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Counter-arguing as barriers to environmentally motivated consumption reduction: A multi-country study

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ABSTRACT

This research extends previous literature on environmentally motivated consumption reduction (EMCR) with a cross-cultural investigation across 28 European countries. The paper elucidates how European consumers' knowledge and perceived seriousness of climate change inhibit the activation of counter-arguments, with implications for EMCR. More specifically, counter-arguing is a critical barrier to reduce EMCR. The developed model is based on the novel premise that the contingency variables, which qualify the impeding role of this barrier, are anchored at different levels. To account for individual and societal aspects simultaneously, multi-level analysis combines large-scale data from a Eurobarometer ($n = 16,095$) with secondary data at the societal level ($n = 28$). The results confirm that counter-arguments as barriers for EMCR and their attenuation through knowledge and perceived seriousness substantially varies across societies. Our results reveal that the collectivism/individualism dimension is most relevant in qualifying the impact of counter-arguments on EMCR. Building on our findings, impact-level-maps of counter-arguments and country clusters aid international marketers of environmentally friendly products to flexibly tailor their marketing campaigns. For policy-makers, our results further highlight that rather than raising knowledge with educative campaigns, perceptions of seriousness should be targeted to foster EMCR and inhibit counter-arguing.

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1. Introduction

August 1st, 2018 marked the day that humankind is believed to have effectively 'overshot' the resources that earth can sustain each year (Overshootday.org, 2018). The overshoot date compellingly illustrates pressing global concerns that the human population greatly exceeds earth's capacity to renew consumable resources. Given the dramatic ecological and climatic implications, many policy makers and non-governmental organizations are attempting to enhance consumers' knowledge about the harmful consequences of excessive consumption behaviors, urging consumers to a more sustainable consumption lifestyle. However, educating consumers is often insufficient in evoking actual changes in habits (e.g., healthy consumption, [Mai & Hoffmann](#),

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2015). Recent observable developments (e.g., shorter winters, warmer temperatures, melting of ice caps, etc.) may solidify the perceived seriousness of the implications of consumption decisions for the environment. Nonetheless, even though well aware of the environmental consequences, some consumers employ neutralization techniques, such as generating counter-arguments, to avoid changing their behaviors (Kunda, 1990). As a result of such liberating counter-arguments, efforts to tackle climate change by transforming consumption patterns may fall short in stimulating actual environmentally motivated consumption reduction (EMCR).

The present paper is particularly interested in identifying the factors that prevent consumers from acting in accordance with their knowledge and perceived seriousness. This research develops the fundamental premise that catalysts determine whether increased knowledge about climate change and stronger perceived seriousness of the issue hamper the tendency to activate counter-arguments, which has substantial implications for EMCR. What has been ignored thus far is that these catalyzing variables may be anchored at different levels, namely, the individual level and the societal level. Whether cognitions about climate change inhibit the activation of counter-arguments depends on consumer's emphasis on individual or common needs (egocentric and social motives) but also on whether the society in which a consumer is embedded places greater or lesser emphasis on the community or the individual (collectivistic and indulgent cultures). The holistic perspective taken in this paper aims at answering the question of what levers should be pulled to translate knowledge into action.

We conduct a multi-level analysis combining large-scale data ($N = 16,095$) with secondary data at the societal level ($N = 28$ countries), including cultural profiles, gross domestic product (GDP), and country-specific consumption levels. On the individual level, this research focuses on EMCR, conceptualized here as the extent to which consumers lower their consumption in certain domains with the explicit intent to protect the environment. While recent investigations have explored the role of environmental knowledge and ecological motivations in EMCR (Ortega-Egea and Frutos, 2013; Varadarajan, 2014), we extend this stream of research in two important ways. First, our research suggests that motivated reasoning processes (Kunda, 1990) explain why environmentally educated consumers do not reduce their consumption patterns. Second, we explore relevant contingency variables that operate at different levels: the individual and the societal level. We explain inter-individual variances in the activation of counter-arguments by distinguishing two central types of values: egocentric and social-altruistic. We expect cultural values to be a key moderating variable at the societal level that determines when individuals and societies take action to fight climate change (e.g., Deng, Walker, & Swinnerton, 2006; Milfont, Duckitt, & Cameron, 2006; Soye, 2012). Fig. 1 summarizes the conceptual framework.

