Moral licensing, moral cleansing and pro-environmental behaviour: the moderating role of pro-environmental attitudes

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**Moral licensing, moral cleansing and pro-environmental behaviour: The moderating
role of pro-environmental attitudes**

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Abstract

The present study examined the conditions under which highlighting past pro-environmental behaviour produces a “license” to engage in less pro-environmental behaviour: a phenomenon known as *moral licensing*. It also examined whether highlighting a lack of past pro-environmental action would lead to *moral cleansing*, where people engage in moral behaviour to maintain a positive moral self-image. It extends the existing literature on moral licensing and moral cleansing by exploring environmental attitudes as a moderator of the effect of people’s past pro-environmental behaviour on their subsequent actions. Participants ($N = 213$) completed the Environmental Attitude Scale and were then exposed to either a stronger green credentials manipulation, or a weaker green credentials manipulation, or they took part in a control group. As a key dependent variable, they were then provided with an opportunity to find out about their personal carbon footprint, with their responses being interpreted as possible evidence of moral licensing/cleansing. There was evidence that participants with more pro-environmental attitudes who were reminded of frequent previous pro-environmental behaviour were less likely to seek information about their carbon footprint (consistent with a *moral licensing* effect) and that participants with less positive environmental attitudes who were reminded of infrequent previous pro-environmental behaviour were more likely to seek such information (consistent with *moral cleansing*). The findings are discussed in relation to spillover effects.

Keywords: moral licensing, moral cleansing, positive spillover, environmental attitude, theory of planned behaviour,

1. Introduction

Many environmental behaviour change campaigns focus on the simple and ostensibly painless steps that people can take to live a greener lifestyle, in the hope that adoption of one pro-environmental behaviour will lead to further pro-environmental behaviours: an idea known as *positive spillover*. In recent years, this idea of positive spillover has gained increasing support both within the academic community (Nash, Whitmarsh, Capstick, Hargreaves, Poortinga, Thomas, Sautkina, Xenias, 2017; Thøgersen & Crompton, 2009; Truelove, Carrico, Weber, Raimi, & Vandenberg, 2014) and among policymakers (Defra, 2008; Defra, 2011) as a pragmatic focus for the promotion of sustainable pro-environmental lifestyle changes. However, research has shown that performing pro-environmental actions does not always increase people's inclination to adopt more environmentally-friendly behaviours; in fact, research has generated mixed results in this regard (e.g., Truelove et al., 2014). Rather than promoting positive spillover effects, several studies have reported that past pro-environmental behaviour can inhibit future pro-environmental behaviour. One possible reason for an absence of positive spillover effects has been termed 'moral licensing', where the adoption of one pro-environmental behaviour actually decreases the likelihood of other pro-environmental behaviours, as a result of past morally-laudable behaviour being construed as permitting people to engage in a more self-indulgent behaviour (e.g., Tiefenbeck, Staake, Roth, & Sachs, 2013): behaviour that in other circumstances might be thought discreditable (Miller & Effron, 2010). Moral licensing has a corollary: *moral cleansing*, where past indulgence in discreditable behaviour is compensated (psychologically) by increases in positive behaviours. Both instances of such moral accounting are thought to be most likely among people who *care* about their moral credentials in a given behavioural domain (e.g., Thøgersen and Olander, 2003). In general, "moral credits provide license by offsetting the negative impact of a transgression on one's moral self-concept, whereas moral

credentials provide license by making a behaviour appear as if it were not a transgression at all” (Miller & Effron, 2010, p. 126).

1.1. Highlighting participants’ past pro-environmental behaviour

Behavioural positive spillover refers to the idea that engagement in a single pro-environmental behaviour may lead to further far-reaching and environmentally-significant behavioural changes (Thøgersen & Crompton, 2009). In a three-wave longitudinal survey, for example, Thøgersen and Ölander (2003) found that recycling behaviour was correlated positively with the later purchase of organic products and with pro-environmental transportation decisions. Similarly, Thøgersen and Noblet (2012) reported positive relationships between pro-social consumer behaviours (everyday green consumer behaviour) and environmental policy support (acceptance of wind power in their area). They argued that simple behaviours act as wedge points to engaging in more costly environmental action.

Various psychological theories (e.g., self-perception theory [Bem, 1973], cognitive dissonance theory [Festinger, 1962] and goal theory [Fishbach & Dhar, 2005]) support and explain positive spillover. These theories consider different potential explanations for positive spillover in terms of, for example, awareness and consistency processes. Research on people’s desires to be consistent suggests that people often prefer to behave consistently over time to maintain a particular self-view, or to avoid aversive dissonance. Moreover, and importantly for the research that we report in the present study, Thøgersen and Ölander (2003) considered the role of internal factors such as values and norms and found that the likelihood of positive spillover is higher if a person possesses strong personal norms supporting environmental-friendly behaviour.

On the other hand, sometimes adopting particular pro-environmental behaviours may establish ‘moral credit’ (Miller & Effron, 2010) leading to moral licensing. That is,

performance of a particular moral behaviour reduces the motivation to adopt further related moral behaviour because the first behaviour frees (licenses) the person to subsequently disengage from the subsequent moral behaviour. One explanation for this finding is that performing an initial pro-environmental behaviour, for example, may temporarily satisfy people's sense of being a moral person and may reduce feelings of moral obligation or requirement to perform a subsequent pro-environmental behaviour (Miller & Effron, 2010). While engaging in pro-environmental behaviour might highlight an individual's self-conception as a moral individual and motivate them to act in line with their moral self (Conway & Peetz, 2012), research on moral licensing suggests that engaging in pro-environmental behaviour can also permit individuals to act inconsistently with their prior action and to act in a more morally questionable way (Miller & Effron, 2010).

