

Pro-Environmental Behavior Triggers Moral Inference, Not Licensing by Observers

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Abstract

Several studies have shown that moral licensing by observers makes observers more lenient in their judgment of subsequent immoral behaviors committed by a person. Environmental behavior is generally perceived as moral behavior, but it is not known whether it can trigger moral licensing by observers. In two pre-registered experimental laboratory studies ($N_1 = 198$, $N_2 = 501$), we have tested whether prior engagement in pro-environmental behavior triggers licensing by observers and thus makes observers judge more positively actors' subsequent immoral behavior (Study 1) and their subsequent anti- and pro-environmental behaviors (Study 2). We found that people engaging in pro-environmental behavior were subsequently rated as more pro-environmental and moral, and their subsequent pro- and anti-environmental behaviors (but not outright immoral behavior) were rated as more moral by observers. As these effects also concern subsequent pro-environmental behaviors, they are broader than what licensing theory suggests.

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Introduction

Imagine that you encounter two strangers. You learn that the first person engages in all sorts of pro-environmental behaviors, whereas the second person does things that harm the environment. You also learn that both of them are engaged in marital infidelity. Whose marital infidelity would you judge more harshly? Existing studies suggest that your moral judgment about marital infidelity can be influenced by the information about the pro-environmental behavior of the person through a mechanism known as moral licensing by observers (e.g., Effron & Monin, 2010; Wang & Chan, 2019; for a discussion, see Miller & Effron, 2010). Moral licensing by observers arises when the judgment of a person's immoral behavior is positively affected by (rather unrelated) information about the prior good deeds of the person (e.g., Effron & Monin, 2010).

Moral licensing by observers is potentially an important phenomenon because it can affect not only how we perceive other people (Wojciszke et al., 1998) but also how we interact with them (Martin & Cushman, 2016). Relatedly, by making our judgments of other people's morality and their actions more lenient, it can also make us more vulnerable to the immoral actions of others.

Given that pro-environmental behavior is generally perceived as being more moral, altruistic, and pro-social than non-environmental behavior (e.g., Braun Kohlová & Urban, 2020; Puska, 2019; Urban et al., 2019), we can expect that engagement in pro-environmental behavior can trigger licensing by observers. Unlike moral self-licensing, which has received a good deal of attention in the context of pro-environmental behavior (e.g., Gholamzadehmir et al., 2019; Meijers et al., 2019; Urban et al., 2021), no study has addressed environmental moral licensing by observers. We bridge this gap in the literature by focusing on the effect of prior engagement in pro-environmental behavior on how a person and their subsequent behavior are perceived in moral terms. Specifically, in two registered laboratory experimental studies, we examined how information about prior engagement in pro-environmental behavior influences the perception of the person's subsequent immoral behavior (Study 1), environmentally harmful behavior (Study 2), and morality and environmental motivation (both studies).

Moral Licensing by Observers

Studies focusing on moral licensing by observers typically find that observers tend to judge the moral transgression of a person less harshly when the person has a record of prior good deeds (Effron & Monin, 2010; Krumm & Corning, 2008; Nisan & Horenczyk, 1990; Wang & Chan, 2019). For instance, observers condemned the abusive behavior of a supervisor toward his subordinates less when the supervisor had previously shown some, even if unrelated, ethical behavior (Wang & Chan, 2019). Likewise, observers judged the moral transgression of their peers, such as not returning a bag found on the street, less harshly if the actors had previously done something laudable, such as returning a lost wallet (Study 2 in Nisan & Horenczyk, 1990).

Licensing by observers concerns not only moral judgments about behavior but also other judgments about behavior and judgment about the moral character of the actor. For instance, observers perceived discriminatory behaviors against the LGTB community as less discriminatory when the actor had a prior record of non-discriminatory behavior (Krumm & Corning, 2008). Importantly, observers judged the moral character of the actor who committed an immoral act less harshly if that person had done something morally laudable in the past (Effron & Monin, 2010). As we shall see in the next section, character judgments may play an important role in the causal mechanism of licensing by observers.

Mechanism of Moral Licensing by Observers

Moral licensing by observers is sometimes discussed together with the better-known phenomenon of self-licensing (e.g., Effron & Monin, 2010; Miller & Effron, 2010). Some researchers have argued that moral licensing is driven by the same mechanism as self-licensing, namely a so-called *credential* mechanism whereby people who have a prior history of good deeds obtain moral credentials that allow them to engage in subsequent immoral behavior without tarnishing their moral identity. Consequently, their subsequent immoral transgressions are perceived as less immoral (e.g., Miller & Effron, 2010). The credential-based explanation is consistent with the fact that licensing by observers affects not only judgments of subsequent immoral behavior (e.g., Effron & Monin, 2010; Krumm & Corning, 2008; Nisan & Horenczyk, 1990; Wang & Chan, 2019) but also judgments regarding a person's character (Effron & Monin, 2010).

Alternatively, the so-called *credit*-based model used in self-licensing literature has been also used to explain licensing by observers (e.g., Effron &

Monin, 2010). In the credit-based model, prior good deeds allow the actor to balance out his subsequent immoral behavior so that his inner sense of morality is not tarnished. Unlike the credential-based model of licensing, credit-based licensing should make observers more lenient in their judgment of behavior but not in their judgment of the actor's moral character (Effron & Monin, 2010; Miller & Effron, 2010).

