.

Environmental attitude. Environmental attitude was measured with the General Environmental Behavior scale (GEB), a validated attitude scale based on 50 self-reports of ecological behaviors (e.g., Byrka, Kaiser, & Olko, 2017; Kaiser et al., 2010). This Rasch-calibrated scale had a somewhat lower person separation reliability, $rel_{ps} = .70$, and internal consistency, $\alpha = 0.64$, than in previous studies (e.g., Byrka et al., 2017; Kaiser & Wilson, 2000), but it still produced variable scores ($SD = 0.72$, see also General Discussion).

Attention checks. Three attention checks were included in the GEB battery in the first (pretest) questionnaire. These attention checks asked participants to mark a specific answer.

5.1.3. Design and procedure

Participants were asked to fill out a questionnaire with a battery of eight items measuring green identity (not analyzed in this study), 50 items of the GEB scale, and questions on perception of global climate change (not analyzed in this study) in a study that ostensibly focused on self-perception and lifestyles. Participants were invited, two weeks later, to an ostensibly unrelated study focusing on decision-making. Participants were randomly assigned to green or conventional experimental conditions and told that several of them would receive additional reward consisting of products they had selected up to a total value of 450 CZK. After selecting the products, participants proceeded to the die task. After completing the die task, participants proceeded to the second unrelated part of the questionnaire. They were then debriefed. At this point, respondents could withdraw from the study. Participants were paid 20 CZK (€0.8 or $0.9) for completing each of the two questionnaires.

5.2. Results

5.2.1. Manipulation of pro-environmental behavior

As expected, participants in the green condition chose green products of a higher value, $M_{green} = 312$ CZK, $SD_{green} = 153$, $M_{conv} = 128$, $SD_{conv} = 136$, $t(212) = 9.32$, $p < .001$, $d = 1.27$. None of the additional manipulation checks signaled any problems regarding the procedure (for details, see Appendices B and C). Participants' environmental attitude levels had no effect on green product expenditures, $\beta = 0.06$, $t(212) = 0.98$, $p = .33$ (see Appendix D for details).

5.2.2. Presence of dishonest behavior

Dishonesty was evident in participants significantly underreporting the lowest payoff value (no reward) and over-reporting two of the higher payoff values, 300 CZK and 400 CZK (but not the highest one, 500 CZK). The resulting average payoffs, $M = 288$ CZK, $SD = 150$, were significantly higher than the expected payoff of 250 CZK, $t(214) = 3.93$, $p < .001$, $d = 0.27$ (see Fig. 1).

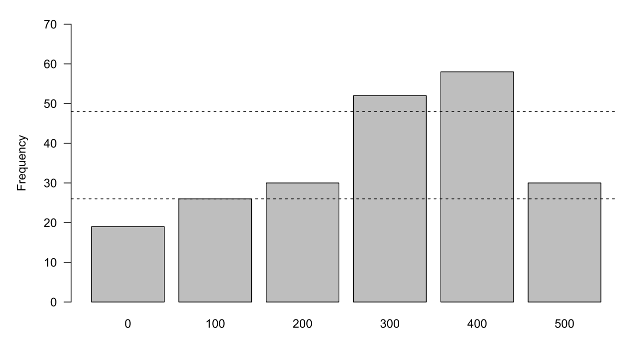

Fig. 1. *Frequencies of reported rewards (in CZK) in the die task (Study 1). Note.* Broken lines denote 95% CI on the expected frequency of each value ($P_{binom} = .167$).

Table 1
Model of payoffs from the die task (ordinal logistic regression, Study 1).

	β	*OR*	95% CI	*z*	*p*
Green shop	−0.32	0.73	[0.45, 1.18]	−1.29	.197
Attitude	−0.03	0.97	[0.70, 1.35]	−0.19	.851
Green shop × Attitude	0.04	1.04	[0.54, 2.01]	0.12	.904

Note. $N = 215$. *Green shop* is a dummy indicator of green condition; *attitude* is environmental attitude. Variables entering interaction are mean-centered to facilitate interpretation of the interaction term. *OR* represents odds-ratio. Thresholds are omitted.

5.2.3. Moral licensing

The average payoff value from the die task was similar in the green and conventional conditions, $M_{green} = 278$ CZK, $SD_{green} = 150$, $M_{conv} = 302$, $SD_{conv} = 150$, $t(212.56) = 1.21$, $p = .23$, $d = 0.16$. Ordinal regression (see Table 1 for details) revealed that experimental conditions, environmental attitude, and their interaction had no significant effect on the reported payoff values, providing no evidence of moral licensing or moderating effect of attitude.

5.3. Discussion of study 1

Study 1 did not provide evidence of cross-domain licensing or a moderating effect of environmental attitude. However, a one-off measure of dishonesty, advantageous for its unobtrusiveness, was a rather imprecise measure of dishonesty, limiting the statistical power of Study 1 to detect licensing.

6. Study 2

To increase statistical power, we used a repeated measure of dishonesty and a larger sample size in Study 2. This study also included a neutral control condition and additional manipulation checks assessing perception of the purchase. Use of a neutral control condition in licensing studies is a recommended (e.g., Mullen & Monin, 2016), but neglected practice (e.g., Mazar & Zhong, 2010), safeguarding against confounding effects of baseline groups which are not neutral.

6.1. Method

6.1.1. Participants

A non-representative sample of Czechs from an Internet panel of a different marketing company than in Study 1 was invited to participate in the study. From 878 participants who accessed the web questionnaire, 85 (9.7%) did not finish the experiment, and three (0.3%) participants expressed a wish to be excluded; the completion rate was similar across the three experimental conditions, $\chi^2(2, N = 878) = 0.48$, $p = .79$, $\varphi = 0.02$. Based on pre-registered criteria, we excluded another 104 participants (11.8%) who had extreme completion times, did not pass attention checks, or guessed the purpose of the study. The final sample ($N = 686$) was variable in terms of sociodemographics (52.6% were females, 5.0% of participants had primary, 79.5% secondary, and 15.5% tertiary education, $M_{age} = 42.6$, $SD_{age} = 12.9$).