1.2. Moral licensing in the environmental domain

Moral licensing and moral cleansing have received increasing amounts of attention in various behavioural domains including in relation to racial prejudice (Monin & Miller, 2001), nutrition (Wilcox, Vallen, Block, & Fitzsimons, 2009), purchasing behaviour (Mazar & Zhong, 2010), and donation (Khan & Dhar, 2006; Sachdeva, Iliev, & Medin, 2009), but few studies have investigated these phenomena in the environmental action domain. Notable exceptions include Meijers, Verlegh, Noordewier, & Smit (2015) who reported that people who donated to charity subsequently expressed lower intentions for pro-environmental behaviour, and Sachdeva, Iliev, & Medin (2009) found that reminding people of their good deeds reduced charitable donations and environmentally-friendly actions.

In terms of moral licensing effects, Tiefenbeck et al. (2013) showed that people who received weekly feedback on their water consumption lowered their water use but also increased their electricity consumption. In a related study, Mazar and Zhong (2010) found that engaging in

green behaviours reduced subsequent cooperative actions: they reported that those who purchased from a green store were more likely to both steal and cheat in a subsequent task than did those who purchased conventional products.

Mirroring the moral licensing effect, it has also been suggested that after committing negative deeds, people sometimes engage in moral behaviour to recover self-worth (Sachdeva et al., 2009). According to Sachdeva, Iliev, & Medin (2009), behaving immorally can have a negative influence on perceptions of self-worth, and people may engage in subsequent moral behaviour in order to regain some of that lost self-worth. Research on such ‘moral cleansing’ suggests that people sometimes try to balance their negative deeds by engaging in actions that metaphorically cleanse themselves of their past transgression and reaffirm their moral self-regard. Zhong and Liljenquist (2006) argued that a threat to the moral self could motivate the restoration of moral purity.

Non-significant effects in research on moral licensing and the evidence of positive spillover effects indicate that licensing effects are not always to be expected after a prior pro-environmental behaviour. Scholars differentiate among pro-environmental behaviours based on their frequency, costs (low cost vs. high cost), and behavioural domain (where initial and subsequent pro-environmental behaviours are in similar/dissimilar domains). Gneezy, Imas, Brown, Nelson, & Norton (2012), for example, found that moral licensing only occurred when the initial moral behaviour was cost-free. Consistent with this, Lanzini and Thøgersen (2014) found that positive spillover effects were more likely for easy-to-change behaviours where there were few disadvantages of making those changes. Fishbach and Dhar (2005) argued that one’s behavioural history will liberate future behaviours when one’s past behaviours are interpreted in terms of progress towards, rather than commitment to, a goal. According to these latter authors, actions that are framed as *goal progress* increase the likelihood of a person pursuing incongruent actions and inconsistent goals, whereas the same

actions framed as a *goal commitment* elicit a tendency to subsequently maintain the pursuit of the focal goal. Researchers have claimed that the difficulty of an initial behaviour will affect the likelihood of spillover effects. Interestingly, Attari et al. (2010) argued that people have a tendency to favour easier environmental behaviours for themselves and to favour harder environmental behaviours for others. In this regard, Truelove et al. (2014) also argued that the order of behaviours matters for spillover, where a highly difficult secondary behaviour will result in a greater likelihood of negative spillover than of positive spillover. Noblet and McCoy (2018) found that individuals who participated in past sustainable energy behaviours were less likely to support a proposed public policy investment in energy efficiency/renewable energy.

Furthermore, Crompton and Thøgersen (2009) argued that a licensing effect is more likely to be found where behaviours are not based on pro-environmental attitudes and values. They also point out that people with more negative attitudes to the environment will not be favourably disposed towards pro-environmental behaviour, anyway. Indeed, research on pro-environmental behaviour has given substantial attention to environmental attitudes, defined as a person's tendency to be concerned about the natural environment (Bamberg, Ajzen, & Schmidt, 2003). It has been suggested that the environmental attitude construct is one of the most powerful predictors of pro-environmental behaviour (Kaiser, Ranney, Hartig, & Bowler, 1999). De Young (2000) argued that people find some environmental behaviours as “worth engaging in because of the personal, internal contentment that engaging in these behaviors provides” (p. 515).

In the current study, participants' pro-environmental attitudes towards the environment were examined as a potential moderator of licensing and cleansing effects. We proposed that prediction of licensing or cleansing may be improved if people's existing relevant attitudes are taken into account. Perhaps in addition to, independent of, or in

interaction with other effects (e.g., costs, order effects, etc.), we suggest that relatively positive attitudes predict decreasing likelihood of moral licensing and increasing likelihood of cleansing, whereas relatively negative attitudes predict increasing likelihood of moral licensing and decreasing likelihood of cleansing.