The main limitation of credit- and credential-based explanations for licensing by observers is that they do not explain why observers are susceptible to granting lenient judgment in the first place. Unlike self-licensing, which is self-serving in that it helps individuals to achieve alternative goals (e.g., Garvey & Bolton, 2017) or relieve strenuous self-control (e.g., Jordan et al., 2011), licensing by observers can be outright detrimental to observers as it allows them to underestimate the threat of immoral behavior of others.

To explain moral licensing by observers, some scholars have hypothesized that observers are vicariously emboldened to assess transgression leniently because they hope that such leniency will be reciprocated (Krumm & Corning, 2008). Unfortunately, this reciprocity-based explanation for licensing by observers has never been put to test. More importantly, it is not obvious how the expectation of reciprocal leniency can explain licensing by observers in situations that involve no repeated interactions between the observer and the actor (Effron & Monin, 2010; Krumm & Corning, 2008; Nisan & Horenczyk, 1990; Wang & Chan, 2019). As we shall see next, some of the effects associated with licensing by observers can perhaps be better explained as a byproduct of other moral inference processes.

The Role of Character Judgment in Moral Inference

For a behavior to be judged immoral, it must be intentional (otherwise it would be an accident) and it must break a shared moral norm (Malle, 2021). Given the importance of intentionality in judgments of immoral behavior (Monroe & Malle, 2017; Young et al., 2010), the judgment of observers is affected by the mental state of actors (Cushman, 2015), the reasons for the judged behavior (Riordan et al., 1983), and the justifications provided for the behavior (Nichols & Mallon, 2006). Crucially, when information about the mental state and reasons of the actor is missing, observers tend to infer this information from the actor's character (Reeder & Brewer, 1979; Skowronski & Carlston, 1987) or other information about the actor (such as their beliefs about target behaviors, e.g., Guglielmo & Malle, 2010; Laurent et al., 2015; Reeder & Brewer, 1979).

Information about the actor's moral character is rarely directly available, but observers are skillful at inferring such information from morally

significant events (Malle, 2021). Such character judgment is prone to biases typical for dispositional inferences made under limited information, such as the over-attribution bias (Ross et al., 1977). In other words, observers tend to infer moral character information even from rather innocuous pieces of information that have low diagnostic value. For instance, upon seeing a CEO candidate who requests a marble table, observers tend to infer his or her bad moral character and consequently are more willing to reject such a candidate (Tannenbaum et al., 2011). Such inferences only underscore the role of moral character as a key factor in the global impression of a person (e.g., Goodwin et al., 2014; Wojciszke et al., 1998); they provides cues for the interpretation of a person's intention (Goodwin et al., 2014). Character judgment is critical in interactions with strangers for whom dispositional information is not available (Martin & Cushman, 2015).

The moral inference process whereby people infer the moral characters of actors from their prior behavior and then use this information in their judgment about the morality of subsequent behavior of actors is consistent with the evidence on moral licensing by observers affecting not only the judgment about the morality of behavior but also character judgment about the morality of the actor (Effron & Monin, 2010). Such a moral inference process is also consistent with the credential model of moral licensing, but unlike the credential model, it implies that prior good deeds will improve the moral evaluation of any subsequent morally significant behavior, not just the immoral behavior.

Pro-Environmental Behavior as a Trigger of Licensing by Observers

As far as we know, pro-environmental behavior has never been studied as a potential trigger of licensing by observers, but there are strong indications that pro-environmental behavior can initiate licensing by observers. Firstly, engagement in pro-environmental behavior constitutes a morally significant event from which observers infer the morality of a person (Mazar & Zhong, 2010; Urban et al., 2019), their prosociality and altruism (Berger, 2019; Braun Kohlová & Urban, 2020; Luomala et al., 2020; Mazar & Zhong, 2010; Puska, 2019), and their trustworthiness (Berger, 2019; Luomala et al., 2020). Secondly, such inferences affect how people think and act toward those who engage in pro-environmental behavior: upon seeing a person who has previously engaged in pro-environmental behavior, observers are more willing to donate money to that person for an unrelated cause (disaster relief by the Red Cross; Luomala et al., 2020) and entrust that person with money in a context-free trust game (Berger, 2019). Thus, we expect that prior engagement in

pro-environmental behavior makes observers more lenient in their judgment of subsequent immoral behavior and the moral character of the actor. Given that repeated pro-environmental behavior (as compared to one-off pro-environmental behavior) carries more information about a person's past behavior, we also expect that repeated pro-environmental behavior will have a larger effect on the perception of a person's environmental attitude, moral character, and subsequent behavior.

The Environmental Attitude of Observers as a Moderator of Licensing by Observers

Some previous studies of moral licensing by observers have shown that observers exert more leniency toward members of their in-group (e.g., Krumm & Corning, 2008). In the environmental domain, the way people perceive the pro- or anti-environmental actions of others is often affected by their own environmental identity and attitude because people tend to favor those with a similar attitude to theirs and denigrate those who have a different stance on environmental issues (e.g., Opatow & Weiss, 2000). This would make observers with a higher level of environmental attitude more likely to recognize pro-environmental behavior as a morally significant event. It is also possible that observers with a higher level of environmental attitude are more familiar with pro-environmental behaviors and thus are better positioned to distinguish pro-environmental behavior from other types of mundane actions. Thus, we expect that observers' environmental attitudes will moderate the effect of licensing by observers.