6.1.2. Materials

Manipulation of pro-environmental behavior. Study 2 used the same manipulation of pro-environmental behavior and the same payoff scheme in the store task as Study 1. Study 2 differed from Study 1 in only two aspects, which made it closer to Mazar and Zhong's (2010) study: (i) participants could choose only one piece of each product and (ii) two of the cheapest products were replaced with even cheaper products so that participants could spend more easily all the available money.

Measure of subsequent dishonesty. Dishonesty in Study 2 was measured with a task from Jiang (2013). In each of the 20 trials of the task, participants were asked to choose in their mind either the upper side (facing up) or the bottom side (facing down) of the die prior to a die roll and were told that they would receive as many points in each trial as would be rolled on the side they had chosen. Participants indicated their choice of the die-side after the toss, which gave them the opportunity to cheat.

Participants were told in the introduction to the task that "several participants" would be drawn at the end of the study to receive a monetary prize, with each point having a value of 4 CZK (€0.16 or $0.18). This gave them the opportunity to win between 80 and 480 CZK (€3.1 and €18.7 or $3.7 and $22.1).

Environmental attitude. The environmental attitude of participants was assessed with the GEB scale as in Study 1 ($rel_{ps} = .71$, $\alpha = 0.77$). Attitude scores were variable ($SD = 0.72$).

Evaluation of the purchase. Using five-point semantic differential scales ranging from one to five and anchored with adjective pairs, participants evaluated the ecological quality (adjective pair *unecological - ecological*), moral attributes (adjective pairs: *moral–immoral*, *wrong–-right*; $\alpha = 0.48$), and "use-related" attributes of their purchase (adjective pairs: *useful–useless*, *unnecessary–necessary*, *good purchase–bad purchase*, *expensive–cheap*, *healthy–unhealthy*; $\alpha = 0.76$). Some ratings were reverse-coded so that resulting sum-scores reflected increasing attribute intensity.

6.1.3. Design and procedure

After accessing the online questionnaire of a study which ostensibly focused on reasoning, participants were randomly assigned to one of three conditions: green condition (participants selected products from a list with a majority of green products), conventional condition (participants selected products from a list with a majority of conventional products), and control condition (participants were not shown a list of products and did not select any products). Participants in the green and conventional conditions chose products from a list of products. All participants then proceeded to the die task. Afterwards, participants in the green and conventional conditions evaluated the ecological, moral and "use-related" qualities of their purchase and proceeded to an unrelated part of questionnaire with PANAS scale and moral values scale (not analyzed here). Finally, participants filled out the GEB scale, provided their sociodemographics, and were debriefed, at which point they could decide to have their data excluded. Participants were each paid 20 CZK (€0.8 or $0.9).

6.1.4. Analysis

The preregistered analysis was conducted using a mixed logit model with a binary dependent variable ("lucky choice") which took the value of one if a participant chose the side with the higher value and zero otherwise. A random intercept for participants captured variance in an individual tendency to make lucky choices, a random intercept for trials captured variance in the proportion of lucky choices over the 20 trials, and a participant random slope for the top side captured the individual variance in the tendency to choose the side with a higher number of dots when it was on top. The main effects of condition indicators captured average tendencies to make lucky choices in the two store conditions, and the main effect of environmental attitude captured the effect of environmental attitude on tendency to make lucky choices. Interaction of the experimental conditions and environmental attitude captured the moderating effect of environmental attitude on moral processes associated with the store conditions. Finally, fixed effects for each possible difference between values on the top and bottom side of the die (i.e., one, three, and five for combinations 3–4, 2–5, and 1–6) captured the average tendency to make lucky choices for each possible value difference.

6.2. Results

6.2.1. Manipulation of pro-environmental behavior

As expected, participants in the green condition spent more on green products ($M = 297$ CZK, $SD = 139$) than participants in the conventional condition ($M = 119$ CZK, $SD = 113$), $t(433.69) = 14.83$, $p < .001$, $d = 1.41$. An additional manipulation check revealed that participants in the two experimental conditions evaluated their product basket similarly in terms of ecological quality, $M_{green} = 3.73$, $SD_{green} = 0.99$, $M_{conv} = 3.63$, $SD_{conv} = 0.90$, $t(441.72) = 1.21$, $p = .23$, $d = 0.12$, moral quality, $M_{green} = 3.57$, $SD_{green} = 0.75$, $M_{conv} = 3.60$, $SD_{conv} = 0.81$, $t(432.53) = 0.51$, $p = .61$, $d = -0.05$, and use-related quality, $M_{green} = 3.49$, $SD_{green} = 0.65$, $M_{conv} = 3.47$, $SD_{conv} = 0.66$, $t(438.49) = 0.30$, $p = .76$, $d = 0.03$. However, the proportion of expenditures on green products in the total value of selected products had a positive and statistically significant effect on the rating of ecological quality, $b = 0.84$, 95% CI [0.41, 1.27], $t(389) = 3.85$, $p < .001$, $\beta = 0.30$ (see Appendix E for details), morality, $b = 0.38$, 95% CI [0.03, 0.73], $t(389) = 2.17$, $p = .03$, $\beta = 0.17$ (see Appendix F for details), and even use-related quality of selected goods, $b = 0.35$, 95% CI [0.06, 0.64], $t(389) = 2.41$, $p = .02$, $\beta = 0.19$ (see Appendix G for details). None of additional manipulation checks signaled failure of the procedure (see Appendix H for details). As expected, participants with a higher environmental attitude spent a higher proportion of money on green products, $b = 0.04$, 95% CI [+0.00, 0.08], $t(440) = 2.22$, $p = .03$, $\beta = 0.08$ (see Appendix I for details).

6.2.2. Presence of dishonest behavior

Dishonesty was evident in participants' making on average 12.07 ($SD = 3.09$) lucky choices, significantly more than the expected number of 10 lucky choices per participant, $t(684) = 17.58$, $p < .001$, $d = 0.67$.