We contribute to ongoing research on how to induce positive social and environmental change in different cultures (e.g., Choi, Chang, Li, & Jang, 2016). Internationally operating firms and policy makers urgently need such knowledge to market products and services facilitating consumption reduction (of energy, water, etc.), to transform consumer behaviors, or to fine-tune their sustainable marketing strategies in international markets (e.g., Desiraju, Nair, & Chintagunta, 2004; Slangen & Dikova, 2014). Our analysis of the multi-level moderators of counter-arguments and EMCR adds to the understanding of environment-based business opportunities nationally and cross-nationally (e.g., Leonidou, Katsikeas, Fotiadis, & Christodoulides, 2013) as well as to

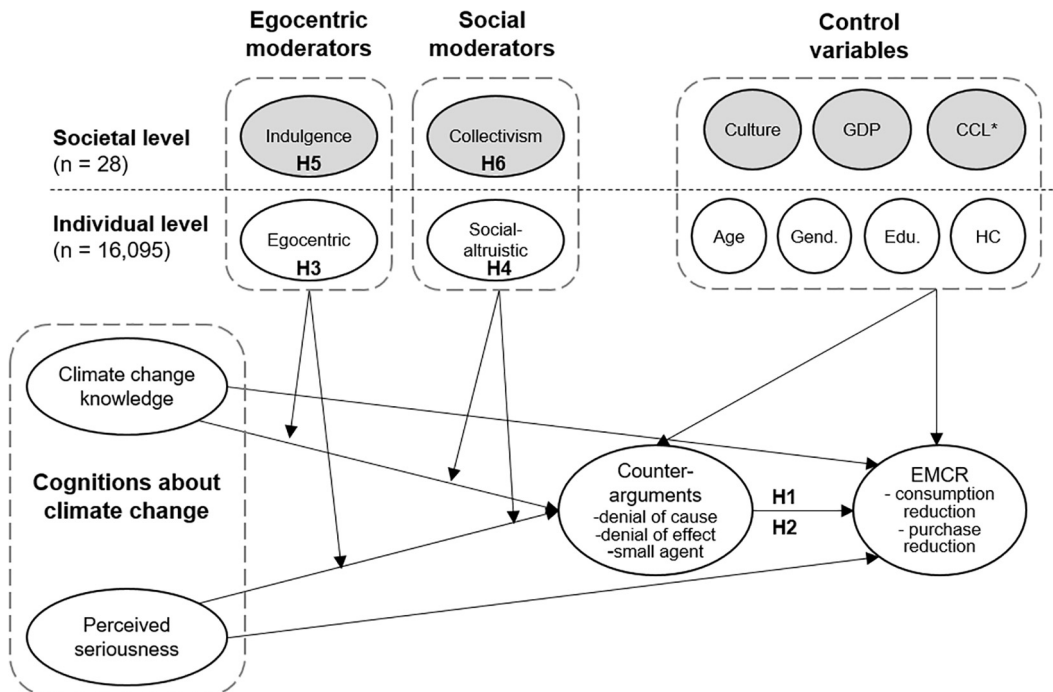


Fig. 1. Conceptual model.

the concept of international segmentation in marketing (Burgess & Steenkamp, 2013; Steenkamp and Ter Hofstede, 2002). With impact-level maps and country segments based on our results, this research offers concrete guidance for commercial and social marketers to tailor the target of their marketing campaigns and helps them tackle the pressing global issue.

2. Conceptual background

2.1. Environmentally motivated consumption reduction

Two primary routes have been advanced regarding how individuals can contribute to the achievement of environmental improvements. First, on the “consumption path”, consumers acquire products that are believed to be beneficial for the environment (“green” products; e.g., Banbury, Stinerock, & Subrahmanyam, 2012; Ertz, Karakas, & Sarigollu, 2016). Second, the “anti-consumption path” requires individuals to reduce their extent of consumption, especially of products with potentially harmful implications for the environment (Seegebarth, Peyer, Balderjahn, & Wiedmann, 2016). So far, the anti-consumption path has received far less attention in the literature than the consumption path (Chatzidakis & Lee, 2013; Conolly & Prothero, 2008). To fill this void, scholars have recently suggested shifting the focus to EMCR (Ortega-Egea and Frutos, 2013).