Research Goals

In this research, we aimed to examine moral licensing by observers in the environmental domain. Specifically, we were interested in whether prior engagement in the pro-environmental behavior of actors (the hypothetical individuals presented in our studies) makes observers (participants of our studies) more likely to judge as relatively more moral subsequent moral transgressions (Study 1) and subsequent anti-environmental behavior (Study 2; see also Figure A1 in Supplemental Appendix for a graphical review of studies). We were also interested in how prior pro-environmental behaviors affect the rating of morality and environmental attitude of the actor (both studies). In addition, we also looked at whether the expected effect of prior pro-environmental behavior extends to subsequent pro-environmental behavior (Study 2), in contrast to the expectations of the licensing-by-observers hypothesis but consistent with the operation of moral inference processes.

Study I

In Study 1, we looked at how the prior engagement of an actor in one-off and repeated pro-environmental behaviors affects how observers perceive subsequent moral transgressions of actors and how they perceive their moral character.

Method

Participants. We invited a convenience sample of 245 Czech speakers (this and the subsequent study were in the Czech language) from a laboratory's participant pool to fill out a pre-study questionnaire approximately one week before the laboratory session. Of 237 participants who completed the pre-study, we invited 201 randomly selected participants (the registered sample size was 200) in groups of 12 to 17 participants to take part in the laboratory study. All participants completed the laboratory session but data from three participants were not saved due to a technical error. The remaining sample of 198 participants was used for analysis. The sample was variable in terms of age ($M=24.30$, $SD=7.66$), education (6.56% had primary education, 56.57% had secondary education, and 36.87% had tertiary education), and gender (74.24% were women).

Sample size determination. Sample size for this study was determined based on available resources. The experiment was a part of a series of laboratory experiments that were conducted within one laboratory session.

Procedure. Before taking part in the laboratory study, participants filled in a pre-study questionnaire. This questionnaire assessed participants' environmental attitude using behavioral and evaluative versions of the GEB scale (only the behavioral version of the GEB scale was used in this study). Approximately one week later, participants were invited to participate in a one-hour-long laboratory session. Upon arriving in the laboratory, participants were seated in cubicles, completed informed consent, and engaged in a series of tasks using desktop computers. Participants first completed unrelated studies consisting of a choice blindness task and an implicit association test of attitude to transportation.

Next, participants proceeded to the eight trials of the present study, in which they read short descriptions of hypothetical people (actors). Each trial described one hypothetical person identified by a male name selected randomly from a list of eight common Czech male first names. Each of the eight trials was composed of four vignettes, each describing a specific behavior of

the person (see Figure A2 in Supplemental Appendix for an example of the trial). The vignettes were presented as statements made by people close to the actors. In each trial, two of the vignettes related to a one-off behavior and two related to repeated behavior. Two trials included a vignette describing a one-off pro-environmental behavior (the remaining three vignettes were filler vignettes). Two trials included a vignette describing a repeated pro-environmental behavior (the remaining three vignettes were filler vignettes). Two trials included both a vignette describing a one-off pro-environmental behavior and a vignette describing a repeated pro-environmental behavior (the remaining two vignettes were filler vignettes). The remaining two trials contained only filler vignettes unrelated to pro-environmental behavior. The trial order was randomized. In each trial, another short vignette was displayed below the four vignettes that described a recent immoral behavior that the person had engaged in (this behavior was not labeled as immoral). Participants then rated the morality of the behavior and the morality of the actor and then proceeded to the next trial. After completing the eight trials, participants went through the same eight descriptions of actors but this time they evaluated their environmental attitude.

Participants then completed the Moral Foundation Questionnaire and engaged in a product choice task, which were parts of unrelated studies, were debriefed and received a fixed reward for participation in the study (200 CZK, equivalent to \$8.5). Randomly drawn participants received small prizes.

Design. The study had a 2 (one-off pro-environmental behavior: absent vs. present) \times 2 (repeated pro-environmental behavior: absent vs. present) within-subject factorial design with two trials for each combination of the two factors.

Materials

Independent variables. We manipulated information about the prior engagement of the actors in one-off and repeated pro-environmental behaviors through vignettes describing repeated and recent one-off pro-environmental activities of the actor. The vignettes were based on 50 items of the General Environmental Behavior scale (Kaiser, 2020) but were presented as descriptions of 50 recent one-off events (for one-off vignettes) or 50 repeated events (see Tables A1 and A2 in Supplemental Appendix for details of the vignettes). Example of a vignette with one-off pro-environmental behavior: "In the morning, Marek decided to take a bus to work." Example of a vignette with a repeated pro-environmental behavior: "Marek usually takes the bus to work."

Given that the one-off and repeated vignettes overlapped in terms of target behaviors, we never showed overlapping vignettes to the same participant. One-off and repeated filler vignettes described neutral behaviors unrelated to environmental conservation and were randomly selected from lists of 16 one-off and 16 repeated filler vignettes (see Tables A3 and A4 in Supplemental Appendix for details).

Dependent variables. Perceived morality of actors' subsequent behavior. Participants were shown a short vignette describing a situation in which the actor behaved immorally. These vignettes were randomly sampled from a list of 54 situations that were based on standardized moral vignettes describing episodic real-life moral norm violations, such as marital infidelity, shoplifting, cheating in an exam, etc. (Knutson et al., 2010; Czech version adopted from Vranka & Bahník, 2016; see Table A5 in Supplemental Appendix for details of items). Immoral behaviors were not labeled as such. An example of an immoral behavior vignette: "Marek went to buy himself a sandwich for lunch. He did not have any change, so he put the sandwich in his pocket and walked away without paying. Nobody saw him." Participants then rated the behavior on a six-point Likert scale "how moral it was, according to your opinion, that [actor's name] did [target immoral behavior]" (1 = *very immoral*, 2 = *quite immoral*, 3 = *rather immoral*, 4 = *rather moral*, 5 = *quite moral*, 6 = *very moral*).