Because the top and bottom side of a dice always add up to seven, the expected value under assumption of randomness was 3.5 for each trial and the total expected win was 280 CZK (1 point = 4 CZK) over the 20 trials. However, participants claimed on average 311.9 CZK ($SD = 45.7$), significantly more than the expected win, $t(684) = 18.25$, $p < .001$, $d = 0.70$, providing additional evidence of cheating.

6.2.3. Moral licensing

We found no differences in cheating, represented by the average number of lucky choices, across the three conditions, $M_{green} = 12.1$, $SD_{green} = 3.1$, $M_{conv} = 12.2$, $SD_{conv} = 3.1$, $M_{contr} = 11.9$, $SD_{contr} = 3.1$, $F(2, 683) = 0.45$, $p = .50$, $\eta^2 < 0.001$, one-way ANOVA. Also, the average rewards claimed, another measure of dishonesty, were similar across the three conditions ($M_{green} = 311$ CZK, $SD_{green} = 46$, $M_{conv} = 314$ CZK, $SD_{conv} = 46$, $M_{contr} = 310$ CZK, $SD_{contr} = 46$), $F(2, 683) = 0.10$, $p = .76$, $\eta^2 < 0.001$.

The trial-level mixed-effect model revealed no significant main effect of green condition on the likelihood of making a lucky choice, rejecting the licensing hypothesis (see Table 2 for details). In addition, there was no effect of the conventional condition (as compared to the control group), as well as no significant effect of environmental attitude on the tendency to make lucky choices. Also, none of the two-way interactions of experimental conditions and environmental attitude were statistically significant, suggesting a lack of the moderating effect of environmental attitude. The model has revealed several effects unrelated to licensing, such as the tendency of participants to choose the lucky side more often when the ratio of values on the top and bottom sides was highest. Choosing the lucky side was also more likely for values facing up.

Table 2
Model of lucky choices (mixed effect model, Study 2).

Fixed effects	β	*OR*	95% CI	*z*	*p*
Intercept	0.45	1.56	[1.47, 1.66]	14.40	< .001
Green shop	0.05	1.05	[0.92, 1.20]	0.71	.477
Attitude	0.05	1.05	[0.97, 1.14]	1.21	.225
Conventional shop	0.09	1.10	[0.96, 1.26]	1.34	.181
Low ratios	−0.02	0.98	[0.92, 1.04]	−0.74	.459
High ratios	0.09	1.09	[1.05, 1.13]	5.16	< .001
Round	0.01	1.01	[0.85, 1.19]	0.09	.927
Higher up	0.54	1.71	[1.50, 1.95]	8.14	< .001
Green shop × Attitude	−0.12	0.89	[0.74, 1.07]	−1.27	.204
Conventional shop × Attitude	0.09	1.09	[0.90, 1.33]	0.90	.368
BIC	17694				
Deviance	17561				

Note. $N = 13{,}711$. *OR* represents odds-ratio. *Green shop* is a dummy indicator of green condition and *conventional shop* is a dummy indicator of conventional condition; *attitude* is environmental attitude; *higher up* is a dummy indicator of trials with higher values facing up; *high ratios* is a contrast-coded indicator of trials with ratio of values 1:6 (as opposed 2:5 and 3:4); *low ratios* is a contrast-coded indicator of trials with ratio of values 2:5 (as opposed to 3:4); *round* is the order of the trial. Variables entering interactions are mean-centered to facilitate interpretation of the interaction terms. Random effects are omitted.

6.3. Discussion of study 2

Study 2 did not support the hypothesized cross-domain licensing effect of pro-environmental behavior on dishonesty, even with a large sample size and a validated repeated measure of dishonesty. However, Study 2 was still only a conceptual replication of the original study by Mazar and Zhong (2010) using a different measure of dishonesty.

7. Study 3

Unlike the previous two studies, Study 3 was a close replication of Mazar and Zhong's (2010) study, as it used the same manipulation of the initial pro-environmental behavior and the same measure of subsequent dishonesty.

7.1. Method

7.1.1. Participants

A non-representative sample of 456 Czechs from a proprietary Internet panel of the same company as in Study 2 accessed the questionnaire, but 31 (6.8%) participants did not finish it (all dropped out before the debriefing); the completion rate was similar across the three experimental conditions, $\chi^2(2, N = 456) = 5.21$, $p = .07$, $\varphi = 0.11$. Based on pre-registered criteria, we excluded another 52 participants (11.4%) who had extreme completion times, did not pass attention checks, or guessed the purpose of the study. The final sample ($N = 373$) was variable in terms of sociodemographics (51.7% were females, 5.9% of participants had primary, 79.9% secondary, and 14.2% tertiary education, $M_{age} = 42.8$, $SD_{age} = 12.1$).

7.1.2. Materials

Manipulation of pro-environmental behavior. Study 3 used the same manipulation of initial pro-environmental behavior as Study 2. The only difference being that Study 3 used the payoff function from Mazar and Zhong (2010) in which one in 25 participants received selected products.

Measure of subsequent dishonesty. To measure dishonesty, we used the dots task from Mazar and Zhong (2010), presented as a visual attention test, in which participants were shown a series of squares divided by a diagonal line (see Appendix J). A total of 20 dots was displayed in each of the squares. The ratio of dots on the two sides was either 15:5, 14:6, or 13:7; each square was shown for one second and in 40% of trials more dots appeared on the right side from the diagonal. Participants were asked to identify the side with the majority of dots. After each trial, participants gained 0.05 CZK (€0.0019 or $0.0023) if they indicated the left side, and 0.5 CZK (€0.019 or $0.023) if they indicated the right side from the diagonal. The payoff function was justified by a cover story that spotting the dots on the right side was more difficult. After 30 practice trials, the task and the payoff function were again explained and participants proceeded to the main dots task, which consisted of 90 trials. The only major deviation from the study by Mazar and Zhong (2010) was that the present study was conducted online and not as a laboratory experiment.

Environmental attitude. The environmental attitude was assessed with the GEB scale as in Studies 1 and 2 ($rel_{ps} = .71$, $\alpha = 0.71$). Attitude scores were variable ($SD = 0.71$).

