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Comparing the effectiveness of monetary versus moral motives in environmental campaigning

J. W. Bolderdijk^{1*}, L. Steg¹, E. S. Geller², P. K. Lehman² and T. Postmes¹

Environmental campaigns often promote energy conservation by appealing to economic (for example, lower electricity bills) rather than biospheric concerns (for example, reduced carbon emissions), assuming that people are primarily motivated by economic self-interest. However, people also care about maintaining a favourable view of themselves (they want to maintain a 'positive self-concept'), and may prefer to see themselves as 'green' rather than 'greedy'. Consequently, people may find economic appeals less attractive than biospheric appeals. Across two studies, participants indicated feeling better about biospheric ('Want to protect the environment? Check your car's tire pressure') than economic ('Want to save money? Check your car's tire pressure') tyre-check appeals. In a field experiment, we found that an economic tyre-check appeal ('Do you care about your finances? Get a free tire check') elicited significantly less compliance than parallel biospheric and neutral appeals. Together, these studies discredit the conventional wisdom that appealing to economic self-interest is the best way to secure behaviour change. At least in some cases, our studies suggest, this strategy is not effective.

Persuasive appeals are widely used to promote energy conservation behaviours¹, and thereby mitigate climate change^{2–4}. An assumption underlying many of these appeals is that to be effective, appeals should target individual economic concerns (for example, 'Save money, save energy')⁵. The predominant reliance on economic appeals matches the widespread misconception that people are primarily motivated by (economic) self-interest^{6–8}, and are not motivated to change unless some personal benefit is implicated⁹. However, in doing so, an important—perhaps even more basic¹⁰—source of human motivation is overlooked: people are motivated to maintain a positive self-concept^{11,12}, which can be achieved by acting in line with one's internal moral standards^{13,14}. In this paper, we argue that our understanding of effective environmental campaigning can improve by taking targets' self-concept into account: owing to the motivation to maintain a moral self-image, people may prefer biospheric to economic appeals, rendering the latter less effective than commonly assumed.

Pro-environmental appeals and the self-concept

Although often not an explicit motive, most people desire a stable, competent and morally good self-concept, and strive for consistency between their behaviour and this self-concept^{15,16}. Engaging in morally good behaviours (for example, volunteering) can foster the positive self-concept^{17,18}, and thereby elicit positive affect^{19,20}. Immoral conduct (for example, lying), may however threaten the positive self-concept, thereby eliciting negative affect^{21–23}. Thus, the desire to maintain a positive self-concept can motivate people to act in a morally sound fashion.

Although individuals differ in the extent to which they value environmental quality²⁴, many share the belief that nature is 'sacred'²⁵, and consider it part of their moral responsibility to take care of the environment^{26,27}. As a result, acting 'green' may exert a positive influence on the self-concept²⁸, allowing people to 'feel good'²⁹. Conversely, the pursuit of personal monetary gain generally does not yield such moral benefits¹². In fact, as

exemplified by the labels 'miser', 'cheapskate' and 'scrooge', the relentless pursuit of small monetary gains can in some specific cases be considered morally questionable^{30,31}, and result in negative feelings, such as shame³².

Building on this reasoning, we argue that the way pro-environmental behaviour is advertised in environmental campaigns may influence how people feel about compliance. By stressing the selfless, societal aspects of pro-environmental behaviour, biospheric appeals enable people to perceive compliance as morally good conduct, which may evoke positive affect. Economic appeals, on the other hand, may inadvertently highlight the egoistic aspects of pro-environmental behaviour, thereby compromising people's ability to think of compliance as selfless and morally good.

If our reasoning is correct, we should find that, first, people experience relatively more positive affect when anticipating complying with biospheric instead of economic appeals. Second, the relative attractiveness of the biospheric over economic appeals should become particularly pronounced when people are stimulated to link compliance to their self-concepts. Thus, the affective preference for biospheric rather than economic appeals should be even more likely to emerge when the individual's self-concept is activated. Third, given that decisions are sometimes based on (anticipated) affective responses^{33,34}, we expect that biospheric appeals, at least in some cases, could even result in more compliance than parallel economic appeals.