Perceived morality of the actor. Participants rated on a six-point Likert scale "how moral or immoral [actor's name] is overall" (1 = *very immoral*, 2 = *moderately immoral*, 3 = *rather immoral*, 4 = *rather moral*, 5 = *moderately moral*, 6 = *very moral*).

Manipulation check. Perceived environmental attitude of the actor. We instructed participants "to rate, using the following scale, what attitude does [actor's name] have towards the environment" on a six-point Likert scale (1 = *strongly negative*, 2 = *moderately negative*, 3 = *rather negative*, 4 = *rather positive*, 5 = *moderately positive*, 6 = *strongly positive*).

Moderator. Environmental attitude of the observer. We measured participants' environmental attitude with 48 items (see Table A6 in Supplemental Appendix for details) based on the GEB-50 scale (Kaiser, 2020). The scale has been extensively validated previously as a measure of environmental attitude (for a review, see Kaiser & Wilson, 2019). The two items not used in the current study could not be easily used with a polytomous response format. An example of an item: "I use a clothes dryer." Participants indicated the frequency with which they engage in each of 48 ecological behaviors using a

six-point Likert-type scale (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *frequently*, 5 = *very frequently*, 6 = *always*). We reverse-coded some of the items so that higher scores indicated higher ecological engagement, collapsed categories 1 to 3 and 4 to 6, and estimated participants' attitude levels using the Rasch measurement model for dichotomous data (for details, see, e.g., Bond & Fox, 2012). The scale had a sufficient internal consistency, $\alpha = .79$, and person separation reliability, $rel. = .79$.

Analysis. We used mixed ordinal logit models with maximal specification reflecting the design of the study (see Barr et al., 2013) to analyze the effect of prior information of the four dependent variables. Two of the three registered models (i.e., models for the rating of the morality of a person and their behavior) were too complex for the current data, resulting in some parameters having boundary values (e.g., zero variance of random parameters) and had to be simplified (by leaving out some of these random parameters; for technical details, see pre-registration). Note, however, that changes in the specification of models did not have any impact on estimates of the fixed effects that are of primary interest in the current study.

Results

Manipulation check. As expected, participants perceived the actor to have a more pro-environmental attitude when he engaged in one-off pro-environmental behavior, $OR = 6.55$, 95% CI [1.19, 36.08], $p = .031$, and/or in repeated pro-environmental behavior, $OR = 9.54$, 95% CI [2.09, 43.62], $p = .004$ (see Table A7 in Supplemental Appendix for details); the sizes of the two effects were not statistically different, $W = 0.32$, $p = .746$, the Wald test of equality of logit regression parameters.

An exploratory analysis revealed that observers' environmental attitude did not moderate the effect of actors' prior engagement in pro-environmental behavior on the perception of actor's environmental attitude for one-off pro-environmental behavior, a ratio of $OR = 1.14$, 95% CI [0.89, 1.45], $p = .302$, or for repeated pro-environmental behavior, a ratio of $OR = 1.09$, 95% CI [0.85, 1.39], $p = .496$ (see Table A10 in Supplemental Appendix for details).

Perceived morality of actors' subsequent behavior. The perceived morality of actors' subsequent (immoral) behaviors was affected neither by their prior engagement in one-off pro-environmental behavior, $OR = 1.13$, 95% CI [0.94, 1.37], $p = .201$, nor by their prior engagement in repeated pro-environmental behavior, $OR = 0.98$, 95% CI [0.81, 1.19], $p = .864$ (see Table A8 in Supplemental Appendix for details); the sizes of the two effects were not statistically

different, $W=1.03$, $p=.304$. Observers' environmental attitudes had no significant main effect on their rating of the morality of actors' subsequent behavior, $OR=1.05$, 95% CI [0.84, 1.32], $p=.644$. Observers' environmental attitude also did not moderate how their rating of actors' subsequent behaviors was affected by prior engagement of actors in one-off pro-environmental behavior, ratio of $OR=0.92$, 95% CI [0.74, 1.15], $p=.484$, or in repeated pro-environmental behavior, ratio of $OR=1.00$, 95% CI [0.81, 1.25], $p=.978$ (see Table A11 in Supplemental Appendix for details).

Perceived morality of the actors. Participants perceived the actor to be more moral when he engaged in one-off pro-environmental behavior, $OR=1.67$, 95% CI [1.36, 2.06], $p<.001$, and/or in repeated pro-environmental behavior, $OR=1.41$, 95% CI [1.15, 1.73], $p=.001$ (see Table A9 in Supplemental Appendix for details); the sizes of the two effects were not statistically different, $W=1.23$, $p=.220$. Observers' environmental attitudes did not have a significant effect on their rating of the morality of the subsequent behavior of the actor, $OR=1.07$, 95% CI [0.78, 1.47], $p=.665$ (see Table A12 in Supplemental Appendix for details). Observers' environmental attitude also did not moderate how observers' rating of actors' morality was affected by an actor's prior engagement in one-off pro-environmental behavior, ratio of $OR=0.92$, 95% CI [0.74, 1.15], $p=.484$, or in repeated pro-environmental behavior, ratio of $OR=1.00$, 95% CI [0.81, 1.25], $p=.978$.