Evaluation of the purchase. Participants used the same scales as in Study 2 to evaluate the ecological quality (one item only), moral quality (two items, $\alpha = 0.54$), and use-related quality (five items, $\alpha = 0.77$) of their purchase.

7.1.3. Design and procedure

After accessing the online questionnaire, participants were randomly assigned to one of three experimental conditions, the same as those in Study 2 (green, conventional, and control conditions). Participants in the two store conditions chose products of their liking. All participants then proceeded to the dots task. After completing the dots task, participants in the green and conventional conditions evaluated the ecological, moral, and use-related quality of their purchase and then answered a battery of four affect-state items adapted from PANAS (not analyzed in this study). All participants then answered the GEB battery, provided their sociodemographics and were debriefed, at which point they could decide to drop out of the study. Participants were paid 20 CZK (€0.8 or $0.9) for their participation.

7.1.4. Analysis

The analysis was carried out using a mixed logit model with the trial-level information on incorrect identification of the side as the dependent variable. In this model, random intercepts for participants and trials captured individual erring rate and variation of erring across trials. A participant random slope for the trials with a higher number of dots on the left side captured the individual tendency to dishonesty. The fixed intercept estimated the average likelihood of errors. The average dishonesty tendency was captured as the main effect of a dummy variable indicating trials in which more dots were on the left side (the "non-winning" side); only in such trials could participants benefit from incorrect identification of the side. The interaction of this variable with environmental attitude captured the effect of environmental attitude on cheating. The interaction of the non-winning side indicator and experimental conditions captured differences in cheating between the experimental conditions. Finally, a three-way interaction of the non-winning side indicator, environmental attitude, and experimental conditions captured the moderating effect of environmental attitude on cheating across the experimental conditions. Apart from the above-mentioned predictors, the order of the trial, and the proportion of dots in each trial were included as additional covariates in the model.

7.2. Results

7.2.1. Manipulation of pro-environmental behavior

As expected, participants in the green condition selected green products of a higher total value ($M = 314$ CZK, $SD = 117$) than participants in the conventional condition ($M = 122$ CZK, $SD = 121$), $t(249.79) = 12.80$, $p < .001$, $d = 1.61$. Correspondingly, the average number of green products bought in the green condition ($M = 3.01$, $SD = 1.55$) was higher than in the conventional condition ($M = 0.94$, $SD = 0.85$), $t(180.63) = 12.98$, $p < .001$, $d = 1.63$.

Participants in the green condition rated their purchase as more ecological ($M = 3.84$, $SD = 0.95$) than participants in the conventional condition ($M = 3.52$, $SD = 0.91$), $t(245.24) = 2.71$, $p = .007$, $d = 0.34$, but not as more moral ($M_{green} = 3.49$, $SD_{green} = 0.77$, $M_{conv} = 3.50$, $SD_{conv} = 0.71$), $t(242.65) = 0.05$, $p = .96$, $d = -0.01$, or as having different "use-related" qualities ($M_{green} = 0.44$, $SD_{green} = 3.65$, $M_{conv} = 3.40$, $SD_{conv} = 0.63$), $t(245.48) = 0.47$, $p = .64$, $d = 0.06$. As expected, environmental attitude was positively associated with expenditures on green products, $b = 0.05$, 95% CI [0.01, 0.09], $t(234) = 2.23$, $p = .03$, $\beta = 0.10$ (see Appendix K). However, the proportion of expenditures on green products had no effect on ratings of the ecological quality of a purchase, $b = 0.05$, 95% CI [-0.50, 0.60], $t(234) = 0.17$, $p = .87$, $\beta = 0.02$ (see Appendix L), its morality, $b = -0.15$, 95% CI [-0.60, 0.30], $t(234) = 0.63$, $p = .53$, $\beta = -0.07$ (see Appendix M), or its use-related quality, $b = -0.12$, 95% CI [-0.51, 0.27], $t(234) = 0.61$, $p = .54$, $\beta = -0.07$ (see Appendix N). None of the additional manipulation checks signaled problems in the procedure (see Appendix O for details).

7.2.2. Presence of dishonest behavior

Dishonesty has been revealed by a significantly higher likelihood of participants making errors by selecting the higher-paying right side than the left side, even when adjusted for unequal numbers of trials, ($M_{right.side} = 0.030$, $SD_{right.side} = 0.116$, $M_{leftt.side} = 0.015$, $SD_{leftt.side} = 0.080$), $Z = 5.47$, $p < .001$, $r = .28$, two-sided exact Wilcoxon paired signed-rank test.

7.2.3. Moral licensing

The proportion of choices of the higher-paying right side was similar in the green ($M = 41.19\%$, $SD = 4.89$), conventional ($M = 40.77\%$, $SD = 3.52$), and control condition ($M = 41.70\%$, $SD = 7.07$), $F(2, 369) = 0.98$, $p = .38$, $\eta^2 = 0.005$, one-way ANOVA, and greater in each condition than the true share of 40%, $t_{green}(119) = 2.67$, $p = .008$, $d = 0.24$; $t_{conv}(131) = 2.50$, $p = .01$, $d = 0.22$; $t_{control}(119) = 2.64$, $p = .009$, $d = 0.24$, indicating dishonesty in all three conditions. Nonetheless, the difference between the green and control condition was not statistically significant, $t(211.69) = 0.65$, $p = .52$, $d = -0.08$. Neither was significant the difference between the green and conventional condition, $t(214.2) = 0.79$, $p = .43$, $d = 0.10$.

Crucially, the results from the mixed-effect logit model (see Table 3 for details), which had outcomes from each of the 90 trials as its dependent variable, led to similar conclusions regarding the lack of the licensing effect as there was no interaction between the non-winning side and the green condition. There was no moderation effect of environmental attitude, but there was an unexpected positive effect of environmental attitude on cheating. The model also revealed several expected effects, none of which had implications for the licensing hypothesis. For instance, the odds of making an incorrect identification were more than four times higher when the majority of dots was on the lower-paying left side rather than on the right, a strong indication of cheating. However, the estimate of the intercept suggested that participants had a very low probability of incorrect identification on any given round. Furthermore, participants had about 1.3 times greater odds of making an incorrect identification when the ratio of dots was most ambivalent (i.e., 7:13) as compared to less ambivalent ratios (i.e., 5:15 and 6:14). Unexpectedly, the conventional condition had a negative and marginally significant effect on cheating.

