

Fake News? Examining the Connection between Value-based Environmental Messages, Environmental Concern, and Proenvironmental Intention

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Abstract

Purpose and design: This study examines the connections between value-based environmental messages (biospheric, altruistic and egoistic), environmental concern and pro-environmental intention. Thirty-three men and 50 women, in the ages between 18 and 70 participated in the survey study.

Findings: Results confirm the importance of biospheric values, with a significant positive association between biospheric value-based messages and pro-environmental intention. Biospheric environmental concern had a significant positive effect on value based environmental message ratings, while the effect of egoistic concern was negative. An emerging trend of value competition between environmentalism and altruism is noted.

Practical implications: The findings suggest that social marketing attempts to promote pro-environmental intentions should use broad biospheric message frames in order to appeal to individuals with these values. Messages targeting egoistic and altruistic individuals may require narrower, situation-specific framings.

Keywords: Environmental concern; Environmental messaging; Pro-environmental intention

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Introduction

Loss of biodiversity is recognised as one of the fastest growing environmental threats. According to environmental scientists [1,2]. Conventional farming methods and rapid agricultural expansion threatens to impact biodiversity on a previously unprecedented scale. A meta-analysis of 76 studies comparing conventional and organic farming methods [3], revealed that biodiversity tends to be significantly higher on organic farms than on conventional farms. The authors arrived at the conclusion that organic farming could play a significant role in increasing biodiversity, if the continued growth in the organic farming sector received sustained consumer support. At the same time, a counter-current of valuebased narrative have emerged, becoming one of the focal points during and after the latest presidential election in the USA, calling for balancing the regulation of environmental protection in a way that puts people's

interest first, especially their right to economical growth and development. Hence, customer support for organic produce may be at risk. Additionally, research shows that the currently applied sustainable consumer policy instruments (e.g. organic labels) have a limited impact, as they fail to awaken interest for organic food within large segments of the mainstream market. Presently, purchasing organic food is still very much the exception, not the norm, according to the European Commissions report (European Commission Agriculture and Rural Development, 2010). Studies conducted in the USA show how individuals adapt and endorse their party's values regarding environmental regulation [4]. Lately, the trend in social media emerging is to apply the label "fake news" to all sorts of reporting including scientific studies that run counter to the individual's values [5]. The question is, how can environmental messaging reach individuals holding these values? 2 The focus of the present study is to investigate possible pathways to a more efficient promotion of a certain type

of pro-environmental behaviour, e. g., purchasing organic food. One way to achieve this objective is by examining the possible differences in how people evaluate environmental messages based on their values, and their concern for the environment. Most individuals will readily admit some level of concern for the environment. However, not everyone's environmental concern is similar, e.g., it does not stem from the same set of personal values. Studying the difference between value-based target groups can provide the necessary information for the identification of starting points for soft policy measures, such as social marketing campaigns.

The Importance of Values in Environmental Research

Using a the same definition as the larger field of social psychology, environmental psychologists view values as desirable transsituational goals varying in importance, serving as a guiding principle in the life of the individual [6]. Values, being the defining features of a person's moral hierarchy, affect and govern a wide range of attitudes and behaviours [7]. Although values can change, a person's values tend to remain stable over time. Therefore, values can provide an efficient instrument for describing and explaining similarities and differences between individuals and groups. Contemporary research in environmental psychology emphasizes the importance of human values for explaining pro-environmental attitudes and behaviours [8,9]. Through their research, Stern et al. [10-12] have found that certain values are of specific interest in the explanation of pro-environmental behaviour. Based upon their findings, they formed the value-belief-norm theory, stating that beliefs about the adverse consequences of environmental problems for the objects people value determine (although not solely) their intentions to perform pro-environmental behaviours, in the attempt to avert the anticipated negative effects. Stern and colleagues identified three types of objects as the basis for individuals' concern about adverse consequences. They termed the corresponding values as biospheric (based in a concern for nature and for other species), altruistic (concern for other human beings), and egoistic values (concern for one's own personal interests). Individuals may have all three of the value orientations to a greater or lesser extent, and the expression of the values is also influenced by the specific situation. By stating what is important in people's lives, these value orientations function as principles that guide individuals in their selection, pursuit and evaluation of pro-environmental behaviours. The individuals' structure of values forms the basis of their concern for the environment.