Main results

Study 1 examined how people anticipate feeling about complying with biospheric and economic appeals. As part of an online questionnaire, we asked drivers ($N = 98$) to imagine entering a petrol station, and noticing a tyre-check appeal at the petrol station's air pump. Participants were randomly assigned to either read an appeal containing economic arguments ('Want to save money? Check your car's tire pressure!') or biospheric arguments ('Want to protect the environment? Check your car's tire pressure!'). Participants indicated how they thought complying

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with that specific appeal would make them feel (scores ranged from Bad = 1 – Good = 7 and Pleasant = 1 – Unpleasant = 7; $r = -0.81$). A measure for positive affect was created by reverse scoring the second item and then averaging the two. Participants also rated the extent to which they perceived the appeal as credible (Unbelievable = 1 – Believable = 7). As predicted, we found that participants anticipated more positive affect from complying with the biospheric ($M = 5.66$, $s.d. = 1.56$) than with the economic appeal ($M = 5.15$, $s.d. = 1.33$), $F(1, 95) = 3.60$, $p = 0.06$, $d = 0.35$. Credibility ratings of the economic ($M = 5.92$, $s.d. = 1.46$) and biospheric ($M = 5.72$, $s.d. = 1.21$) appeal did not differ significantly $F(1, 95) = 0.73$, NS.

The results from Study 1 suggest that people may feel better about complying with biospheric instead of economic appeals. We believe the relative attractiveness of biospheric rather than economic appeals is related to people's basic motivation to preserve a positive self-concept: people rather see themselves as 'green' than 'greedy'. If this assumption is correct³⁵, we should find that activating the self-concept will make the biospheric appeal even more attractive, while further decreasing the attractiveness of the economic appeal.

Study 2 tested whether activating participants' self-concept would further increase the affective preference for biospheric over economic appeals. We also wondered whether the affective preference for biospheric instead of economic appeals is limited to specific groups (for example, people who strongly value environmental quality), or indicative of a more general pattern. We therefore also measured individual differences in the endorsement of biospheric values.

Participants were 51 psychology students (age $M = 22.1$, $s.d. = 1.42$, 63.7% female). We did (versus did not) activate people's self-concept using a priming procedure^{36,37}: we asked participants to read a short story, and circle either self-related pronouns ('I', 'me', 'my' in the self-activation condition), or neutral pronouns ('the', 'it' and 'a' in the control condition). Next, participants were asked to imagine entering a petrol station and noticing Sign A ('Care about your finances? Check your car's tire pressure!') and Sign B ('Care about the environment? Check your car's tire pressure!') at the two available air pumps.

Participants were instructed to carefully read and compare the two appeals, and imagine they had decided to get a tyre check. We then asked them, using a seven-point scale, to indicate which of the two signs would make them feel better (Sign A = 1, Sign B = 7). Note that a higher score on this scale denotes participants anticipating the biospheric appeal (Sign B) to elicit more positive affect relative to the economic appeal (Sign A). The questionnaire ended with a scale that, besides egoistic, hedonic and altruistic values, assessed participants' endorsement of biospheric values with four items³⁸.

The average score on anticipated affect was 5.07 ($s.d. = 1.45$), which is significantly higher than the scale midpoint of 4, $t(50) = 5.30$ $p < 0.001$, $d = 1.49$. This indicates that, as in Study 1, participants anticipated feeling better about complying with the biospheric than with the economic appeal. We regressed prime (−1 for control words, 1 for self-relevant words), (centred) relative biospheric value strength and their interaction term onto anticipated affect. The regression model was significant $R^2_{\text{adjusted}} = 0.12$, $F(3, 46) = 3.26$, $p = 0.03$. As predicted, we found a main effect of self-activation: participants' affective preference for the biospheric over the economic appeal became even more pronounced when they were primed with self-relevant ($M = 5.64$, $s.d. = 1.07$) instead of neutral words ($M = 4.54$, $s.d. = 1.58$), $\beta = 0.38$, $t(46) = 2.80$, $p = 0.007$, suggesting that people's responses to persuasive appeals are indeed influenced by the salience of the self-concept. Interestingly, this effect did not appear to be moderated by biospheric value strength ($\beta = -0.15$, $t(46) = -1.07$, NS), suggesting a general

pattern. In fact, value strength did not alter affective preference ($\beta = 0.11$, $t(46) = 0.79$, NS): participants with strong and weak biospheric values alike indicated that they would feel better when complying with the biospheric instead of economic appeal.

Studies 1 and 2 demonstrated that people may anticipate feeling better about complying with biospheric rather than economic appeals, especially when such appeals have direct implications for their self-concept. Importantly, this notion may also have implications for the effectiveness of pro-environmental appeals: how people feel about acting could also influence whether they act^{33,34}.