The simpler model with the dishonesty rate as the dependent variable, similar to the one presented in the original study by Mazar and Zhong (2010), revealed only an interaction effect of environmental attitude and conventional condition (see Appendix P for details).

7.3. Discussion of study 3

Study 3, which was a close replication of Mazar and Zhong's (2010) study, also did not find any evidence of the moral licensing effect and its moderation by environmental attitude. This study only found an unexpected positive effect of environmental attitude on cheating.

Table 3
Model of incorrect identification of the side (mixed logit model, Study 3).

Fixed effects	β	*OR*	95% CI	*z*	*p*
Intercept	−6.98	< 0.01	[> 0.00, < 0.01]	−22.35	< .001
Green shop	−0.01	0.99	[0.42, 2.31]	−0.03	.978
Attitude	−0.16	0.85	[0.53, 1.37]	−0.66	.507
Left side	1.45	4.28	[1.39, 13.16]	2.54	.011
Conventional shop	−0.28	0.76	[0.33, 1.73]	−0.66	.511
Low ratios	0.11	1.11	[0.94, 1.32]	1.22	.223
High ratios	0.23	1.25	[1.14, 1.38]	4.62	< .001
Round	0.12	1.13	[0.70, 1.82]	0.51	.611
Green shop × Attitude	−0.39	0.68	[0.21, 2.21]	−0.64	.519
Green shop × Left side	−0.13	0.88	[0.27, 2.86]	−0.21	.832
Attitude × Left side	0.69	1.99	[1.03, 3.87]	2.03	.042
Attitude × Conventional shop	−0.23	0.80	[0.25, 2.53]	−0.39	.700
Conventional shop × Left side	−1.03	0.36	[0.12, 1.11]	−1.78	.075
Green shop × Attitude × Left side	0.88	2.41	[0.45, 12.85]	1.03	.302
Conventional shop × Attitude × Left side	−0.14	0.87	[0.18, 4.16]	−0.17	.863
BIC	4367				
Deviance	4169				

Note. $N = 33{,}480$. *OR* represents odds-ratio. *Green shop* is a dummy indicator of green condition and *conventional shop* is a dummy indicator of conventional condition; *attitude* is environmental attitude; *left side* is a dummy indicator of trials with more dots on the left side; *high ratios* is a contrast-coded indicator of trials with dots ratio 7:13 (as opposed 5:15 and 6:14); *low ratios* is a contrast-coded indicator of trials with dots ratio 6:14 (as opposed to 5:15); *round* is the order of the trial. Variables entering interactions are mean-centered to facilitate interpretation of the interaction terms. Random effects are omitted.

8. General Discussion

We conducted two conceptual and one close replication of a study by Mazar and Zhong (2010, Study 3), which originally introduced the possibility that pro-environmental behavior may lead to dishonest behavior through a cross-domain licensing effect. We did not replicate this effect in any of our three studies. In addition, we also did not find a moderating effect of environmental attitude on moral licensing, which was reported in the previous studies (e.g., Garvey & Bolton, 2017; Hahnel et al., 2015).

8.1. Moral licensing effect size

Replication problems are not uncommon in the moral licensing domain (e.g., Blanken, van de Ven, Zeelenberg, & Meijers, 2014), but the degree of this problem is difficult to estimate in the presence of publication bias (Blanken, van de Ven, & Zeelenberg, 2015; Simbrunner & Schlegelmilch, 2017), which is likely to inflate the average effect size (Kuper & Bott, in press). Another complication for assessment of licensing studies is the fact that high-powered replications of licensing studies are relatively rare. Nonetheless, existing replications either found no licensing effect (e.g., Blanken et al., 2014) or a very small licensing effect (e.g., Ebersole et al., 2016).

The size of the effect of Mazar and Zhong's procedure on dishonesty is difficult to evaluate because the study has never been replicated with a measure of dishonest behavior as a dependent variable and only replicated once with a measure of prosocial behavior (Hahnel et al., 2015) and once with a measure of intention to prosocial behavior (Susewind & Hoelzl, 2014). Other studies which employed Mazar and Zhong's (2010) procedures focused on the effect of initial pro-environmental behavior on subsequent pro-environmental behavior (see, e.g., Geng et al., 2016). Based on previous meta-analyses and close replications of other licensing studies (e.g., Blanken et al., 2015; Ebersole et al., 2016), a small effect of licensing cannot be ruled out.

8.2. Culture-specific moderators of licensing

Another potential explanation for absence of the licensing effect in our studies is the cultural moderation of licensing apparent in differences of average effect sizes of licensing between North American studies, $d = 0.51$, studies from Western Europe, $d = 0.24$, and East Asian studies, $d = -0.37$ (Simbrunner & Schlegelmilch, 2017). The origin of these differences is not clear, but cultural moderators may include cross-cultural differences in morality (e.g., Haidt, 2013) and differences in how people connect their past, present and future actions (e.g., de la Fuente, Santiago, Román, Dumitrache, & Casasanto, 2014). Even though the meta-analysis by Simbrunner and Schlegelmilch (2017) did not test specific cultural moderators and did not rule out alternative explanations (e.g., culture-specific publication bias), the hypothesis of cultural moderation remains a possible, but very speculative explanation for why our study, conducted in a Central European country, found no licensing effect.

8.3. Manipulation of pro-environmental behavior

Failure to replicate the moral licensing effect may also be due to insufficient experimental manipulation of pro-environmental behavior. Making people engage in pro-environmental behavior is difficult in itself (e.g., Schultz, 2014) and maintaining the inconspicuousness of such manipulation, which is critical in licensing studies (e.g., Clot, Grolleau, & Ibanez, 2013) is even harder.

Manipulation of pro-environmental behavior was successful in our studies when judged against criteria used in previous studies. Namely, it made participants select green products of a higher total value (e.g., Hahnel et al., 2015; Mazar & Zhong, 2010; Susewind & Hoelzl, 2014). However, extended manipulation checks included in our Studies 2 and 3 suggested that the manipulation affected the perceived ecological quality of selected products in Study 3, but not in Study 2, and it had no effect on the rating of morality of purchase in either of the studies.