The value basis of environmental concern

Following [13], value-based environmental concerns are defined in the context of the present study as the affective components of the belief that environmental damage will adversely affect valued objects. Biospheric and altruistic values are considered self-transcendent, as they promote interests and goals beyond those of the immediate self. Individuals motivated by biospheric and altruistic concern consider the impact of their actions on

others, and their behaviour is based on the perceived costs and benefits to the group. Self-transcendent values are assumed to have a broad focus, which means that they can be activated by a general awareness of harmful consequences resulting from environmental problems and a feeling of responsibility for these problems. Biospheric values are the broadest in scope, including non-human elements, such as animals and plant life, focusing on the wellbeing of the ecosystem as a whole.

Altruistic values are narrower in scope, as their main focus is protecting the environment for the sake of human beings, for both present and future generations. Altruistic concern assigns an instrumental value to the environment, viewing it as an element vital to the wellbeing of people. Thus, the value of nature is not inherent (as in biospheric value orientation), but determined by its contributions to humanity. Focusing on the human element and assigning an instrumental value to the environment are traits shared by both altruistic and egoistic concern. Therefore, some theories do not differentiate between altruistic and egoistic concern [14] or view them as overlapping or very closely related [15-17]. In contrast to the group-oriented, self-transcending values of biospherism and altruism, self-enhancement (e.g. egoistic) values focus narrowly on the immediate self. Those motivated by egoistic concern will consider how environmental issues affect them personally by weighing the costs and benefits of acting in a pro-environmental manner in relation to their personal wellbeing. When the costs of the behaviour outweigh the personal benefits, egoistic individuals will most likely choose to act in a way that maximizes their personal benefits. Thus, when the perceived benefits (for example, higher quality or better health outcomes) outweigh the perceived costs, the individual is likely to engage in pro-environmental behaviours.

Previous research

Research findings have empirically verified the existence of the tripartite (biospheric, altruistic and egoistic) structure of environmental concern through factor analysis and crosscultural content analysis in various samples [13,17,19-21]. Beside its theoretical value, the tripartite structure also has relevant practical applications. Numerous studies have found a link between the individual's environmental concern and the number of pro-environmental intentions and behaviours the person adopts. However, this attitude-behaviour link remains somewhat unclear. The majority of environmental research supports the idea that biospheric values are positively related to a greater concern for environmental problems, pro-environmental attitudes, intentions and behaviours. A number of psychological studies [13,22-29] have found a recurring pattern, with biospheric concern emerging as the strongest predictor for proenvironmental intentions and behaviour, while egoistic concern shows an inverse association in most cases. As a result, researchers' suggestions for social marketing attempts and further research endeavours are generally directed towards different ways of enhancing people's biospheric value orientation [7,8]. The basic pattern of these research findings seems to support the idea that individuals who value nature for its own sake are the most likely to act on their existing pro-environmental

attitudes and engage in proenvironmental behaviours, while people with egoistic values oppose environmentalism. Still, there are ample findings contradicting this pattern. Some of the studies examining attitudes towards organic food [30,31] that found a strong positive relationship between biospherism and proenvironmental attitudes found no negative correlations regarding egoistic concern. In fact, much of the research on organic food highlights egoistic motives (e.g. health and health consciousness) as predominantly positive motives in explaining favourable attitudes, intentions and behaviours towards organic food [32-37]. Notably, Magnusson et al. found health to be the stronger predictor of attitude and purchase intention towards organic food when compared to environmental motives.