EMCR describes the extent to which consumers intentionally lower their overall level of consumption of certain (or all) objects with the aim to protect the environment (Ortega-Egea and Frutos, 2013). The consumption reduction literature mainly focuses on household consumption and analyzes behaviors such as energy consumption (Poortinga, Steg, Vlek, & Wiersma, 2003), water consumption (Corral-Verdugo, Carrus, Bonnes, Moser, & Sinha, 2008), or car use (Nordlund & Garvill, 2003). Conversely, some works on purchase reduction have explored specific domains, such as the reduction of bottled water (Bolderdijk, Gorsira, Keizer, & Steg, 2013), plastic bags (Sharp, Høj, and Wheeler, 2010), or products with a high carbon footprint (Vanclay, Shortiss, Aulsebrook, Gillespie, Howell, Johanni, & Yates, 2011). Previous research explored how sustainability affects consumption behavior of individual consumers. Adopting a consumer-oriented paradigm, Huang and Rust (2011) treat consumers as entities that strive to maximize their self-interest. One cornerstone of the study is that consumers in rich countries should be willing to consume less if they are aware of the negative effects of global consumption inequity. In our study, we elaborate on this and merge individual promoters and inhibitors of the reduction of consumption levels with cross-cultural and economic factors (e.g., a country's GDP).

Rather than isolating specific fragments of reduction behaviors, scholars have begun considering EMCR at broader levels. When studying universal antecedents, researchers conceptualize EMCR as a general composite construct that captures aggregate sets of consumption reduction behaviors from different domains (Richetin, Perugini, Conner, Adjali, Hurling, Sengupta, & Greetham, 2012). As this conceptual framework emphasizes universality and general applicability, the present research employs a general EMCR concept building on the work of Ortega-Egea and Frutos (2013), which includes actions pertaining to both household and purchase domains. We will now first turn to the influence of climate change knowledge and perceived seriousness on EMCR and counter-arguing. This is followed by a discussion of individual moderators. Finally, we make predictions about cultural influences.

2.2. Counter-arguments as a critical barrier of EMCR

The framework developed in this paper suggests that consumers are frequently motivated to find and stress counter-arguments in order to reduce the degree to which they feel obliged to engage in EMCR. Counter-arguments have been defined as arguments that individuals develop in response to certain persuasive messages (Fransen, Verlegh, Kirmani, & Smit, 2015).

The present research integrates findings of different streams in the literature to develop our conceptual model. Our research builds on previous studies considering environmentally motivated consumption reduction (Barr & Gilg, 2006; Corral-Verdugo et al., 2008; Nordlund & Garvill, 2003; Poortinga, Steg, Vlek, & Wiersma, 2003; Vanclay et al., 2011) and integrates research on the attitude-behavior gap (or “ethical purchase gap”) (Boulstridge & Carrigan, 2000; Carrigan & Attalla, 2001; Chatzidakis, Hibbert, & Smith, 2007). More specifically, we integrate findings on motivated reasoning (Bhattacharjee, Berman, & Reed, 2012; Kunda, 1990; Tsang, 2002) and counter-arguments from studies on consumer boycotts as a related field of consumption reduction (Hoffmann 2013; Klein, Smith, & John, 2004) and sustainable consumption (Kollmuss & Agyeman, 2002; Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007). We also integrate various related concepts, such as neutralization techniques (Gruber & Schlegelmilch, 2014), behavioral control and self-efficacy (Gifford, 2011), perceived effectiveness (John & Klein, 2003; Klein, Smith, & John, 2004), inconsistencies from a social-psychological lens (e.g., Kaiser, Byrka, & Hartig, 2010), and trust in the media and politics (Ahluwalia, 2000). With the multi-layered multi-country approach, the current project adapts and extends the framework by Ortega-Egea and Frutos (2013).

Table 1 presents ten selected academic studies with different approaches to understand justifications and barriers that may be helpful to explain the attitude-behavior gap on EMCR. The table is focused on those studies that are at most relevant to our research, with respect to the examined EMCR measures as well as the underlying theories and concepts. For example, we included representative work that helped us to identify the three different counter-arguments used in our study or research that examined a single EMCR domain (such as the reduction of car use).

The literature on anti-consumption and ethical consumer behaviors has widely demonstrated that many consumers associate a reduction in their consumption levels with subjective costs (e.g., Hoffmann, 2013). For example, Hutter and Hoffmann (2013) show that many consumers holding pro-environmental attitudes consider consumption reduction a sacrifice they want to avoid. To resolve dissonance, consumers tend to engage in cognitive strategies (e.g., motivated reasoning, neutralization) to maintain a (biased) characterization of an unethical action as morally acceptable (Bersoff, 1999). We therefore assume that some consumers

Table 1
Literature overview.