This lack of effect of manipulation on the morality rating cannot be explained by our participants' disregard of the green product profile. First, our pilot study (see Appendix A), similar to the validation conducted by Mazar and Zhong (2010, Study 1), revealed that our participants viewed the purchase of green products as moral. Second, the correlation of participants' environmental attitude with expenditures on green products in Studies 2 and 3 suggested that they had considered, in their choice, how pro-environmental the products were. It is still possible, though, that purchasing green products is insufficient to influence moral self-perception. So far, only one study (Garvey & Bolton, 2017) has found a mediating role of prosocial self-perception in what they interpreted as "within-domain" moral licensing. Still another possibility is that participants perceived their product choice as externally constrained, which might have also attenuated the licensing effect (see Clot et al., 2013). Importantly, since previous studies have not included detailed manipulation checks, we also cannot rule out the possibility that their effects were driven by other product attributes than their green profile.

8.4. Measures of dishonesty

To rule out an experimental demand effect on dishonesty, we used rather unobtrusive measures of dishonesty in Studies 1 and 2, which made individual cheating measurable only probabilistically, whereas the dishonesty measure used in Mazar and Zhong's (2010) study and also in our Study 3 allowed for more precise identification of individual cheaters.

We detected dishonest behavior with each of these measures and none of the measures seemed to raise suspicion regarding the focus of our studies (the highest suspicion rate was in Study 3, 3.3%). It is true though that, in comparison to previous studies, the tendency to cheat was somewhat lower in Study 2 (60% of lucky throws in our study vs. 64% reported in a study by Jiang, 2013) and also in Study 3 (our participants chose the higher-paying side in 40.8%–41.7%, depending on the condition, whereas this was reported as 42.5%–51.4% in Mazar & Zhong, 2010). Combined with the potentially small effect size of the licensing, a somewhat smaller tendency to cheat on the part of our participants could have contributed to the lack of moral licensing in Study 3, but probably not in Studies 1 and 2, which revealed a strong tendency to cheat at the group level.

8.5. Moderation of moral licensing by environmental attitude

The moderating effect of environmental attitude, which strengthens commitment to the goal of environmental conservation and thus attenuates moral licensing in the environmental domain (e.g., Geng et al., 2016; Susewind & Hoelzl, 2014), could also explain the absence of licensing. A similar moderating effect of attitude has been noted in several studies (e.g., Garvey & Bolton, 2017; see also Effron, Cameron, & Monin, 2009). Our three studies, conducted on samples with a similar or even higher variability of environmental attitude ($SD = 0.72–0.74$) than the samples in other recently published studies using the same attitude measure (e.g., Byrka, Hartig, & Kaiser, 2010; Taube, Kibbe, Vetter, Adler, & Kaiser, 2018), have revealed no such moderating effect and therefore the lack of licensing is probably not due to attenuation by a restricted attitude range. Given that the unexpected positive effect of environmental attitude on dishonesty was observed only in Study 3, it is possible that it might have been a type I error, and therefore it requires replication.

8.6. Data collection mode and sampling

Another potential explanation for our null results may lie in differences in data collection modes and sampling strategies: whereas the study by Mazar and Zhong (2010) was a laboratory experiment conducted with a student participant pool, our study was conducted online with samples of participants recruited from proprietary Internet panels of opinion poll companies. However, we think that neither the data collection mode nor sampling strategy were likely to limit the ability of our studies to detect a licensing effect. Many licensing studies have been conducted online (e.g., Blanken et al., 2014; Ebersole et al., 2016), including the conceptual replication of cross-domain licensing by Hahnel et al. (2015). Online studies are also used to study dishonesty (e.g., van der Zee, Anderson, & Poppe, 2016) and, as our studies show, can detect dishonesty well enough. Participants from Internet panels and student pools generally manifest similar level of trust towards experimental procedures (Thomas & Clifford, 2017) and the same level of attentiveness (Hauser & Schwarz, 2016).

8.7. Sample size and statistical power

Another potential explanation for the lack of the licensing effect in our studies may be related to statistical power. The sample size for Study 1 was determined before data collection using power analysis, so that the study could detect an effect size of $d > 0.4$, $N = 200$, two-sided t-test, $\alpha = .05$, $1 - \beta = .8$ (Faul, Erdfelder, Lang, & Buchner, 2007), a somewhat smaller effect size than the one reported in the original study, $d = 0.53$ (see Mazar & Zhong, 2010). Sample sizes for Studies 2 and 3 were the maximum sample sizes we could afford given financial constraints. With the given sample sizes, Studies 2 and 3 would each have a statistical power larger than 97% to detect the effect size reported in the original study ($d = 0.53$). Even if the true effect size for the licensing effect in our study equaled the effect size estimated in the meta-analysis by Blanken et al. (2015, $d = 0.31$ or $f = 0.155$), the statistical power of Studies 1–3 for one-off measures of dishonesty would be 0.62, 0.96, and 0.77 respectively.[2]

8.8. Implications

At minimum, our results suggest that the procedures used by Mazar and Zhong (2010) to study the effect of pro-environmental behavior on subsequent honesty are subject to unknown boundary conditions which were not described in the original study. These boundary conditions are likely to attenuate licensing in other studies using the same procedures. This is an important finding because Mazar and Zhong's (2010) procedure has been so far the only procedure used to manipulate pro-environmental behavior in moral licensing studies.

Our results also demonstrate that engagement in pro-environmental behavior will not always trigger moral licensing. This means that policies which promote pro-environmental behavior are less likely to lead to immoral and anti-social behavior than previously suggested (e.g., Mazar & Zhong, 2010).