Similar results emerged in the initial test of the value-belief-norm model, Stern et al. found that both egoistic and biospheric concern positively predicted pro-environmental intentions [11]. Egoistic concern was found to be the strongest predictor, showing the highest positive correlation among the three value orientations. The findings were also replicated in later studies [12,38]. In the literature, self-enhancement has been suggested to primarily lead individuals to act against environmental protection when personal costs are perceived high [27]. Yet empirical evidence shows that pro-environmental behaviours are based on multiple motivations [39,40] and not only self-transcendent values contribute to the explanation of pro-environmental intentions, but also self-enhancement values. Some researchers have suggested that facilitating a positive relationship between self-enhancement (egoistic) values and pro-environmental behaviour might require certain conditions [9,41]. According to Schultz et al. the contradictory findings regarding the relationship between selfenhancement values (e.g. egoistic concern) and pro-environmental behaviour and intentions may be explained by taking into consideration that environmental concerns that stem from different values may require different value activating conditions. Values have to be cognitively activated to have an impact on behaviour [42], e.g., people need to be aware that their values are relevant to the specific situation. People's values affect their beliefs by drawing attention to information about the consequences of environmental issues regarding the objects they value [43]. As individuals differ in the value base of their environmental concerns, eliciting proenvironmental behaviour in a given situation may be determined by what sort of information is presented to whom. The framing of the content may determine the activation of underlying personal norms: how the value of the information is perceived, how it is processed and if it will be acted upon. Schultz et al. suggests that negative relationship between egoistic concerns and pro-environmental intentions can be explained by the lack of norm activation, as pro-environmental behaviours are traditionally marketed in a way that makes them thoroughly incompatible with self-interest. Environmental messages and social marketing attempts are frequently based on self-transcendent values, framed in terms of sacrifice towards a greater good. The focal point of these campaigns is the inherent benefit for the larger society. As selftranscendent values (e.g. biospheric and altruistic) have a broad focus, they can be

activated by the general awareness of harmful consequences for others, adapting feelings of responsibility for the environmental problem. However, this is not the case with selfenhancement (egoistic) values, as their scope is narrow, centred on the immediate self. According to Schultz et al. environmental campaigns should also address how the individual is personally affected by environmental problems and the potential benefits for the self, resulting from adapting pro-environmental behaviour. They see this as anecessary step to induce the activation of self-enhancement values underlying egoistic environmental concern. Therefore, the cognitive activation of egoistic values through processing information about harmful effects on the personal level may lead to a positive relationship between egoistic values and pro-environmental intentions. If egoistic individuals perceive a threat to the self as a result of environmental damage, concern would be expressed, and the individuals would be motivated to act in a way that reduces the threat. Thus, increased accessibility of the underlying values based on the norm activation framework might provide an explanation for the predominantly positive correlations found between self-enhancement values (such as health consciousness and health concern) and pro-environmental attitudes, behaviour and intention in studies on organic food. Viewed in this light, egoistic concerns may have the potential to be useful in encouraging proenvironmental behaviours in this specific context [44].

Environmental messaging using tailored information

Environmental messaging as a method is widely used in various campaigns to educate and persuade the public about the advantages of pro-environmental behaviour [45,46], however, the effects of general campaigns are usually only small to moderate. A potentially more useful approach is message tailoring, e.g., using data from or about a specific individual related to a given outcome, to determine the most appropriate information that meets the unique needs of the individual. In the environmental domain, tailored messages have previously been shown to result in significant energy savings through behavioural changes in household energy conservation [45]. It is increasingly recognised that the application of social marketing approaches to encourage pro-environmental behaviour requires the identification of target groups encompassing the heterogeneous motivations and necessities of individuals. Knowledge about motivational determinants (e.g., values) can be used to design interventions for a more efficient promotion of pro-environmental intentions and behaviour [47]. Based on the body of previous research, it can be argued that individuals, based on their dominant type of environmental concern, can be viewed as members of different target groups. Thus, in the context of the present study, the consequences of choosing organic food over conventional food can be addressed through different message framings to highlight the biospheric, altruistic or egoistic aspects, respectively.