Study 3 therefore tested whether an economic tyre-check appeal can even prove less effective than a parallel biospheric appeal. We aimed to test our reasoning in a natural setting, in which participants were not aware that their behaviour would be monitored. A US petrol station allowed us to post sandwich boards with one of four signs (containing biospheric, economic, safety and control appeals) next to different petrol pumps. In addition to condition-specific information (see below), all signs explained that local oil-change stations would perform free tyre checks on presentation of tyre-check coupons. Coupons were attached to the sandwich boards, accompanied by the instruction that each customer should take only one flyer. We examined whether the type of sign posted on the sandwich board would influence the likelihood of customers taking a tyre-check coupon. The biospheric sign started with 'Care about the environment? Get a free tire check'. The economic sign started with 'Do you care about your finances? Get a free tire check'. We also used a safety 'Do you care about your safety? Get a free tire check' and control 'Get a free tire check' sign. In addition to this tagline, the biospheric, economic and safety signs portrayed condition-specific arguments for getting a tyre check, as well as pictures that symbolized specific consequences of improper tyre pressure (an exhaust emitting fumes, a stack of burning dollar bills and a car with a torn tyre, respectively). The control appeal contained neutral reasoning, and included a picture of a tyre gauge. The sandwich board signs are available as Supplementary Information.

We tallied the number of flyers taken for each of the four signs during the 22 observation days. In total, across the four conditions, 23 coupons were taken, 11 while the biospheric sign was posted, 7 while the control sign was posted, 5 while the safety sign was posted and 0 while the economic sign was posted (Fig. 1). Pilot studies that evaluated the number of customers and the salience of the signs revealed that an average of 75.8 customers pulled up to the petrol station during an observation period, and 30.3% of these customers looked at the sign for at least three seconds. On the basis of these data, we estimated that 8.7% of the customers noticing the sign took a coupon in the biospheric condition, 5.5% in the control condition, 4.0% in the safety condition and 0% in the economic condition. A chi-squared test showed that, despite the low numbers of customers taking a coupon, the likelihood of one or more coupons being taken during an observation period depended on the type of sign displayed, $\chi^2(3) = 10.40$, $p = 0.02$, Cramer's $V = 0.34$. Specifically, using a z -test to compare column proportions, we found that the economic appeal yielded significantly less compliance than the biospheric and control appeals. Differences across other conditions did not reach the level of statistical significance at $p = 0.05$.

These results suggest that the biospheric appeal persuaded more people than the economic appeal. In fact, the economic appeal seemed to have backfired: whereas customers took coupons when the control, environmental and safety signs were on display, not a single coupon was taken while the economic sign was displayed.

Conclusions

It is critical to have an accurate understanding of factors that promote or stifle persuasion in the environmental domain, as

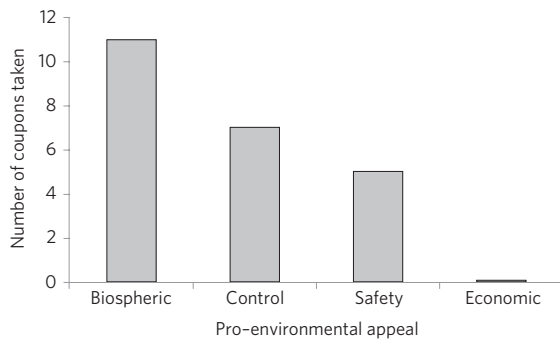


Figure 1 | Number of coupons taken for each of the four appeals.

ill-constructed messages can do more harm than good^{5,39–41}. In this paper, we argued that biospheric appeals—more than economic appeals—enable people to perceive compliance as morally good conduct, and thus feel good about their decision to act. Indeed, participants anticipated more positive affect when complying with biospheric than economic appeals (Study 1). The affective preference for the biospheric appeal became more pronounced when we primed participants with self-related words (Study 2), alluding to the causal role of the self. Finally, we found that economic appeals elicited less compliance than environmental and control appeals (Study 3), demonstrating the practical relevance of our reasoning. Together, these studies suggest that people's responses to persuasive appeals may be informed by how compliance is anticipated to impact their self-concept.

Our studies raise some questions for future research. Participants generally felt better about biospheric than economic appeals, but this effect may—besides biospheric values (we examined this in Study 2)—depend on other relevant individual differences, such as cultural background⁴² and ideology⁴³. Next, our field experiment signals that offering a self-interested rationale (that is, an economic appeal) could even result in less compliance than no rationale (that is, a control appeal), suggesting that there may be something in economic appeals that puts people off. As compliance was unobtrusively recorded in this study, we could not directly ask participants for their motivations. By employing a different research design, future (laboratory) studies may be able to pinpoint why—and when—economic appeals can backfire.