Discussion

We found that pro-environmental behavior triggers moral inference about the character of the actor but not moral licensing by observers that would change the perception of the immoral behavior committed by the actor. We also found that these effects were not moderated by observers' environmental attitudes.

Study 2

Study 2 extends previous study by focusing on observers' judgment of both subsequent anti- and pro-environmental behaviors that are somewhat more ambiguous in moral terms.

Method

Participants. A non-representative sample of 501 participants from a laboratory participant pool was invited to participate in this laboratory study. All

participants completed the study. The sample was somewhat variable in terms of age ($M=24.50$, $SD=7.87$), gender (60.87% were women), and education (70.25% were university students).

Sample size determination. The sample size was determined for another study which was administered jointly in the same batch of studies.

Procedure. Participants were seated in cubicles in the laboratory and engaged in a series of studies using desktop computers. After finishing one unrelated study on cheating and one study on anchoring, participants proceeded to the present study. Same procedure as in Study 1 was used to manipulate actors' prior pro-environmental behavior. Participants completed eight trials of the task and rated the environmental friendliness of subsequent behavior (manipulation check), and the environmental attitude of the person. Next, the participants read the same eight descriptions of hypothetical persons and rated the morality of the subsequent behavior and the morality of the hypothetical person (see Figures A4 and A5 in Supplemental Appendix for examples of trials).

Finally, participants proceeded to tasks unrelated to the current study (a lottery task and a personality traits questionnaire). After completing the study, participants collected their rewards for participation in the study (200 CZK, equivalent of 8 USD) as well as any additional reward they could have earned in other studies.

Design. The study used a 2 (one-off pro-environmental behavior: absent vs. present) \times 2 (repeated pro-environmental behavior: absent vs. present) \times 2 (subsequent one-off behavior: pro-environmental vs. anti-environmental) full factorial within-subject design.

Materials

Independent variables. Prior pro-environmental behavior of the actors. We used the same procedure to manipulate actors' prior one-off and repeated pro-environmental behaviors as in Study 1.

Actors' subsequent engagement in pro-environmental and anti-environmental behaviors. We manipulated information about actors' subsequent engagement in one-off pro-environmental or anti-environmental behavior by presenting a randomly chosen vignette that described either a recent one-off pro-environmental behavior or anti-environmental behavior that actors had engaged in. Pro-environmental vignettes were taken from the same pool of vignettes used to manipulate prior one-off pro-environmental behavior. Anti-environmental vignettes were inspired by one-off pro-environmental vignettes but featured actions with negative rather than positive impacts on the environment (see Table A13 in Supplemental Appendix for details).

Subsequent behaviors were randomly chosen in each trial with the limitation that no type of behavior could be chosen twice for the same participant (i.e., a certain type of behavior could appear either as a prior or as a subsequent behavior, but not both). An example of an anti-environmental vignette: “On his way to work, Marek bought a six-pack of bottled water.”

Dependent variables. Perceived environmental friendliness of actors' subsequent behavior. Participants rated “the environmental impact of [actor's name] doing [target behavior]” on a six-point Likert scale (1 = *very negative*, 2 = *moderately negative*, 3 = *rather negative*, 4 = *rather positive*, 5 = *moderately positive*, 6 = *very positive*).

Perceived environmental attitudes actors. We used the same measure as in Study 1, except that we labeled the most extreme answer categories as “very negative” and “very positive,” rather than “strongly negative” and “strongly positive”; this is consistent with other scales used in this study.

Perceived morality of actors and perceived morality of their subsequent behaviors. We used the same measures as in Study 1 to assess the perceived morality of actors and their subsequent behaviors.

Analysis. Similar to Study 1, we formulated ordinal logit models with maximal specification reflecting the design of the study. Some of these models were too complex for our data and had to be simplified (by leaving out some of these random parameters; for technical details, see the pre-registration). Note, however, that these changes in the specification of models did not have any impact on estimates of fixed effects that are of primary interest in the current study.

Results

Manipulation check. As expected, participants rated subsequent anti-environmental behavior below the midpoint of the six-point scale as having negative environmental impacts, $M=2.66$, $SD=0.79$, and they correctly rated subsequent pro-environmental behavior as having positive environmental impacts, $M=4.67$, $SD=0.92$, $t=74.14$ (3,910.8), $p < .001$. Registered analysis corroborated this result by showing that subsequent anti-environmental behavior was rated as less pro-environmental than pro-environmental behavior, $OR=0.0015$, 95% CI [0.0009, 0.0025], $p < .001$ (see Table A14 in the Supplemental Appendix for details); this result suggests that participants correctly recognized subsequent pro-environmental and anti-environmental behaviors in the descriptions in the vignettes.

Effect of actors' prior pro-environmental behaviors on the perception of environmental friendliness of their subsequent behavior. Participants perceived the actor's behavior as relatively more pro-environmental (regardless of whether the behavior was pro- or anti-environmental) when the actor had previously engaged in one-off pro-environmental behavior, $OR=1.21$, 95% CI [1.02, 1.44], $p=.032$ (for details, see Table A14 in the Supplemental Appendix). We did not observe a significant interactive effect of the prior one-off pro-environmental behavior and the type of subsequent behavior, ratio of $OR=1.12$, 95% CI [0.87, 1.44], $p=.389$ (see Table A14 in Supplemental Appendix for details), meaning that prior one-off pro-environmental behavior affected ratings of subsequent pro- and anti-environmental behaviors similarly. Unlike for prior one-off pro-environmental behavior, we did not find any effect of actors' prior repeated pro-environmental behavior on the rating of their subsequent behaviors by observers, $OR=1.13$, 95% CI [0.96, 1.35], $p=.151$, even though the size of this effect was not different from the effect size of the one-off pro-environmental behavior, $W=0.52$, $p=.607$, the Wald test of equality of logit regression parameters.