Study	Main Findings and Concepts	Research Type	Methods	Multi-level	Cultural Moderators	Country Controls	Country	Concepts related to Counter-Arguments	Identified Measures related to EMCR
1 Kunda, 1990	Motivated Reasoning	Conceptual	-	No	No	No	-	-	-
2 Kollmuss & Agyeman, 2002	Secondary psychological responses aimed at relieving persons from negative feelings	Conceptual	-	No	No	No	-	Apathy and resignation [small agent], refusal to acknowledge the reality [denial of the effect & cause]	Pro-environmental behavior
3 Poortinga, Steg, Vlek, & Wiersma, 2003	Relationships between preferences for different types of energy-saving measures and environmental concerns	Quantitative, self-reporting	Conjoint analysis, ANOVA	No	No	No	NL	Environmental concerns, acceptability of energy-saving measures	Energy-saving measures, energy-saving strategy, amount of energy savings
4 Nordlund & Garvill, 2003	Examination of willingness to reduce personal car use	Quantitative, self-reporting	Hierarchical model	No	No	No	SE	Value orientation, problem awareness, personal norms	Willingness to reduce personal car use
5 Klein, Smith, & John, 2004	Identification and empirical validation of antecedents leading to consumer boycotts	Quantitative, self-reporting	Regression analysis	No	No	No	US	Free riding, small agent, boycott induced harm	Prevalence of boycotting
6 Lorenzoni, Nicholson-Cole, and Whitmarsh, 2007	Individual barriers to engage with climate change	Qualitative/Quantitative, self-reporting	Survey, semi-structured interviews, focus groups	No	No	No	UK	Fatalism [small agent], distrust in information sources [denial of the effect], uncertainty and skepticism [denial of the cause]	Pro-environmental behavior
7 Gifford, 2011	Identifying and defining seven categories of psychological barriers that block humans from environmentally related aspirations or goals	Conceptual	-	No	No	No	-	Perceived behavioral control and self-efficacy [small agent], judgmental discounting [denial of the effect], refusal to acknowledge the problem or its real impact [denial of the cause]	Pro-environmental behavior
8 Ortega-Egea & García-de-Frutos, 2013	Interrelated effects of environmental knowledge and ecological motivations on environmental attitudes and consumption reduction	Quantitative, self-reporting	Structural equation modeling (SEM)	No	No	No	Multiple	Positive attitudes, negative attitudes	Reduction of energy consumption, disposable items, water, seasonal products
9 Gruber & Schlegelmilch, 2014	Strategies to neutralize demands for conformity to social norms	Qualitative, self-reporting	Focus groups and in-depth interviews	No	No	No	AT	Denial of responsibility [small agent], denial of injury [denial of the effect]	Purchases involving sustainability attributes
10 Seegebarth, Peyer, Balderjahn, & Wiedmann, 2016	Concept of sustainability-rooted anti-consumption (SRAC)	Quantitative, self-reporting	Structural equation modeling (SEM)	No	No	No	DE	-	Voluntary simplicity, collaborative consumption, boycotting
11 This study a)	The level of environmentally motivated consumption reduction (EMCR) varies across societies	Quantitative, self-reporting	Hierarchical linear modeling	Yes	Yes	Yes	Multiple	Small agent, denial of the cause, denial of the effect	Reduction of energy consumption, water, disposable items, car usage

Notes: AT = Austria, DE = Germany, NL = The Netherlands, SE = Sweden, US = United States, UK = United Kingdom, a) With the multi-layered multi-country approach, this research adapts and extends the framework by Ortega-Egea & García-de-Frutos (2013).

who initially planned to reduce their consumption patterns may strive to generate arguments to justify actions that run against their own moral principles. The coexistence of certain actions (e.g., driving inefficient SUVs) and contradicting normative expectations (e.g., protecting the environment) provokes cognitive dissonance. To avoid feelings of guilt for performing harmful actions, individuals resort to motivated reasoning by selectively gathering supportive information and downplaying contradicting information, which results in emotionally valued conclusions (Bhattacharjee, Berman, and Reed, 2012; Kunda, 1990; Rousseau & Tijoriwala, 1999). Consumers' legitimization of why their behavior does not conform to norms is metaphorically described as "neutralization" (Gifford, 2011; Sykes & Matza, 1957). This cognitive defense mechanism to avoid self-blame and social sanctions has been shown to help explain the widely observed inconsistencies in ethical or sustainable consumption (Chatzidakis, Hibbert, & Smith, 2007; Gruber & Schlegelmilch, 2014).