To measure participants' general environmental attitudes, we used the Environmental Attitudes Scale (EAS; Ebenbach, Moore & Parsil, 1998). This scale distinguishes between internally-motivated pro-environmental attitudes (hereafter: EAI), and externally-motivated pro-environmental attitudes (hereafter: EAE), where the former are consistent across situations, persistent and autonomous, and the latter are inconsistent, weak, and contingent on external reward or punishment. It has been suggested that internally-motivated people are generally more ecologically concerned (Balderjahn, 1988; Henion & Wilson, 1976; Schwepker & Cornwell, 1991).

We note that research on moral licensing and cleansing effects has predominantly examined whether behaviour in one domain affects behaviour in another domain; however, in the current study we examined the effects of past pro-environmental behaviour on future pro-environmental behaviour within the same domain.

Overview of the present study

The first aim of this research was to examine when licensing would emerge in the pro-environmental domain. Specifically, we hypothesized (1) that highlighting past pro-environmental behaviour (specifically: asking participants to recall past pro-environmental behaviour) would “license” subsequent engagement in less pro-environmental behaviour, and (2) that highlighting lack of past pro-environmental action would lead to more pro-environmental behaviour (a ‘cleansing’ effect). However, we hypothesized that general environmental attitudes would moderate this relationship. Specifically, we expected (3) that

the relationship between highlighting individuals' past pro-environmental behaviour and their future pro-environmental behaviour would be stronger for individuals with internally-motivated pro-environmental attitudes such that those with more positive internal pro-environmental attitudes would exhibit a weaker (or no) licensing effect. Finally, we also expected (4) that individuals with more positive pro-environmental attitudes would be more likely to exhibit moral cleansing effects after recalling a lack of pro-environmental actions.

2. Method

2.1. Pilot Study

Prior to the main study, a pilot study was conducted to construct two sets of pro-environmental actions. Participants ($N = 29$) were asked whether or not they had ever carried out each of a series of 19 environment-related actions e.g., "have you ever turned off your computer when not in use" (see Table 1). The 5 actions that were most frequently reported as having been carried out were designated as 'frequent pro-environmental actions' and the 5 actions that were least frequently indicated as having been carried out were designated as 'infrequent pro-environmental actions'.

2.2. Main study

2.2.1. Participants

Two hundred and thirteen university students (173 females, 40 males; $M_{\text{age}} = 21.12$ years) from five different universities in the UK took part in an online survey. Participants were asked to log into the study website and were instructed that they would be completing four short questionnaires. They were entered into a prize draw (with two £50 prizes [about \$66]) in return for their participation.

2.2.2. Materials

Demographic information. Participants provided information about their age and gender and whether they were students or employed.

Environmental Attitudes. Participants initially completed the 13-item Environmental Attitude Scale (EAS; Ebenbach, Moore, & Parsil, 1998). Participants were asked to rate the extent of their agreement or disagreement with a series of statements on 7-point Likert-type response scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Items were reverse coded, as appropriate. Internally-motivated environmental attitudes (hereafter: EAI) were measured via 8 items, e.g., “I try hard to carry my pro-environmental beliefs over into all the other parts of my life”, ($\alpha = .85$).

Additionally, we measured externally-motivated pro-environmental attitudes (hereafter: EAE), with 5 items, e.g., “I try to express only my pro-environmental views in order to avoid negative reactions from others”, $\alpha = .71$.

Green Credentials manipulation: To assess moral licensing and moral cleansing effects, participants were randomly assigned to one of three conditions: a *stronger green credentials* group, a *weaker green credentials* group or a *control* group (Table 1).

In the *stronger green credentials* condition, participants were presented with the five most frequent pro-environmental actions identified in the pilot study and asked if they had ever carried out these actions (two response options: “Yes, I have done this” and “No, I have not done this”).

In the *weaker green credentials* condition, participants answered the same question in relation to the five most infrequent pro-environmental actions.

In the *Control* condition, participants were asked if they have ever carried out five unrelated actions (e.g., visiting the Tower of London).

In each condition, in order to make salient the high or low number of ‘yes’ boxes that they had ticked, participants were asked to indicate to how many of the 5 behaviours they had responded, ‘yes, I have done this’.

Dependent measures: First, participants were provided with a definition of carbon footprints and the effect of carbon footprints and greenhouse gases on the environment. They were then asked to keep in mind the idea of reducing their carbon footprints within the next few months as they progressed through the questionnaire.

Information-seeking behaviour. Participants’ subsequent information-seeking behaviour was measured in two ways:

Carbon footprint information request. Participants were asked if they would like to calculate their carbon footprint: they were informed that knowing their carbon footprint would help them to understand their impact on the environment and to help them find easy ways to reduce that impact. They were given the option to request a link to information that would assist them with this (“If you would like to calculate your carbon footprint, we will direct you to a useful web-page”). There were two response options: “Yes, I would like to be directed to the web-page” and “No, I do not want to be directed to the web-page”.

Accessing the carbon footprint web-page. We recorded whether or not participants actually clicked on the web-page link provided. In order to do this, a web-page address was provided at the end of the questionnaire and participants were informed that if they had asked for information about the web-page to calculate their carbon footprint, then they should click on this link. Once they clicked on it, they were automatically connected to a page that asked them to re-enter their email address. Participants then clicked a ‘next’ button to be re-directed to the carbon calculator page.

Additional measures of attitudes towards reducing carbon footprints, subjective norms, moral norms, perceived control and intentions were included.