To get a better understanding of whether the perceived environmental friendliness of subsequent anti- and pro-environmental behaviors was differentially affected by prior pro-environmental behaviors, we conducted exploratory analyses on subsamples of observations of only anti-environmental behaviors and pro-environmental behaviors, respectively. This analysis (see Tables A15 and A16 in the Supplemental Appendix for details) revealed that observers rated subsequent anti-environmental behavior as more environmentally friendly if the actor had a record of repeated pro-environmental behavior, $OR=1.21$, 95% CI [1.01, 1.46], $p=.041$, or one-off pro-environmental behavior, $OR=1.39$, 95% CI [1.16, 1.68], $p=.001$. Likewise, observers rated subsequent pro-environmental behaviors as more environmentally friendly if the actor had a record of one-off pro-environmental behavior, $OR=1.22$, 95% CI [1.03, 1.46], $p=.025$, but not if he had a record of repeated pro-environmental behavior, $OR=1.14$, 95% CI [0.96, 1.35], $p=.148$. In other words, prior engagement in (one-off) pro-environmental behavior increased the perceived environmental friendliness of both subsequent anti-environmental behavior and subsequent pro-environmental behavior.

Perceived environmental attitude of the actor. As expected, the environmental attitude of an actor was rated as more pro-environmental when he engaged in one-off pro-environmental behavior, $OR=3.09$, 95% CI [1.02, 9.36], $p=.047$, and when he engaged in repeated pro-environmental behavior, $OR=4.36$, 95% CI [1.48, 12.81], $p=.007$ (see Table A17 in Supplemental Appendix for

details); the sizes of the two effects were not statistically different, $W=0.44$, $p=.661$. As also expected, the attitude of the actor was rated as less pro-environmental when he subsequently engaged in anti-environmental behavior than if he engaged in pro-environmental behavior, $OR=0.11$, 95% CI [0.08, 0.14], $p<.001$.

The perceived morality of the subsequent pro- and anti-environmental behavior. As expected, participants on average rated subsequent anti-environmental behavior below the midpoint of a six-point scale, that is, as slightly immoral, $M=3.21$, $SD=1.11$, whereas they rated subsequent pro-environmental behavior as moderately moral, $M=4.93$, $SD=0.97$, and thus more moral than anti-environmental behaviors, $t=52.12(3,940.60)$, $p<.001$. Registered analysis corroborated this result by showing that subsequent anti-environmental behavior was perceived as being less moral than subsequent pro-environmental behavior, $OR=0.012$, 95% CI [0.007, 0.021], $p<.001$. Prior repeated pro-environmental behavior by the actor led observers rate the subsequent behavior as more moral, $OR=1.36$, 95% CI [1.14, 1.63], $p=.001$, but prior one-off pro-environmental behavior had no such statistically significant effect, $OR=1.13$, 95% CI [0.94, 1.35], $p=.199$ (see Table A18 in Supplemental Appendix for details), even though the sizes of the two effects were not statistically different, $W=1.50$, $p=.132$. Prior repeated pro-environmental behavior had statistically similar effects on subsequent pro- and anti-environmental behaviors as suggested by the statistically insignificant interaction effect of prior one-off pro-environmental behavior and the type of subsequent behavior, ratio of $OR=0.96$, 95% CI [0.74, 1.22], $p=.717$. Likewise, prior repeated pro-environmental behavior affected similarly subsequent pro- and anti-environmental behaviors, $OR=0.96$, 95% CI [0.75, 1.23], $p=.761$.

To corroborate that the effects of prior pro-environmental behavior on the ratings of the morality of subsequent anti- and pro-environmental behaviors were similar, we conducted exploratory analyses separately on a subsamples of observations with subsequent anti-environmental and pro-environmental behaviors (see Tables A19 and A20 in Supplemental Appendix for details). These analyses revealed that observers perceived subsequent anti-environmental behavior as more moral if the actor previously engaged in repeated pro-environmental behavior, $OR=1.32$, 95% CI [1.11, 1.57], $p=.002$, but we did not find evidence for a similar effect of previous engagement in one-off pro-environmental behavior, $OR=1.08$, 95% CI [0.90, 1.28], $p=.406$. Likewise, prior repeated pro-environmental behavior had a positive effect on the rating of morality of subsequent pro-environmental behavior, $OR=1.39$, 95% CI [1.16, 1.66], $p<.001$, but prior one-off pro-environmental behavior

had no such effect, $OR=1.10$, 95% CI [0.91, 1.31], $p=.321$. Thus, we found evidence that prior engagement of an actor in repeated pro-environmental behavior makes observers more likely to rate both subsequent anti-environmental and subsequent pro-environmental behaviors as relatively more moral.

Perceived morality of the actor. As expected, participants rated the actor as more moral when he engaged in prior one-off pro-environmental behavior, $OR=1.90$, 95% CI [1.22, 2.94], $p=.004$, and repeated pro-environmental behavior, $OR=2.28$, 95% CI [1.25, 4.15], $p=.007$ (for details, see Table A21 in the Supplemental Appendix); the sizes of the two effects were not statistically different, $W=0.49$, $p=.628$. As expected, the actor was rated as less moral if he subsequently engaged in anti-environmental (rather than pro-environmental) behavior, $OR=0.21$, 95% CI [0.17, 0.27], $p<.001$.