2.2.1. Selection of counter-arguments

Counter-arguing plays a central role in our model because these rationalizations should reduce the extent of EMCR. Building on the different varieties of neutralization techniques (Gruber & Schlegelmilch, 2014), the current work focuses on three archetypes of counter-arguments that prevent consumers from engaging in pro-environmental behaviors: small agent, denial of the effect, and denial of the cause. Among other counter-arguments (e.g., claim of entitlement, justification by comparison, etc.), the selection of these three specific counter-arguments was based on theoretical considerations, managerial relevance, and construct specificity.

From a theoretical perspective, the three types of arguments were selected because they directly map into the distinct phases of the logical chain of argumentation in which consumers might engage. First, individuals may doubt whether or not the effect truly exists (captured by the construct denial of the effect). In the case of climate change, for example, individuals might argue that the implications of climate change for the environment and consumers' everyday life have been exaggerated. Biased assimilations such as these can be sparked by the media, politics, etc. (Ahluwalia, 2000). Secondly and after accepting the existence of the effect, individuals may ask whether or not humankind is responsible for climate change (i.e., denial of the cause, Soyez, Hoffmann, Wuenschmann, & Gelbrich, 2009; Thompson & Barton, 1994). Consumers may argue that current CO₂ emissions have only a marginal impact on the world climate and that there has been a considerable variance in the global temperature. Third, if humankind is responsible for climate change, individuals might ask whether or not they are individually responsible (i.e., the small agent argument). Consumers may argue that climate change is an unstoppable process that cannot be changed through their behaviors and they thus deny their responsibility for climate change consequences. This justification of being a small agent reflects the perceived lack of effectiveness (John & Klein, 2003; Klein, Smith, & John, 2004). In sum, our set of counter-arguments captures all levels of responsibility, starting at an abstract level (does the effect really exist?) and ending on the individual level (am I responsible for the effect?).

From a managerial standpoint, we expect that these three types of counter-arguments bear the strongest managerial implications. Likewise, a keyword search in google scholar with an extensive list of counter-arguments (Gruber & Schlegelmilch, 2014) suggests that the three types are among the most widely discussed in academia. Finally, these counter-arguments also stand out from a conceptual perspective because they are domain-general and directly tap into climate change, whereas other counter-arguments are often product-specific or related to specific consumption decisions (e.g., claims of entitlement).

Consumers are expected to differ in the activation of the three types of arguments and thus show variance in the overall extent of counter-arguing. It is therefore imperative to center attention on the factors that inhibit the activation of counter-arguments. In the next section, we elaborate on why the single arguments serve as mediating variables for the impact of climate change knowledge and perceived seriousness.

2.3. Climate change knowledge and perceived seriousness

This research spotlights factors that potentially reduce counter-arguing and directly or indirectly (by reducing counter-arguing) enhance EMCR. With this focus, the framework improves our understanding of how to tackle the very rationalization process that leads to suboptimal consumption patterns. In general, we expect that consumers are less likely to rationalize potentially harmful behaviors when they are more aware of the environmental consequences of these behaviors.

2.3.1. Climate change knowledge

Scholars consider insufficient knowledge a central barrier of pro-environmental behavior (Gifford, 2011). Consumers cannot intentionally take actions without any basic knowledge. Consequently, knowledge of environmental issues is expected to be a necessary precondition for pro-environmental behaviors in general (Bamberg & Möser, 2007; Kollmuss & Agyeman, 2002) and consumption reduction in particular (Ortega-Egea and Frutos, 2013). Based on the above-introduced chain of counter-arguing, knowledge is expected to be mediated via the diverse counter-arguments for different reasons. First, the more individuals know about an environmental hazard, the less they are able to deny climate change. Elevating levels of knowledge about climate change may also guide individuals to believe that the problem is real rather than an exaggeration of the media. Second, with elevating levels of knowledge, individuals are less likely to reason that humankind has no influence on environmental issues. Third, the more knowledge about environmental issues individuals possess, the less they will presume that they personally cannot do anything about it. This small agent rationalization is also applied in related contexts, for example, when individuals consider boycotting companies (Klein, Smith, & John, 2004). In light of these arguments, we expect that climate change knowledge strengthens EMCR directly as well as indirectly by inhibiting the development of counter-arguments.