Previous research highlighted the negative side effects that may result from relying on self-interest as a tool to promote pro-environmental behaviour: focusing people on the selfish reasons for pro-environmental behaviour in one domain (namely, the monetary benefits from car-sharing) may make them less inclined to engage in pro-environmental behaviour in other domains (for example, recycling)⁵. Our research points to another, perhaps even plainer risk of exclusively appealing to self-interest (that is, economic appeals): at least in some cases, this strategy is not even effective in changing the target behaviour. This risk seems relevant for behaviours commonly advertised in campaigns (for example, taking shorter showers, turning down the thermostat), as they typically offer only limited financial gain, if any. Of course, our findings cannot be interpreted as a demonstration that biospheric appeals will always outperform economic ones. Economic appeals may, for instance, prove more persuasive in situations where a pro-environmental action involves substantial and obvious economic benefits, of which people were previously unaware (for example, installing home insulation). However, our studies do discredit the conventional wisdom that appealing to self-interest (that is, economic appeals) is always the best way to secure behaviour change. Social marketers aiming to change behaviour may thus benefit from also considering another, basic source of human motivation: the need to maintain a favourable view of oneself.

Methods

We tested our reasoning in both laboratory and field settings in which the same pro-environmental action was advertised: checking the tyre pressure of personal vehicles. The benefits of checking tyre pressure can be framed as being in one's financial interest (that is, fuel savings offer monetary benefits), or serving societal benefits (that is, fuel savings reduce harmful emissions). Moreover, choosing this particular topic allowed us to implement a behavioural measure of persuasion. Although we had clear predictions regarding the direction of effects, we chose to report two-sided significance levels throughout the paper. Consequently, our analyses reflect a conservative test of our hypotheses.

Study 1 was part of a larger questionnaire study among customers of a Dutch car insurance company (84% male, all owned a driving licence and were older than 30 years of age), which included additional items and scenarios. Specifically, the reported tyre-check between-subjects scenario that queried participants' affective responses to economic and biospheric tyre-check appeals was preceded by another between-subjects scenario in which participants indicated how much they valued the monetary ('1.5% reduction of fuel costs') or biospheric benefits ('1.5% reduction of CO₂ emissions') of maintaining proper tyre pressure. In line with the idea that the importance of self-interest may be overstated⁸, participants indicated that the reduction in fuel costs was slightly more worthwhile than an equivalent reduction in vehicle emissions. To eliminate any carry-over effects from this scenario to affective responses to the second scenario reported under Study 1, we analysed and report the effects of the responses to the second scenario with the different versions from the first scenario as a covariate (with analysis of covariance). In addition to measuring positive affect using the dimensions Bad–Good and Pleasant–Unpleasant (reported here), we also examined responses using the dimensions Sad–Happy and Ashamed–Proud, but found no significant between-subject differences on these dimensions.

Study 2 was part of a larger questionnaire conducted among first year Psychology students at a Dutch University, who received course credit for participation. For each participant, we controlled for his/her general use of the value scale by subtracting the overall score across all 16 value items from the item-specific scores on the 4 biospheric items. The participant's average across these four corrected biospheric items reflects how he/she values biospheric concerns relative to hedonic, egoistic and altruistic concerns, and thus formed a measure of relative biospheric value strength ($\alpha = 0.61$, $M = 0.15$, $s.d. = 0.83$). We also analysed the data with the absolute rather than relative scores on biospheric value strength; the pattern of results remains the same. This questionnaire included additional items and scenarios that are beyond the scope of this paper. Study 2's priming manipulation did not influence biospheric value strength.

Study 3 was conducted at a petrol station located near the shopping centre of the university town of Blacksburg, Virginia. Responses were recorded during 22 observation days. During this time, a research assistant posted one of four types of sandwich board sign at the petrol pumps at 11:00. These sandwich boards were then removed at 15:00. The four signs were rotated across petrol pumps according to a Latin square design. This procedure ensured that exposure to each of the signs was equally distributed across petrol pumps, assuring that any effects could be attributed to sign content, rather than sign location. At the end of each observation period, the number of coupons taken at each of the signs was tallied. During some observation periods, multiple customers took a coupon. To run a Chi-squared test, we split scores on the variable 'coupons taken per sign during an observation period' into two categories: no versus one or more coupons taken.

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Author contributions

J.W.B. and L.S. designed Study 1. J.W.B., L.S. and T.P. designed Study 2. J.W.B., E.S.G. and P.K.L. designed Study 3. J.W.B. analysed the data and wrote the manuscript; all authors commented. J.W.B. and L.S. supervised the project.

Additional information

Supplementary information is available in the online version of the paper. Reprints and permissions information is available online at www.nature.com/reprints. Correspondence and requests for materials should be addressed to J.W.B.

Competing financial interests

The authors declare no competing financial interests.