Discussion

Similar to Study 1, we found that observers inferred the environmental attitudes and moral character of actors from their prior pro-environmental behaviors. Unlike in Study 1, we found some evidence that prior engagement of actors in pro-environmental behaviors made observers rate their subsequent behaviors as more environmentally friendly and more moral. However, we also found that these effects were not limited to the perception of subsequent anti-environmental behaviors, as the licensing hypothesis would predict.

General Discussion

Across two registered experimental studies, we examined an intriguing phenomenon of moral licensing by observers whereby observers tend to judge the morality of immoral behavior and moral character of the actor less harshly if the person has a prior record of good deeds (e.g., Effron & Monin, 2010). We explored the effect of moral licensing by observers on a judgment about subsequent minor moral transgressions unrelated to environmental protection (Study 1) as well as on judgment about pro- and anti-environmental behaviors (Study 2).

We found that observers inferred a higher pro-environmental attitude and morality of the actor from his pro-environmental behavior (and a lack of pro-environmental attitude and lack of morality from his anti-environmental actions). We did not find any evidence that prior engagement of the actor in pro-environmental behavior would make observers rate subsequent minor moral infractions as more moral and we also did not find evidence that such

effects would be moderated by observers' environmental attitudes (Study 1). However, we found that the prior pro-environmental behavior of the actor makes observers more likely to rate subsequent pro- and anti-environmental behaviors as relatively more pro-environmental and more moral (Study 2). Clearly, such effects are broader in scope than what the phenomenon of moral licensing by observers would imply and align better with the predictions of moral judgment theories (e.g., Reeder & Brewer, 1979; Skowronski & Carlston, 1987) as we discuss in a separate section below.

Morality Judgments From Displays of Pro-Environmental Behavior

As expected, we found in both studies that observers were sensitive to the environmental friendliness of behavior and perceived pro- and anti-environmental behaviors as such. Moreover, observers interpreted pro- and anti-environmental behaviors in moral terms as they perceived pro-environmental behavior as moral and anti-environmental behavior as immoral (for similar results, see, e.g., Braun Kohlová & Urban, 2020; Mazar & Zhong, 2010; Urban et al., 2019). We also found in both studies that upon witnessing initial engagement in pro-environmental behavior, observers perceived the actor not only as a person with a higher level of environmental attitude but also as a more moral person. These observations attest to the tendency of people to make character judgments based on limited information about morally significant events (Malle, 2021), one of the manifestations of the fundamental attribution error (Jones & Harris, 1967).

We found in both studies that observers inferred a higher level of environmental attitude from repeated pro-environmental behavior as compared to one-off pro-environmental behavior. This observation is in line with the notion that repeated behavior is more likely to lead to dispositional attribution (e.g., Kelley, 1973). Somewhat surprisingly, we did not observe that same effect on the judgment of a person's morality. We can only speculate why this was the case, but the fact is that in the process of moral inference, observers weigh different pieces of information in a way that does not necessarily reflect their objective diagnostic value (Birnbaum, 1973).

No Moderating Role of Observers' Environmental Attitude

Our studies found no evidence that observers' environmental attitudes affect their judgment of actors' environmental attitudes, their morality, and the morality of their behavior. We also did not find any evidence that observers'

environmental attitudes moderate how the prior engagement of actors in pro-environmental behavior affects observers' rating of actors' environmental attitude, their morality, and morality of their subsequent immoral behavior. This is in contrast to previous studies showing that people tend to judge people more leniently if they have similar attitudes as their own (e.g., Opatow & Weiss, 2000). On the other hand, some other studies have shown that environmental attitudes do not moderate moral inference from pro-environmental behavior (e.g., Braun Kohlová & Urban, 2020). However, it is also possible that the moderating effect of environmental attitude was simply attenuated due to our samples being drawn from a specific sub-population (for discussion, see Limitations).

Positive Effect of Prior Pro-Environmental Behavior on Perceived Environmental Friendliness and Morality of Subsequent Behavior

Study 2 revealed that actors' prior engagement in pro-environmental behavior makes observers more likely to judge their subsequent behavior as more environmentally friendly and more moral. These observations are consistent with the literature on moral inference that suggests that people have a tendency to make character judgments based on information from morally significant events (Malle, 2021). Consequently, such character information is then used by observers to make a judgment about the morality of the subsequent behavior of the actor (Reeder & Brewer, 1979; Skowronski & Carlston, 1987).

The effect of actors' prior engagement in pro-environmental behavior on observers' judgment of actors' subsequent behavior found in our study differs from the expectations of the theory of licensing by observers in two key respects. First, this effect is broader than the licensing-by-observers effect because the latter should theoretically concern only subsequent immoral behavior (Effron & Monin, 2010; Krumm & Corning, 2008; Nisan & Horenczyk, 1990; Wang & Chan, 2019), whereas we observed an effect that equally concerned subsequent moral (i.e., pro-environmental) and immoral behavior (i.e., anti-environmental behavior). Second, we were able to observe this effect in Study 2 but not in Study 1, even though Study 1 used prior and subsequent behaviors that did not fall in the same domain (environmental conservation vs. everyday minor moral transgressions). Behaviors falling into different domains should theoretically favor licensing-by-observers mechanism by making observers less likely to perceive the actors as hypocrites (Effron & Monin, 2010). Conversely, the fact that both prior and

subsequent behaviors were related to environmental protection should have attenuated the positive effect of prior pro-environmental behavior on the rating of morality and environmental friendliness of subsequent anti-environmental behavior in Study 2, as such behavior should be perceived as hypocritical by observers. This, however, was not the case.