Since our study presents the first replications of the cross-domain moral licensing effect of pro-environmental behavior on subsequent dishonesty, it would be premature to conclude that such an effect does not take place based solely on our null results. Given that we have not found the effect of Mazar and Zhong's (2010) procedure on the perceived morality of a purchase, and other studies did not examine it, further studies are needed to corroborate this effect or its absence by, among others, examining the role of theoretically expected mediators and moderators. In addition, alternative approaches to manipulation of pro-environmental behavior suitable for licensing studies are required to provide complementary evidence of cross-domain licensing. Such manipulation of pro-environmental behavior could probably use some of the persuasion techniques used in marketing, such as the *foot-in-the-door* or *door-in-the-face* techniques, *anchoring*- and *commitment*-based techniques or techniques exploiting the *scarcity principle* (e.g., Cialdini, 2007). Potentially promising is also the *choice blindness* technique, which can be used to manipulate peoples' decision-making (Hall, Johansson, & Strandberg, 2012).

In the light of the small effect size of licensing and the large publication bias in the licensing literature (Blanken et al., 2015; Simbrunner & Schlegelmilch, 2017), researchers should view the potential of cross-domain moral licensing due to pro-environmental behavior as worthy of critical examination.

[2] We have conducted additional Bayesian test of the null hypothesis. This analysis has revealed that the true effect of pro-environmental behavior on dishonesty was practically zero in Study 2 and that there is a high probability that no moral licensing took place in any of the three studies (see Appendices Q and R for details).

9. Conclusions

One close and two conceptual replications of cross-domain moral licensing effect have revealed no licensing effect of engagement in pro-environmental behavior on subsequent honesty. Our results thus suggest that cross-domain moral licensing due to engagement in pro-environmental behavior may be less likely than previously thought and thus future studies should focus on corroborating the mechanism of moral licensing. Policies supporting pro-environmental behavior will not necessarily lead to a moral licensing effect.

Appendices A–R

Appendices for this article can be found online at https://doi.org/10.1016/j.jenvp.2019.01.011.

References

Blanken, I., van de Ven, N., & Zeelenberg, M. (2015). A meta-analytic review of moral licensing. *Personality and Social Psychology Bulletin, 41*, 540–558. https://doi.org/10.1177/0146167215572134.

Blanken, I., van de Ven, N., Zeelenberg, M., & Meijers, M. H. C. (2014). Three attempts to replicate the moral licensing effect. *Social Psychology, 45*, 232–238. https://doi.org/10.1027/1864-9335/a000189.

Byrka, K., Hartig, T., & Kaiser, F. G. (2010). Environmental attitude as a mediator of the relationship between psychological restoration in nature and self-reported ecological behavior. *Psychological Reports, 107*, 847–859. https://doi.org/10.2466/07.PR0.107.6.847-859.

Byrka, K., Kaiser, F. G., & Olko, J. (2017). Understanding the acceptance of nature-preservation-related restrictions as the result of the compensatory effects of environmental attitude and behavioral costs. *Environment and Behavior, 49*, 487–508. https://doi.org/10.1177/0013916516653638.

Catlin, J. R., & Wang, Y. (2013). Recycling gone bad: When the option to recycle increases resource consumption. *Journal of Consumer Psychology, 23*, 122–127. https://doi.org/10.1016/j.jcps.2012.04.001.

Cialdini, R. B. (2007). *Influence: The psychology of persuasion.* New York, NY: HarperCollins.

Clot, S., Grolleau, G., & Ibanez, L. (2013). Self-licensing and financial rewards: Is morality for sale? *Economics Bulletin, 33*, 2298–2306.

Ebersole, C. R., Atherton, O. E., Belanger, A. L., Skulborstad, H. M., Allen, J. M., Banks, J. B., et al. (2016). Many Labs 3: Evaluating participant pool quality across the academic semester via replication. *Journal of Experimental Social Psychology, 67*, 68–82. https://doi.org/10.1016/j.jesp.2015.10.012.

Effron, D. A., Cameron, J. S., & Monin, B. (2009). Endorsing Obama licenses favoring Whites. *Journal of Experimental Social Psychology, 45*, 590–593. https://doi.org/10.1016/j.jesp.2009.02.001.

Eskine, K. J. (2012). Wholesome foods and wholesome morals? Organic foods reduce prosocial behavior and harshen moral judgments. *Social Psychological and Personality Science, 4*, 251–254. https://doi.org/10.1177/1948550612447114.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175–191. https://doi.org/10.3758/BF03193146.

Fischbacher, U., & Föllmi-Heusi, F. (2013). Lies in disguise—an experimental study on cheating. *Journal of the European Economic Association, 11*, 525–547. https://doi.org/10.1111/jeea.12014.

de la Fuente, J., Santiago, J., Román, A., Dumitrache, C., & Casasanto, D. (2014). When you think about it, your past is in front of you: How culture shapes spatial conceptions of time. *Psychological Science, 25*, 1682–1690. https://doi.org/10.1177/0956797614534695.

Garvey, A. M., & Bolton, L. E. (2017). Eco-product choice cuts both ways: How proenvironmental licensing versus reinforcement is contingent on environmental consciousness. *Journal of Public Policy and Marketing, 36*, 284–298. https://doi.org/10.1509/jppm.16.096.

Geng, L., Cheng, X., Tang, Z., Zhou, K., & Ye, L. (2016). Can previous pro-environmental behaviours influence subsequent environmental behaviours? The licensing effect of pro-environmental behaviours. *Journal of Pacific Rim Psychology, 10*. E9 https://doi.org/10.1017/prp.2016.6.

Hahnel, U. J. J., Arnold, O., Waschto, M., Korcaj, L., Hillmann, K., Roser, D., et al. (2015). The power of putting a label on it: Green labels weigh heavier than contradicting product information for consumers' purchase decisions and post-purchase behavior. *Frontiers in Psychology, 6*https://doi.org/10.3389/fpsyg.2015.01392.

Haidt, J. (2013). *The righteous mind: Why good people are divided by politics and religion.* New York, NY: Vintage Books.

Hall, L., Johansson, P., & Strandberg, T. (2012). Lifting the veil of morality: Choice blindness and attitude reversals on a self-transforming survey. *PLoS One, 7*, e45457. https://doi.org/10.1371/journal.pone.0045457.