Aims and hypotheses

The main objective of this study is to examine the connection between environmental concern, value-based environmental

messages, and pro-environmental intention (e.g., purchase intention of organic food). The primary aim is to analyse whether the participants' evaluation of value-based environmental messages is connected to their dominant type of environmental concern. Participants will be asked to respond to sets of environmental messages in order to determine whether the messages that highlight the value that corresponds with one's dominant environmental concern will be perceived as more salient. Based on previous research, biospheric message frames are expected to appeal to individuals with high biospheric concern, altruistic messages are expected to appeal to individuals with high altruistic concern, and messages with egoistic frames are expected to appeal to individuals with high egoistic concern. The research hypotheses are:

H1: biospheric concern will have a positive effect on biospheric message persuasiveness, and no effect on altruistic or egoistic message persuasiveness ratings.

H2: altruistic concern will have a positive effect on altruistic message persuasiveness. It is not expected to affect biospheric or egoistic message persuasiveness.

H3: The level of egoistic concern will have a positive effect on egoistic message persuasiveness, and no effect on biospheric or altruistic message persuasiveness ratings.

If supporting findings emerge, targeting different groups based on their dominant environmental concerns may be appropriate. Presenting tailored information to target groups may then result in more efficient interventions and influence a higher degree of proenvironmental behaviour. The results of the analysis may be useful in understanding why other-oriented campaigns have been ineffective when trying to reach the majority of the Western populations, given the self-enhancing nature of the values governing these cultures. The second aim of this study is to examine the relationship between pro-environmental intention (e.g. purchase intention of organic food) and different framings of value-based environmental message types (biospheric, altruistic and egoistic), in order to see if a specific message frame emerges as more efficient in eliciting purchase intention. Based on previous studies, the research hypothesis is;

H4: Any of the three types of message framings can positively affect the intention to purchase organic food. Biospheric message framing is expected to have the largest positive effect on purchase intention.

Method

Participants and procedure

Data was collected from a convenience sample of 83 participants (33 men and 50 women), with a mean age of 36.7 years ($SD=16.09$, Range 18-70). Participants were recruited by approaching people who were passing through the foyer of a public building in the city of Gothenburg, Sweden. This type of sampling has previously been used in environmental studies (14,21]. Participants were asked to fill in a self-administered questionnaire including the measures for pro-environmental intention, environmental concern and

value-based environmental messages. The questionnaire also contained other statements that are not used in this study, and 2 socio-demographic questions (age and gender). Upon completing the questionnaire, the participants were thanked, and received a lottery ticket as compensation for their participation. Statistical analysis was conducted using IBM SPSS Statistics version 19.0.

Instruments

Scale indices were constructed for pro-environmental intention, environmental concern and value-based environmental messages. A score for each sub-scale for each participant was calculated as the mean of his or her scores on the individual items.

Value-based environmental messages

Participants were given a series of messages about organic food products. The content of the messages was adapted from reports from the website of the Swedish National Food Administration [48] and research articles published on the website of the International Research Centre for Organic Food Systems (ICROFS), the coordinator of European transnational research supported by the European Commission [49]. The messages were framed in either of three ways - biospheric, egoistic or altruistic framing – for a total of nine different messages. For example, a message framed to appeal to biospheric values was: "When you choose organic food products, you choose to support natural cultivation methods without the use of chemical toxins. You contribute to the protection of endangered insects and birds." (see **Appendix A** for a complete list of the messages). Participants were given the instruction: The following statements may be used as messages for encouraging people to choose organic food. Please indicate the extent of how persuaded you are by each of these statements: 1 (not at all persuaded) to 2 (not particularly persuaded) 3 (somewhat persuaded) 4 (persuaded) 5 (completely persuaded).

Environmental concern

To measure beliefs about the environment, the Environmental Motives scale developed by Schultz (2001) was applied, translated to Swedish. The Environmental Motives scale was chosen due to its robust measurement properties in assessing biospheric, altruistic and egoistic concern for valued objects (13,21,44,50). The scale assesses the set of valued objects on which people base their environmental concern. It consists of three subscales, each with four value items: (1) egoistic concern (myself, my health, my lifestyle, my future), (2) altruistic concern (children, people in Sweden, humanity, future generations), and (3) biospheric concern (plants, animals, marine life, birds). Participants were given the prompt: "People around the world are generally concerned about environmental problems because of the consequences that result from harming nature. However, people differ in the consequences that concern them the most." Participants then rated the 12 value items on a 7-point Likert scale, from 1 (not important) to 7 (supreme importance), in response to the statement "I am concerned about environmental problems because of the consequences for _____."