H1. Climate change knowledge reduces the tendency to activate counter-arguments, which in turn translate into EMCR. Counter-arguments thus mediate the relationship between climate change knowledge and EMCR.

2.3.2. Perceived seriousness

As a second key determinant, our framework posits that the more serious consumers perceive climate change and its consequences to be, the less likely they are to counter-argue, and the more likely they are engaged in pro-environmental behaviors (van der Linden, Leiserowitz, Feinberg, & Maibach, 2015). Consumers resort to neutralization techniques to dissolve internal cognitive dissonance in favor of the behavioral option that is more convenient (e.g., taking the car instead of public transportation or cycling). If consumers perceive climate change as being more serious, they have less reason to develop counter-arguments to justify and retain their current (over)consumption patterns in face of these environmental problems. Perceived seriousness can be considered a proxy for the subjective distance between consumers and environmental consequences (Hoffmann, 2013; Hoffmann & Schlicht, 2013). Low proximity to feared consequences should therefore reduce the extent to which consumers engage in liberating rationalizations by developing counter-arguments. Adapting again the chain of counter-arguing, we explain the mediating role of the different types of counter-arguments as follows: First, if perceptions of seriousness are strong, consumers should be less likely to infer that climate change has been exaggerated. Second, with elevating levels of perceived seriousness, consumers are less likely to believe that nothing can be done to fight the issue. With regard to consumer boycotts, Hoffmann (2013) has shown that the closer consumers are to a transgression, the higher is their perceived control. This corresponds with the third counter-argument as individuals are less likely to find reasons for an other-directed view on their own life. Summing up, we expect that perceived seriousness fosters EMCR directly as well as indirectly by inhibiting the development of counter-arguments.

H2. Perceived seriousness reduces the tendency to activate counter-arguments, which in turn translate into EMCR. Counter-arguments thus mediate the relationship between perceived seriousness and EMCR.

The inhibiting role of counter-arguing may not be universal; rather, it may depend on the individual and his/her cultural background. As reasoned above, we speculate that the potential of knowledge and perceived seriousness to reduce counter-arguing is qualified by whether the consumer prioritizes common or individual needs (e.g., social-altruistic vs. egocentric values). Notably, these catalytic effects exceed the individual level, as the society in which the individual is embedded can place lesser or greater emphasis on the individual (e.g., collectivistic vs. individualistic cultures). We therefore expect that the mechanisms suggested with H1 and H2 are contingent on factors operating at different levels, namely, the individual and societal levels.

2.4. Inter-individual level: moderating effect of environmental values

The motivation to fight climate change can reflect the value structure of individuals. Building on the conceptualization by Schwartz (1977), research on pro-environmental consumption distinguishes different types of motivation that are activated by different values. At an abstract level, these can be split into egocentric self-enhancement values and altruistic self-transcendent values. In a similar vein, Stern and Dietz (1994) posit that environmental concerns are rooted in a more general set of individual/egocentric values and altruistic values.

2.4.1. Egocentric values

Egocentric values are related to one's self. Changes toward more sustainable lifestyles may be a consequence of egocentric values, such as the desire to improve one's quality of life or to reinforce one's personal identity (Black & Cherrier, 2010; Huneke, 2005). Egocentrically motivated consumers will act in a pro-environmental manner only if they achieve certain personal benefits. Thus, consumers who are guided by egocentric values may hold positive environmental attitudes and engage in pro-environmental behavior, albeit to a lower extent than individuals driven by social-altruistic values (Stern, Dietz, & Kalof, 1993).

2.4.2. Social-altruistic values

Social-altruistic values are related to other human beings. Research on pro-environmental consumption shows that those who are motivated by altruistic values tend to develop more positive attitudes toward the environment (Schultz, 2000). Accordingly, such individuals are more likely to engage in actions that have positive consequences for other people (Thompson & Barton, 1994).