Hauser, D. J., & Schwarz, N. (2016). Attentive Turkers: MTurk participants perform better on online attention checks than do subject pool participants. *Behavior Research Methods, 48*, 400–407. https://doi.org/10.3758/s13428-015-0578-z.

Jiang, T. (2013). Cheating in mind games: The subtlety of rules matters. *Journal of Economic Behavior & Organization, 93*, 328–336. https://doi.org/10.1016/j.jebo.2013.04.003.

Kaiser, F. G., & Byrka, K. (2011). Environmentalism as a trait: Gauging people's prosocial personality in terms of environmental engagement. *International Journal of Psychology, 46*, 71–79. https://doi.org/10.1080/00207594.2010.516830.

Kaiser, F. G., Byrka, K., & Hartig, T. (2010). Reviving Campbell's paradigm for attitude research. *Personality and Social Psychology Review, 14*, 351–367. https://doi.org/10.1177/1088868310366452.

Kaiser, F. G., & Wilson, M. (2000). Assessing people's general ecological behavior: A cross–cultural measure. *Journal of Applied Social Psychology, 30*, 952–978. https://doi.org/10.1111/j.1559-1816.2000.tb02505.x.

Kaiser, F. G., & Wilson, M. (2004). Goal-directed conservation behavior: The specific composition of a general performance. *Personality and Individual Differences, 36*, 1531–1544. https://doi.org/10.1016/j.paid.2003.06.003.

Kuper, N., Bott A., Has the evidence for moral licensing been inflated by publication bias?. Meta-Psychology, (in press).

Mazar, N., & Zhong, C.-B. (2010). Do green products make us better people? *Psychological Science, 21*, 494–498. https://doi.org/10.1177/0956797610363538.

Miller, D. T., & Effron, D. A. (2010). Psychological license: When it is needed and how it functions. *Advances in Experimental Social Psychology, 43*, 115–155. https://doi.org/10.1016/S0065-2601(10)43003-8.

Monin, B., & Miller, D. T. (2001). Moral credentials and the expression of prejudice. *Journal of Personality and Social Psychology, 81*, 33–43. https://doi.org/10.1037//00223514.81.1.33.

Mullen, E., & Monin, B. (2016). Consistency versus licensing effects of past moral behavior. *Annual Review of Psychology, 67*, 363–385. https://doi.org/10.1146/annurev-psych-010213-115120.

Nilsson, A., Bergquist, M., & Schultz, W. P. (2017). Spillover effects in environmental behaviors, across time and context: A review and research agenda. *Environmental Education Research, 23*, 573–589. https://doi.org/10.1080/13504622.2016.1250148.

Noblet, C. L., & McCoy, S. K. (2018). Does one good turn deserve another? Evidence of domain-specific licensing in energy behavior. *Environment and Behavior, 50*, 839–863. https://doi.org/10.1177/0013916517718022.

Sachdeva, S., Iliev, R., & Medin, D. L. (2009). Sinning saints and saintly sinners: The paradox of moral self-regulation. *Psychological Science, 20*, 523–528. https://doi.org/10.1111/j.1467-9280.2009.02326.x.

Schultz, P. W. (2014). Strategies for promoting proenvironmental behavior: Lots of tools but few instructions. *European Psychologist, 19*, 107–117. https://doi.org/10.1027/1016-9040/a000163.

Shalvi, S., Dana, J., Handgraaf, M. J. J., & De Dreu, C. K. W. (2011). Justified ethicality: Observing desired counterfactuals modifies ethical perceptions and behavior. *Organizational Behavior and Human Decision Processes, 115*, 181–190. https://doi.org/10.1016/j.obhdp.2011.02.001.

Simbrunner, P., & Schlegelmilch, B. B. (2017). Moral licensing: A culture-moderated meta-analysis. *Management Review Quarterly, 67*, 201–225. https://doi.org/10.1007/s11301-017-0128-0.

Sorrell, S., & Dimitropoulos, J. (2008). The rebound effect: Microeconomic definitions, limitations and extensions. *Ecological Economics, 65*, 636–649. https://doi.org/10.1016/j.ecolecon.2007.08.013.

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*, 309–317.

Susewind, M., & Hoelzl, E. (2014). A matter of perspective: Why past moral behavior can sometimes encourage and other times discourage future moral striving. *Journal of Applied Social Psychology, 44*, 201–209. https://doi.org/10.1111/jasp.12214.

Taube, O., Kibbe, A., Vetter, M., Adler, M., & Kaiser, F. G. (2018). Applying the Campbell Paradigm to sustainable travel behavior: Compensatory effects of environmental attitude and the transportation environment. *Transportation Research Part F: Traffic Psychology and Behaviour, 56*, 392–407. https://doi.org/10.1016/j.trf.2018.05.006.

Thomas, K. A., & Clifford, S. (2017). Validity and Mechanical Turk: An assessment of exclusion methods and interactive experiments. *Computers in Human Behavior, 77*, 184–197. https://doi.org/10.1016/j.chb.2017.08.038.

Tiefenbeck, V., Staake, T., Roth, K., & Sachs, O. (2013). For better or for worse? Empirical evidence of moral licensing in a behavioral energy conservation campaign. *Energy Policy, 57*, 160–171. https://doi.org/10.1016/j.enpol.2013.01.021.

Truelove, H. B., Carrico, A. R., Weber, E. U., Raimi, K. T., & Vandenbergh, M. P. (2014). Positive and negative spillover of pro-environmental behavior: An integrative review and theoretical framework. *Global Environmental Change, 29*, 127–138. https://doi.org/10.1016/j.gloenvcha.2014.09.004.

Weber, E. U. (1997). Perception and expectation of climate change: precondition for economic and technological adaptation. In M. H. Bazerman, D. M. Messick, A. Tensbrunsel, & K. Wade-Benzoni (Eds.). *Psychological perspectives to environmental and ethical issues in management* (pp. 314–341). San Francisco, CA: Jossey-Bass.

van der Zee, S., Anderson, R., & Poppe, R. (2016). When lying feels the right thing to do. *Frontiers in Psychology, 7*https://doi.org/10.3389/fpsyg.2016.00734.