Pro-environmental intention

A scale was constructed to measure the participants' purchase intention of organic food for the next 3 months. Participants were given the prompt: "Below this text, there is a list of foods. In most shops, both conventionally produced and organic varieties of these items are available. Estimate the extent to which you will choose the organic variety (which can be, for example, marked with the organic label KRAV or the EU organic logo) for the next 3 months." Participants indicated their estimate on a 5-point Likert scale, ranging from 0 (never) to 4 (always or almost always). The list of foods consisted of 7 items: fruit, vegetables, meat, milk, egg, coffee and chocolate. Care was taken to only add items available in both organic and conventionally produced varieties in most shops, generally purchased by most people. The listed food items were selected following the guidelines in previous studies on organic food [28,30] and based on the most sold organic foods according to statistics from the largest Swedish food retailer, ICA (Intellecta, 2011).

Scale reliabilities

All sub-scales were subjected to an assessment of internal consistency. The Cronbach's α values were all above the recommended level of 0.7 [51]. A detailed account of scale reliabilities can be found in **Appendix C**.

Results

All variables were controlled for gender and age differences. Results showed that women scored higher than men on all three EMS sub-scales, and also on pro-environmental intentions, but the differences were not significant. The product-moment correlations between the variables are shown in **Table 1**.

Descriptives

Environmental concern. Means and standard deviations showed that participants reported fairly high levels of altruistic concern ($M=5.5$, $SD=0.97$), biospheric concern ($M=4.91$, $SD=1.64$), and

egoistic concern ($M=4.65$, $SD=1.24$), on scales ranging from 1 to 7. Message persuasiveness. A composite measure of the persuasiveness of value-based environmental messages was calculated as the mean score of the 3 messages with the same type of framing. On scales ranging 1 to 5, participants rated biospheric framing as fairly persuasive ($M=3.69$, $SD=0.95$). The egoistic framing was found to be somewhat less persuasive ($M=3.56$, $SD=0.93$), and the altruistic framing were found to be the least persuasive of the 3 message types ($M=3.40$, $SD=1.05$). A full list of the persuasiveness ratings of the individual messages can be found in **Appendix B**. Pro-environmental intention. Participants reported a moderate level of intention to purchase organic food ($M=1.80$, $SD=0.79$), on a scale ranging from 0 to 4.

Analysis

Hypotheses testing

The results of the analysis are summarized in **Table 2**.

Effect of environmental concern on value-based environmental message persuasiveness

Participants' evaluation of value-based environmental messages were analysed in order to determine whether messages that highlight the value corresponding with one's dominant environmental concern (biospheric, altruistic or egoistic) would be perceived as more salient. A linear regression analysis was conducted to explore the relation between the types of environmental concern (predictor variables) and message persuasiveness ratings (dependent variable), for each of the three message frames. Regressions were conducted using the enter method, with the three predictor variables entered in the same step. 31% of the variance in the effectiveness of the biospheric messages was significantly accounted for. The predictors

accounted for 11.2% of the variance in the effectiveness of the altruistic messages. Environmental concerns accounted for a mere 5.7% of the egoistic message ratings, but this result was not significant.

Table 1 Product-moment correlations between variables (n=83).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------|--------|-------|-------|-------|-------|-------|---|
| Egoistic concern | - | | | | | | |
| Altruistic concern | -.62** | - | | | | | |
| Biospheric concern | .45** | .60** | - | | | | |
| Egoistic messages | .23* | .25* | .26* | - | | | |
| Altruistic messages | 0.08 | .24* | .36** | .64** | - | | |
| Biospheric messages | -0.01 | 0.18 | .50** | .59** | .75** | - | |
| Purchase intention | -0.04 | 0.21 | .49** | .41** | .46** | .69** | - |

** . Correlation is significant at the .01 level (2-tailed). * . Correlation is significant at the .05 level (2-tailed).

Table 2 Significant results of the hypotheses testing.