2.2.3. Design and Procedure

Participants first completed the demographic items, the Environmental Attitude scale (EAS), then were exposed to the experimental manipulation, and then completed the dependent measures.

3. Results

3.1. Preliminary analyses

There was no significant relationship between Gender and Condition, $\chi^2 (2, N = 213) = 1.57, p = .45$, or between Age and Condition, $F (2, 212) = 0.455, p = .63$. We were therefore confident of an unbiased allocation to the three different experimental conditions.

Approximately 81% of participants in the *stronger green credentials* group answered ‘yes’ to all five pro-environmental behaviours ($M = 4.71$), while 60% of participants in the *weaker green credentials* group answered ‘no’ to all five pro-environmental behaviours ($M = 0.65$). The difference between conditions was significant, $t (138) = .071, p = 0.007$.

One-way analyses of variance (ANOVA) were conducted with environmental attitude (internal: IEA, and External: EAE) as the dependent variables and condition (*stronger green credential*, *weaker green credentials*, and *control group*) as the independent variable. There was no significant effect of condition on EAI, $F (2, 212) = .48, p = .61$: *stronger green credential* ($M = 5.43$), *weaker green credentials* ($M = 5.48$), *control group* ($M = 5.59$) or EAE, $F (2, 212) = .40, p = .67$: *stronger green credential* ($M = 3.53$), *weaker green credentials* ($M = 3.38$), *control group* ($M = 3.40$).

An independent-samples t-test shows that there was a significant difference in the EAI scores of participants who carried out no actions ($M = 5.10$, $SD = 1.18$) and those who carried out one or more actions ($M = 6.02$, $SD = 0.91$) in the *weaker green credentials* group; $t(69) = -3.49$, $p < .001$. However, there was no significant difference in the environmental EAI scores of participants who carried out fewer than 5 of the actions ($M = 5.19$, $SD = 0.51$) and those who carried out all 5 actions ($M = 5.48$, $SD = 0.89$) in the *stronger green credentials* group; $t(67) = -1.14$, $p = 0.25$.

3.2. Moral licensing and moral cleansing effects in relation to carbon footprint information request

To test hypothesis (1) and hypothesis (2), a logistic regression analysis was performed to examine the relation between Condition and participants' information-seeking behaviour (Table 2). Before performing the analyses, the condition variable was dummy coded (*stronger green credentials* group vs. control group and *weaker green credentials* group vs. control group). A test of the full model against a constant only model was statistically significant ($\chi^2 [2] = 7.369$, $p = .025$). Nagelkerke's R^2 of .045 indicated a moderate relationship between prediction and pro-environmental behaviour. The constant model classified by 50% and prediction success overall was 58%. The Wald criterion demonstrated that *weaker green credentials* was significantly associated with pro-environmental behaviour ($\beta = 0.466$, $\exp(b) = 1.59$, $Wald = 5.45$, $p = .019$). Participants in this group were more likely to request information than were participants in the control group: evidence of a cleansing effect. *Stronger green credentials* ($\beta = -0.466$, $Wald = 5.47$, $p = .020$) was also significantly associated with pro-environmental behaviour: the Exp (B) value indicates that participants in

the *stronger green credentials group* were .62 times less likely to request information than were participants in the *control* group, thus providing evidence of a licensing effect. These initial effects indicating evidence consistent with cleansing and licensing offer support for hypotheses 1 and 2. The relationship between Condition and information request behaviour is illustrated in Figure 1.

The logistic regression analysis was then extended to assess possible moderation effects of internally-motivated environmental attitude (EAI). EAI was mean centred before performing the analyses. The results are summarized in Table 4. The proportion of participants' information request behaviour was classified into 51% and 64% at null model and full model respectively, demonstrating the value-added contribution of condition and EAI in the prediction of information request behaviour. The model as a whole explained between 13% (Cox and Snell R square) and 18% (Nagelkerke R^2) of the variance in participants' information request behaviour. A test of the full model against a constant only model was statistically significant, indicating that the predictors reliably distinguished participants' information-request behaviour: $\chi^2(5, N = 213) = 30.86, p < .001$. The stronger green credentials vs. control condition (the first dummy variable) was no longer a significant predictor. The main effect of the second dummy variable (weaker green credentials vs. control) was reduced to marginal significance (Wald = 3.302, $\exp(b) = 1.98, p = .069$). The Wald criterion demonstrated that EAI (Wald = 12.145, $\exp(b) = 0.303, SE = 0.343, p < .001$) made a significant contribution to the prediction, such that for every one unit increase in participants' EAI, the likelihood of participants' information-request behaviour increased by 0.30 times, after controlling for other factors in the model. Importantly, both the interaction of the first dummy variable (stronger green credentials vs. control) and EAI, Wald = 3.12, $\exp(b) = 2.27, p = .078$, and the second dummy variable (*weaker green credentials* vs. *control*) and EAI, Wald = 3.37, $\exp(b) = 2.11, p = .067$, were non-significant (see Figure 3).