Whereas these observations do not fit the expectations of the licensing-by-observers phenomenon, they can be accommodated within the broader framework of moral inference theories. The morality signal of pro-environmental behavior in Study 1 could be a weaker signal of one's morality than subsequent moral infractions committed by the actor. As such, the prior pro-environmental behavior was sufficient to affect the observer's judgment about the morality of the actor's character but not sufficiently strong for that character judgment to influence the perception of subsequent behaviors that were outright immoral. Conversely, in Study 2, the morality signal of prior pro-environmental behavior was on par with the morality (and immorality) signal of subsequent pro- (and anti-) environmental behaviors. As such, prior pro-environmental behavior triggered character judgments that were sufficient to alter perceptions of subsequent pro- and anti-environmental behaviors in terms of their morality.

Theoretical Implications

Engagement in pro-environmental behavior is perceived by observers as a moral phenomenon and makes observers perceive actors and their subsequent pro- and anti-environmental actions as relatively more pro-environmental and moral. It can be potentially misleading to label these effects as licensing effects as they do not "license" immoral behavior. Rather, they improve the impression of the person and her subsequent actions, particularly their subsequent pro-environmental behavior. As such, these effects could resemble licensing-by-observers if one only focuses on subsequent immoral and anti-environmental outcome behaviors. However, as Study 2 shows, these effects are broader and concern at least subsequent pro-environmental behavior but possibly also other types of morally relevant behaviors. In line with moral inference literature (e.g., Kim et al., 2020), these processes can be understood as an updating of observers' character judgment about actors based on observed morally-significant events. Such character judgments are then likely to also affect moral judgments about actors' subsequent behaviors (Reeder & Brewer, 1979; Skowronski & Carlston, 1987).

Credit-based and credential-based explanations adopted from self-licensing literature (e.g., Miller & Effron, 2010) cannot explain licensing by observers for two reasons. Firstly, they do not theoretically explain what would motivate observers to use more lenient moral judgment, something that can harm their self-interest by exposing them to immoral actions of

others. Secondly, our Study 2 shows that observers judge any subsequent action (regardless of being pro- or anti-environmental) as relatively more moral subsequent to prior pro-environmental behavior of actors. Any explanations derived from self-licensing literature would, on the other hand, expect that such effects are limited only to subsequent immoral (or anti-environmental) behavior. Attempts to solve the first problem by assuming reciprocal leniency (e.g., Krumm & Corning, 2008) are not adequate to explain leniency in moral judgment in situations that involve no repeated interactions between the observer and the actor, such as were used in our and several other studies (Effron & Monin, 2010; Krumm & Corning, 2008; Nisan & Horenczyk, 1990; Wang & Chan, 2019).

Practical Implications

Given that both character judgments and moral judgments of behavior determine how we perceive others (e.g., Wojciszke et al., 1998) and how we interact with them, particularly when they are strangers (Martin & Cushman, 2015), the moral inference processes demonstrated in this study have clear practical importance. By improving the impression of the person and her actions, prior pro-environmental engagement can make others more forthcoming and more likely to accept and approve of these actions (e.g., Berger, 2019; Luomala et al., 2020). Likewise, showcasing the prior anti-environmental records of a person can tarnish their moral character and make their subsequent actions appear worse than they are as Study 2 shows.

Limitations

One of the limitations of the current study is that it was conducted on non-representative samples of participants from a laboratory participant pool. We do not think that the sample restriction impacted the effects of the experimental manipulation in our study because moral inference processes similar to ours were previously detected in other types of non-representative samples (e.g., Effron & Monin, 2010; Krumm & Corning, 2008; Nisan & Horenczyk, 1990; Wang & Chan, 2019) and seem to be rather generic.

Another limitation of our study is that we used only vignettes to represent immoral behavior and pro- and anti-environmental behaviors. Arguably, such a representation is similar to situations when people make their judgments based on what they hear about others. Clearly, there are other situations when people make a judgment based on direct observations of the behavior of others. Whether our findings generalize to the later judgmental situation is open to further scrutiny.

Conclusions

People who engage in pro-environmental behavior are perceived as more moral and their subsequent pro- and anti-environmental behaviors are perceived as more moral. Unlike the licensing-by-observers phenomenon, these effects on the perception of morality of subsequent behavior are not limited to subsequent anti-environmental (i.e., immoral) behaviors. These effects can be best understood as moral inference processes whereby observers update their judgment of actors' character and then, based on this information, they also update their judgment about the morality of actors' subsequent behavior. Through such a moral inference mechanism, prior pro-environmental behavior is likely to affect how others see the person, interact with them, and perceive their subsequent behavior.

Author contributions

JU: conceptualization, methodology, formal analysis, data curation, writing—original draft, funding acquisition; ŠB: conceptualization, methodology, software, investigation, writing—review and editing; MBK: conceptualization, methodology, writing—review and editing.

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Data availability

All measures, manipulations, and exclusions are disclosed. No data analysis was undertaken before the end of data collection. Pre-registrations of the two studies as

well as materials, data, analysis scripts, and tests of all registered hypotheses can be found at the following link: <https://osf.io/dzmk9/>. The study has been approved, as a part of a series of moral licensing experiments, by the IRB of the Charles University Environment Centre.

Supplemental Material

Supplemental material for this article is available online.

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