| Hypothesis | Predictor:e. concern | Dependent:persuasiveness | β | SE | t(81) | p |
|------------|--------------------------|--------------------------|---------|------|-------|-------|
| H1 | biospheric | biospheric | 0.65 | 0.06 | 5.68 | 0.001 |
| H2 | | altruistic | 0.35 | 0.08 | 2.7 | 0.008 |
| H3 | egoistic | biospheric | -0.29 | 0.09 | -2.52 | 0.013 |
| Hypothesis | Predictor:persuasiveness | Dependent:intention | β | SE | t(81) | p |
| H4 | biospheric | | 0.77 | 0.1 | 6.13 | 0.001 |

The first research hypothesis (H1) posited that the level of biospheric concern would have a positive effect on biospheric message persuasiveness, and no effect on altruistic or egoistic message persuasiveness ratings. Biospheric concern explained a unique amount of variance in biospheric message effectiveness ($\beta=0.65$, $SE=0.06$, $t(81)=5.68$, $p=0.001$), and altruistic message effectiveness ($\beta=0.35$, $SE=0.08$, $t(81)=2.70$, $p=0.008$), with a positive relation emerging between biospheric concern and persuasiveness ratings for these two message types. Thus, H1 was only partly supported.

The second research hypothesis (H2) posited that the level of altruistic concern would have a positive effect on altruistic message persuasiveness, but no effect on biospheric or egoistic message persuasiveness. Altruistic concern was not significantly predictive in the persuasiveness ratings of any of the message framings. The findings only partly support H2.

The third research hypothesis (H3) posited that egoistic concern would have a positive effect on egoistic message persuasiveness, and no effect on biospheric or altruistic message persuasiveness ratings. Egoistic concern had a significant inverse correlation with biospheric message effectiveness, explaining a unique amount of variance ($\beta=-0.29$, $SE=0.09$, $t(81)=-2.52$, $p=0.013$). H3 is only partly supported. Taken together, specific message frames corresponding to the same type of environmental concern were not rated as more persuasive, except in the case of biospheric message framing that specifically appealed to biospheric concern.

Value-based environmental message persuasiveness ratings and pro-environmental intention

The fourth research hypothesis (H4) posited that all three message types may positively effect purchase intention. Biospheric framing was expected to emerge as the most persuasive message type in eliciting purchase intention of organic food. A linear regression analysis was conducted to explore the relation between the three types of message frames (egoistic, altruistic and biospheric) as the predictor variables and purchase intention as the dependent variable. The linear regressions were conducted using the enter method, with the three predictor variables entered in the same step. The predictors accounted for 46.4% of the

variance ($p=0.001$). Biospheric framing explained the largest amount of variance in purchase intention ($\beta=0.77$, $SE=0.10$, $t(81)=6.13$, $p=0.001$). Biospheric framing emerged as the only variable with a significant positive relation to pro-environmental intention. Neither altruistic, nor egoistic framing was significantly predictive of a unique amount of variance, with altruistic framing showing a near-significant negative correlation. Thus, H4 is only partly supported by the findings.

Discussion

Contrary to expectations, environmental messages that shared a common value base with dominant environmental concern were not found more persuasive, except in the case of biospheric concern. According to the theory proposed by [44], environmental messages conveying how the individual is personally affected may be more salient to individuals with predominant self-