We then ran the same analysis as above but using externally-motivated environmental attitude (EAE) in place of IEA. A test of the full model against a constant only model was statistically significant: $\chi^2 (5, N = 213) = 14.28, p = .014$. The main effects of the first dummy variable, Wald = 1.033, exp (b) = 1.42, $p = .309$, and the second dummy variable (Wald = 1.873, exp (b) = .62, $p = .171$) were again not significant. EAE (Wald = .566, exp (b) = 0.836, $p = .45$) was also not a significant predictor. However, the interactions between the first dummy variable (*stronger green credentials group vs. control*) and EAE was significant, Wald = 4.18, exp (b) = 1.95, $p = .041$. The interaction between EAE and the second dummy variable was not significant, Wald = .030, exp (b) = .945, $p = .86$.

Following the significant interaction effect between the first dummy variable and EAE, a simple slopes test was conducted to test the first dummy variable effect separately for low and high (1 SD below/above the mean) levels of EAE. Low EAE participants, in the *stronger green credentials group* ($b = -.280, t (213) = -.56, p = .57$) and *weaker green credentials group* ($b = .041, t (213) = .86, p = .38$) did not access the web-page significantly more than did low EAE participants in the control group. On the other hand, high EAE participants in the *stronger green credentials group* showed a significant tendency to access the web-page less than participants in the control group, $b = 1.197, t (213) = 2.36, p = .018$, this being indicative of a licensing effect. However, high EAE participants did not access the web-page in the *weaker green credentials* condition significantly more than in the control group, $b = -.538, t (213) = -1.05, p = .293$.¹

¹ A third dummy variable (stronger green credentials vs. weaker green credentials) was also created, and a separate logistic regression analysis was conducted to predict participants' information-seeking behaviour. The Wald criterion demonstrated that third dummy variable (Wald = 7.17, exp (b) = 0.39, $SE = 0.347, p = .007$) was a significant contribution to pro-environmental behaviour. This showed that participants in the stronger green credentials group requested information less frequently than did those in the weaker green credentials group.

The logistic regression analysis was then extended to assess possible moderation effects of EAI. Neither the main effect of the third dummy variable (Wald = .067, exp (b) = .578, $p = .795$), nor EAI (Wald = 1.455, exp (b) = 0.687, $SE = 0.313, p = .229$) nor the interaction between them (Wald = .037, exp (b) = .929, $p = .848$), were significant.

3.3. Moral licensing and moral cleansing effects in relation to accessing the carbon footprint web-page

To further test hypothesis (1) and hypothesis (2), another separate logistic regression analysis was performed to examine the relation between Condition and participants' accessing of the carbon footprint web-page provided. A test of the full model against a constant only model was statistically significant ($\chi^2 [2] = 7.620, p = .022$). Nagelkerke's R^2 of .047 indicated a moderate relationship between prediction and pro-environmental behaviour. The constant model classified by 54% and prediction success overall was 60%. The Wald criterion demonstrated that *weaker green credentials* ($\beta = 0.500, \text{Wald} = 6.43, p = .011$) was a significant predictor. Exp (B) value indicates that participant in the *weaker green credentials* group were more likely to click on the provided web address than participants in *control group*: evidence of cleansing effect. Moreover, participants in the *stronger green credentials* group were less likely to click on the provided web address in than were participants in the *control* group, an indication of a licensing effect ($\beta = -0.441, \text{exp}(b) = 0.64, \text{Wald} = 4.73, p = .030$) (see Table 3). These initial effects indicate evidence consistent with cleansing and licensing offer support for hypotheses 1 and 2 (see Figure 2).

The logistic regression analysis was then extended to assess possible moderation effects of internally-motivated environmental attitude (EAI). EAI was mean centred before performing the analyses. The results are summarized in Table 5. A test of the full model against a constant only model was statistically significant ($\chi^2 = 34.585, p < .001$ with $df = 5$).

Another logistic regression analysis was conducted to assess possible moderation effects of EAE. The main effect of the third dummy variable was not significant ($\text{Wald} = 1.942, \text{exp}(b) = 4.77, p = .162$). However EAE was a significant predictor $\text{Wald} = 4.775, \text{exp}(b) = 1.634, p = .029$. Moreover, the interaction between the third dummy variable and EAE was significant ($\text{Wald} = 5.306, \text{exp}(b) = .484, p = .020$). A simple slope test was conducted, for 1 SD below and above the mean levels of pro-environmental attitude. Participants with lower level of EAE in the *stronger green credentials* group did not access the web-page significantly more than in the *weaker green credentials* group ($b = -.133, t(213) = .275, p = .782$). However, participants with higher level of EAE in the *stronger green credentials* group accessed the web-page significantly less than did higher EAE participants in the *weaker green credentials* group ($b = -1.735, t(213) = -3.38, p = .007$).

The constant model classified by 54% and prediction success overall was 66%. The main effect of the first dummy variable (*stronger green credentials vs. control*) was not significant (Wald = 0.003, $\exp(b) = 1.023$, $p = .95$), but the main effect of the second dummy variable (*weaker green credentials vs. control*) was significant (Wald = 5.44, $\exp(b) = 0.39$, $p = .020$): the $\exp(b)$ value indicated that being in the *weaker green credentials group* increased the likelihood of participants' accessing web-page behaviour by 0.39 times compared to the control group, after controlling for the other predictors in the model. The Wald criterion demonstrated that EAI, Wald = 12.72, $\exp(b) = 0.23$, $SE = 0.40$, $p < .001$, made a significant contribution to the prediction, such that for every one unit increase in a participants' EAI, the likelihood of participants' actual behaviour increased by 0.23 times.

Most importantly, these main effects were qualified by significant interactions between the first dummy variable (*stronger green credentials group vs. control*) and EAI, Wald = 3.96, $t(213) = 2.79$, $p = .046$, and between the second dummy variable (*weaker green credentials group vs. control*) and EAI, Wald = 4.46, $t(213) = 2.62$, $p = .035$. Therefore, following Aiken and West (1991), the significant interactions were examined by testing both the first and second dummy variable effect separately for low (1 SD below the mean) and high (1 SD above the mean) levels of EAI. High EAI participants in the *weaker green credentials group*, did not access the web-page significantly more than did high EAI participants in the control group ($b = .046$, $t(213) = .09$, $p = .92$) but high EAI participants accessed the web-page in the *stronger green credentials group* (marginally significantly) less than in the control group, $b = 1.06$, $t(213) = 0.1.91$, $p = .054$, indicative of a licensing effect. On the other hand low EAI participants in the *stronger green credentials group* showed a non-significant tendency to access the web-page more than did low EAI participants in the control group, $b = -1.01$, $t(213) = -1.35$, $p = .175$, but low EAI participants in the *weaker green credentials* condition did access the web-page significantly more than in the control

group, $b = -1.91$, $t(213) = -2.72$, $p = .006$, this being indicative of a cleansing effect, (see Figure 4).

We then ran the same analysis as above but using externally-motivated environmental attitude (EAE) in place of IEA. A test of the full model against a constant only model was statistically significant ($\chi^2 = 16.59$, $p < .001$ with $df = 5$). The main effects of both the first dummy variable (Wald = .656, $\exp(b) = 1.33$, $p = .418$) and the second dummy variable (Wald = 2.589, $\exp(b) = .579$, $p = .108$) were not significant. EAE (Wald = .022, $\exp(b) = .965$, $p = .88$) was also not a significant predictor. However, the interaction between the first dummy variable (stronger green credentials group vs. control) and EAE was marginally significant (Wald = 3.79, $\exp(b) = 1.92$, $p = .051$) suggesting that participants with stronger EAE were less likely to access the carbon footprint web-page than were participants in the control condition. Following the significant interaction between the first dummy variable and EAE, a simple slopes test was conducted to test the first dummy variable's effect separately for low and high (1 SD below/above the mean) levels of EAE. Low EAE participants, in the *stronger green credentials group* ($b = -.333$, $t(213) = -.66$, $p = .505$) and *weaker green credentials group* ($b = -.347$, $t(213) = -.72$, $p = .466$) did not access the web-page significantly more than did low EAE participants in the control group. On the other hand, high EAE participants in the *stronger green credentials group* showed a significant tendency to access the web-page less than did participants in the control group, $b = 1.113$, $t(213) = 2.09$, $p = .035$, this being indicative of a licensing effect. However, high EAE participants did not access the web-page in the *weaker green credentials* condition significantly more than in the control group, $b = -.809$, $t(213) = -1.59$, $p = .109$.

The interaction between the second dummy variable (*weaker green credentials group* vs. control) and EAE was not significant (Wald = .419, $\exp(b) = 811$, $p = .517$).²

In addition, separate regression analyses were performed to examine the relation between Condition and participants' Attitude towards reducing carbon footprint, intentions and moral norms by assessing possible moderation effects of EAI and EAE. No interactions were found. The only main effect was an effect of the first dummy variable on Attitude towards reducing carbon footprint ($\chi^2(5, N = 213) = 2.101$, $p = .036$).

4. Discussion

This study investigated licensing and cleansing effects in the pro-environmental behaviour domain. The primary aim of this research was to examine the impact of highlighting past pro-environmental behaviour on subsequent behaviour. The results of the study lent support to hypothesis 1 that highlighting pro-environmental credentials would lead to a licensing effect, such that participants were less likely to seek information about calculating their carbon footprint after recalling their past frequent pro-environmental

² A third dummy variable (stronger green credentials vs. weaker green credentials) was also created, and a separate logistic regression analysis was conducted to predict participants' accessing the carbon footprint web-page. The Wald criterion demonstrated that the main effect of the third dummy variable was not significant (Wald = 7.28, $\exp(b) = 0.390$, $SE = 0.349$, $p = .007$).

The logistic regression analysis was then extended to assess possible moderation effects of EAI. The main effect of the third dummy variable was not significant (Wald = .621, $t(213) = .160$, $p = .431$). The Wald criterion demonstrated that EAI was a significant contribution to the prediction, Wald = 16.829, $t(213) = 0.495$, $SE = 0.172$, $p < .001$. The interaction between EAI and the third dummy variable was not significant (Wald = .137, $t(213) = .926$, $p = .712$).