enhancement values (e.g. egoistic concern). However, the findings in this study do not lend support to the theory. Instead, egoistic concern has been found to have a significant negative association with biospheric message persuasiveness ratings. The opposing effect of biospheric and egoistic concern on proenvironmental attitudes and intention is a recurring pattern found in numerous studies in the environmental field [13,22-29], and the present study lends some support to theories that view selfenhancement values as opposed to environmentalism [14,25]. Further, the results of this study suggest that, in order to perceive self-transcendent environmental messages as salient, the explicit activation of biospheric concern may be necessary, as biospheric concern solely explained the higher ratings of both altruistic and biospheric messages. The relationship between value-based environmental message persuasiveness and pro-environmental intention further supports this conclusion. Biospheric framing emerged as the only specific message type with a significant positive relationship to purchase intention, explaining 46% of the variance. Somewhat surprisingly, altruistic messages failed to appeal to self-transcendent values. Although the relation between purchase intention and altruistic message framing failed to reach the level of significance, a noteworthy trend emerged in the data, with altruistic framing showing a negative association. Previous studies finding significant negative correlations between altruism and measures of environmental consciousness [52-54] explained these findings as the effect of the competition for consumers' interest between fairtrade and organic labels, as the fairtrade label more specifically targets the altruistic values connected to other people, thus, it is thought to be more salient to those with high altruistic concern. However, the results of the present study did not lend support to this explanation, as messages with altruistic framing did not have a correlation with altruistic environmental concern. In fact, altruistic messages received the lowest overall ratings. The results may point to the spreading political narrative of a perceived competition between human interests (e.g. economy and development) and environmental conservation (Republican Views, 2014). This may also explain the universal spreading of the label "fake news" to discredit environmental science, as the mean altruistic concern was highest in this sample. We may have to redefine altruistic measures to reflect this development. Several other studies have also reported altruistic concern as the dominant environmental concern in populations, assessed in varied research samples [13,19-21]. Possibly, altruistic message frames may need to be very specific, highlighting positive economical impact to be perceived as salient. Given the fact that altruism emerged as the concern with the highest magnitude, this question merits further research, as it clearly has a very high potential for impact. A similar approach may also be useful in the case of egoistic message frames, as the message about the quality and taste of organic products was rated as the least persuasive. Message frames about health issues (e.g. the lower toxic load of organic foods) were found to be more salient. Consequently, in different situations we may need to highlight different egoistic values. In the case of organic food, health may be the focal point, thus messages about health proved the most salient [55]. Other

situations may benefit from focusing on possible monetary savings [45]. Thus, in order to pique the interest of egoistic individuals, narrower frames may be needed, adapted to the specific situation. In sum, the results of this study point to the importance of biospheric concern in evoking pro-environmental responses. Broad message frames designed to appeal to biospheric values may be an effective way to raise interest in environmental issues. In line with previous suggestions in the literature, focusing on biospheric values seems to remain the primary target for social marketing and policy-making. Also, attempts to promote pro-environmental behaviours through messages may need to use a variety of situation-specific frames to appeal to those with dominating egoistic and altruistic values. The results of this study also suggest that the value base of environmental concern may be more elaborate than it is acknowledged by the value-belief-norm theory [10], as the tripartite structure model fails to explain the disconnection between altruistic concern and the low interest in altruistic values. We may be seeing a restructurization of altruistic values due to the growing political focus on competition between economic interests and conservation. There are some limitations to this study, due to various methodological issues. The correlations between intentions and actual behaviour have been shown to be small to moderate in psychological research [51]. Also, cause-and-effect relationships cannot be ascertained, given the inherent limitations of the cross-sectional, nonexperimental design of this study. Conclusions about larger populations cannot be drawn, due to the method of the sampling and the small number of participants. Similarly, the data

collection method runs the risk of self-selection bias, as perhaps only respondents who cared deeply enough about the research topic felt sufficiently motivated to participate in the study. Taken together, it is possible that these limitations affect the range and variability of the data. At the same time, the greater variation in the sample regarding age and, presumably, other socio-economic variables represents an improvement over the student samples typically surveyed in current psychological research, thus offering an improvement on external validity.

Conclusion

The present study examines the relationships between environmental concern, value-based environmental messages and pro-environmental intention. The findings in this study are in line with results from previous studies in the environmental field, confirming the significant positive association between biospheric values and pro-environmental intention, as only biospheric concern had a positive effect on both biospheric and altruistic value-based environmental message ratings, while egoistic concern had a significant negative relationship with biospheric message effectiveness. The results also suggest that social marketing attempts promoting pro-environmental purchase intentions should use broad biospheric message frames in order to appeal to individuals' biospheric values, while messages targeting groups of individuals with altruistic and egoistic values may require narrow and situation-specific framings, in order to awaken interest.

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