Another logistic regression analysis was then conducted to assess possible moderation effects of EAE. The main effect of the third dummy variable was not quite significant (Wald = 3.103, $\exp(b) = 7.447$, $p = .078$). EAE (Wald = 6.801, $\exp(b) = 1.860$, $p = .009$) was a significant predictor. However, the interaction between the third dummy variable and EAE was significant (Wald = 7.166, $\exp(b) = .421$, $p = .007$). A Simple slopes test was conducted, for 1 SD below and above the mean levels of EAE. Participants with lower EAE in the *stronger green credentials group* did not access the web-page significantly differently than in the *weaker green credentials group* ($b = -0.144$, $t(213) = -.029$, $p = .986$). However, participants with higher level of EAE in the *stronger green credentials group* accessed the web-page significantly less than did high EAE participants in the *weaker green credentials group* ($b = -1.923$, $t(213) = -3.62$, $p = .003$).

behaviours than would participants in the control group. For the sample as whole, participants who recalled their past environmentally-friendly behaviour were less likely to access the provided web-page to calculate their carbon footprint. These findings are compatible with previous work on licensing effects in the donation domain (Jordan, Mullen, & Murnighan, 2011; Sachdeva et al., 2009) and in the pro-environmental behaviour domain (Tiefenbeck et al., 2013). Moreover, the findings of the present study supported hypothesis (2) that highlighting a person's low number of pro-environmental actions would lead to a cleansing effect, such that – for the sample as a whole - participants were more likely (than were participants in the control group) to seek information about calculating their carbon footprint and to access the provided web-page. These results are consistent with the earlier findings of Sachdeva et al. (2009).

We proposed that environmental attitude would act as a moderator of the effect of highlighting participants' past pro-environmental behaviour on their subsequent pro-environmental behaviour. We hypothesized (3) that licensing effects would be less likely for participants with strong pro-environmental attitudes: the results did not support this hypothesis. The findings revealed that it was actually participants with higher internally-motivated environmental attitudes in the *stronger green credentials* condition who were more likely to access the carbon footprint web-page than were participants in the control condition; this pattern, albeit non-significant, was also apparent for the carbon footprint information request.

Again, contrary to our hypothesis, it was found that participants with lower pro-environmental attitudes rather than those with higher pro-environmental attitudes were more likely to access the provided web-page to calculate their carbon footprint than were participants in the control condition; again, this pattern, albeit non-significant, was also

apparent for the carbon footprint information request. These findings are an indication of a cleansing effect.

One of the standard features of moral licensing and cleansing research is the manipulation of highlighting past behaviour using a recall paradigm: in most studies participants have been asked to write about their own or others' positive or negative behaviour or to use experimenter-provided positive or negative words when describing their past behaviour. Generally, it has typically not been reported whether or not participants follow the recall instructions and write about their actions in a way that they have been asked. To overcome this limitation, we conducted a pilot study in order to help construct three groupings of pro-environmental behaviour. In the main study, to make salient the high or low number of 'yes' boxes that had been ticked by participants, participants were asked to indicate to "how many of the 5 behaviours they had responded yes". We believe that this question helped us to make participants' past behaviour salient and to ensure that the manipulation of highlighting past behaviour was effective.

This study also provided both a new manipulation and advanced the literature on licensing and cleansing effects by adding a much-needed neutral control condition (cf. Mullen & Monin, 2016). Although a growing body of literature has found broad evidence for moral licensing, very few studies have measured the moral licensing effect comparing a 'moral' condition to a control group; most of these studies have compared a moral condition to an immoral condition (for one exception, see Conway & Peets, 2012).

As mentioned earlier, utilising positive spillover is a pragmatic way to help promote sustainable lifestyle changes. The findings of this study demonstrated the importance of considering the effects of spillover in campaigns attempting to promote environmentally-beneficial action. Van der Werff, Steg, & Keizer (2014) proposed that campaigns should focus on a range of rather different pro-environmental actions or on single actions that have

strong signalling features; they suggested that the stronger the signalling functions of these behaviours, the more likely it is that they will strengthen people's environmental self-identity which might lead to more pro-environmental actions. This is also congruent with Meijers et al.'s (2014) conclusion that people who see themselves as morally or environmentally-conscious are more likely than those who do not see themselves in this way to engage in sustainable behaviour after recalling their past pro-environment behaviour.

Limitations: The composition of our sample is a limitation insofar that university students are obviously not representative of the general population. Lanzini (2014) suggested students usually have very tight budgets and very specific behavioural patterns influenced by their situational conditions (i.e., living on campuses), which might influence their pro-environmental behaviour. Therefore, future research is needed to assess licensing and cleansing effects with samples representative of other populations in different domains of pro-environmental behaviour, such as energy consumption, energy reduction, transportation, and consumer purchase decisions. Another limitation of this study concerns the size of the sample. Studies investigating licensing and cleansing effects usually have been carried out in a laboratory setting with small samples (as noted by Mullen & Monin, 2016); applying large-scale replication assessments of licensing and cleansing effects would increase our confidence in the prevalence of licensing effects. Furthermore, another issue of note for this study - and of many studies in this domain - concerns the selected dependent variable, where accessing the website was considered a positive action and not accessing the website was considered less positive vis-à-vis 'the environment'. Although this dependent variable could be interpreted differently, we cannot think of compelling reasons for evaluating the action, *per se*, as less positive than the inaction. However, we have to concede that people may have multiple motives for being interested in carbon footprint information (e.g., anything from to confirm rather than to evaluate their 'green' credentials, to serve their curiosity about how the

process works, through to complying with what they perceive to be experimenter expectations). It may be that such other motives may be partly responsible for the unexpected moderation effects that we found. All this would support the above suggestion to expand the range of pro-environmental actions that are investigated in research that examines moderation effects affecting spillover before firm conclusions might be drawn.

Future directions and conclusion: One obvious avenue for future research is to consider other individual difference variables as moderators of licensing and cleansing effects. In the current study, the moderating impact of environmental attitude was examined; there might be other moderator variables that may play a similar role. For example, the level of conceptual abstraction of past behaviour (the extent to which past behaviours are conceptualised on an abstract or concrete level) may impact on pro-environmental behaviour in a similar way.

The findings of the current research add to the body of literature that seeks to identify the conditions under which licensing effects or, more generally, positive spillover effects might be expected. A better understanding of how past pro-environmental action relates to future pro-environmental action can be expected to be useful in communication and other intervention campaigns that make use of the strategy of making salient people's past behaviour. Of course, there may be limited usefulness to any experimental studies that only access subsequent behaviour within a narrow time period, given that it is longer-term behavioural patterns that are likely to be of more real-world interest. Nevertheless, and although longer-term behaviour effects of past moral action merit much more research attention, insights into the range of short-term behavioural consequences following pro-environmental behaviour are important for contributing to a clearer broader picture of both anticipated and unanticipated consequences of pro-environmental action.

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1. Have you ever switched off a light in a room that was not in use? ^a
 2. Have you ever joined a national or international environmental organization? ^b
 3. Have you ever turned off your computer when not in use? ^a
 4. Have you ever offset your flight emissions?
 5. Have you ever made a public commitment not to take any flights for a year (or more)? ^b
 6. Have you ever put waste paper in the recycling rather than throwing it away? ^a
 7. Have you ever saved water by turning off the tap while cleaning your teeth?
 8. Have you ever volunteered your time to an environmental charity, for over 20 hours a week? ^b
 9. Have you ever chosen products that have environmentally-friendly packaging?
 10. Have you ever put waste glass products in the recycling rather than throwing it away? ^a
 11. Have you ever taken public transport when you could have made the journey by car?
 12. Have you ever made a public commitment to reduce your carbon footprint?
 13. Have you ever donated over £50 (fifty pounds) to an environmental charity (e.g. World-Wide Fund for Nature)? ^b
 14. Have you ever bought organic food every time that this option has been available? ^a
 15. Have you ever planted a tree in your community (or paid someone to do this)?
 16. Have you ever switched off an electrical appliance at the plug rather than leaving it on standby?
 17. Have you ever used recycled printer paper?
 18. Have you ever written to your MP to urge him/her to back pro-environmental legislation? ^b
 19. Have you ever bought an 'organic' product of some sort?
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^a Used in the *stronger green credentials* condition

^b Used in the *weaker green credentials* condition

Page: 13, Table 2: *Logistic Regression Analysis of Carbon footprint information request*

	B	S.E.	Wald	<i>p</i>	Exp(B)
Stronger green credentials vs. control (DC1 ^a)	-0.466	0.199	5.47	0.020	0.63
Weaker green credentials vs. control (DC2 ^b)	0.466	0.199	5.45	0.019	1.59

^a DC1 refers to the first dummy variable

^b DC2 refers to the second dummy variable

Page: 16, Table 3: *Logistic Regression Analysis of accessing the carbon footprint webpage*

	B	S.E.	Wald	<i>p</i>	Exp(B)
Stronger green credentials vs. control (DC1)	-0.441	0.202	4.73	0.030	0.64
Weaker green credentials vs. control (DC2)	0.500	0.197	6.43	0.011	1.64

^a DC1 refers to the first dummy variable

^b DC2 refers to the second dummy variable

Page: 14, Table 4: *Moderated Logistic Regression Analysis of Carbon footprint information request*

	B	S.E.	Wald	<i>p</i>	Exp(B)
Internal EAS	-1.194	0.343	12.145	0.000	0.303
Stronger green credentials vs. control (DC1)	-.266	0.374	0.508	0.476	0.766
Weaker green credentials vs. control (DC2)	0.684	0.377	3.302	0.069	1.983
Internal EAS x DC1	0.818	0.464	3.113	0.078	2.267
Internal EAS x DC2	0.745	0.406	3.362	0.067	2.107

^a DC1 refers to the first dummy variable

^b DC2 refers to the second dummy variable

Page: 16, Table 5: *Moderated Logistic Regression Analysis of accessing the carbon footprint web-page*

	B	S.E.	Wald	<i>p</i>	Exp(B)
Internal EAS	-1.43	0.401	12.726	0.000	0.239
Stronger green credentials vs. control (DC1)	0.023	0.404	0.003	0.954	1.023
Weaker green credentials vs. control (DC2)	-0.932	0.400	5.442	0.020	0.394
Internal EAS x DC1	1.027	0.516	3.964	0.046	2.793
Internal EAS x DC2	0.965	0.457	4.468	0.035	2.625

^a DC1 refers to the first dummy variable

^b DC2 refers to the second dummy variable

Page: 14, Figure 1. *Carbon footprint information request* as a function of experimental condition

Page: 16, Figure 2. *Accessing the carbon footprint web-page* as a function of experimental condition

Page: 14, Figure 3. *Carbon footprint information request as a function of experimental condition and (a) internal EAS and (b) external EAS*

(a)

(b)

Page: 16, Figure 4. *Accessing the carbon footprint web-page as a function of experimental condition and (a) internal EAS and (b) external EAS*

(a)

(b)