2.4.3. Moderating effects

The literature also provides indications of a moderating role in pro-environmental consumer decision making (de Maya, López-López, & Munuera, 2011; Vermeir & Verbeke, 2008). When individuals engage in motivated reasoning, they tend to search selectively for supportive information and downplay contradicting input (Kunda, 1990; Rousseau & Tijoriwala, 1999). It seems plausible that personal values may color this process because values guide individuals on what information to support or to dismiss (Bolderdijk, Gorsira, Keizer, & Steg, 2013; Steg, Bolderdijk, Keizer, & Perlaviciute, 2014). For example, environmental appeals are more influential when they are in line with the recipient's personal values (van den Broek, Bolderdijk, & Steg, 2017). For individuals holding social-altruistic values, greater climate change knowledge should therefore more effectively suppress the activation of counter-arguments. Likewise, the inhibiting role of perceived seriousness should also be stronger for individuals who have internalized

social-altruistic values. The literature provides indications that the linkage between formed attitude and pro-environmental behavioral intentions is strengthened by altruistic values (Vermeir & Verbeke, 2008).

By contrast, for consumers holding egocentric values, our theorizing predicts that elevating levels of seriousness activate the fear of loss and a feeling of self-protection, thereby inducing change. If egocentric consumers develop a feeling that they are personally affected by climate change and that the environmental hazard is a serious problem (perceived seriousness), they may be less likely to engage in counter-arguing to avoid acting (which would go against their personal interest). Consumers with egocentric values are therefore expected to act upon their knowledge and perceptions of seriousness, albeit for different reasons than social-altruistic consumers. In line with this reasoning, we propose that both social-altruistic and egocentric values strengthen the influence of climate change knowledge and perceived seriousness on the generation of counter-arguments.

H3_{a/b}. Egocentric values moderate the relationship between (a) climate change knowledge/(b) perceived seriousness and counter-arguments: With elevating levels of egocentric values, the inhibiting influence of (a) climate change knowledge/(b) perceived seriousness on counter-arguments is more pronounced.

H4_{a/b}. Social-altruistic values moderate the relationship between (a) climate change knowledge/(b) perceived seriousness and counter-arguments: With elevating levels of social-altruistic values, the inhibiting influence of (a) climate change knowledge/(b) perceived seriousness on counter-arguments is more pronounced.

2.5. Societal level: the moderating role of culture

Beyond individual differences in values, the consumer's cultural background may color the inhibiting effects of climate change knowledge and perceived seriousness on counter-arguments (which are passed on to EMCR). Initial evidence points to the conclusion that cultural values modify the reasoning process (Husted & Allen, 2008). While we have so far considered egocentric and social values at the consumer level, values prioritizing individual needs or the social group can also be shared at the societal level. Our framework therefore includes cultural values that relate to egocentric interests (indulgence vs. restraint) and social interests (collectivism vs. individualism).

Hofstede (2011, p.1) describes culture as "the collective programming of the mind which distinguishes the members of one group or category of people from those of another". Despite some critiques (e.g., Nasif, Al-Daeaj, Ebrahimi, & Thibodeaux, 1991), Hofstede's concept of culture is widely applied, and we build on this concept because numerous studies have demonstrated its predictive validity in varying contexts (Ralston, Egri, Furrer, Kuo, Li, Wangenheim, & Fu, 2014). Hofstede's classification has been collected for a wide array of countries, is constantly updated, and provides feasible country scores.

Hofstede, Hofstede, & Minkov's (2010) latest classification differentiates between six cultural dimensions, two of which are explicitly related to egocentric values in our framework (indulgence vs. restraint) and social values (collectivism vs. individualism). Indulgence stands for a society that prioritizes relatively free gratification of basic and natural human desires related to enjoying life and having fun (Hofstede, Hofstede, & Minkov, 2010). Collectivism is reflected in strong ties between individuals. Members of collectivistic societies are not only expected to care for themselves and close family; they also belong to in-groups that take care of them and expect loyalty in exchange (Hofstede, 2011). Given that these dimensions are closely linked with egocentric and social interests, respectively, we expect them to modify the inhibiting effects of climate change knowledge and perceived seriousness on counter-arguing.

2.5.1. Indulgence

Societies with high scores on the cultural dimension of indulgence prioritize relatively free gratification of basic and natural human desires that are closely related to enjoying life and having fun (Hofstede, Hofstede, & Minkov, 2010). Indulgence has recently been added to Hofstede's conceptualization and has not yet been considered for pro-environmental behaviors. As the level of indulgence captures the perceived conflict or tradeoff between balancing immediate needs and the consequences of one's behaviors, indulgence is thus a prime candidate to qualify the inhibitors of counter-arguments. For example, even when climate change is perceived as a potential threat, it should be the individuals living in an indulgent society (favoring immediate enjoyment) who are reluctant to act and rationalize their knowledge about climate change and perceived seriousness by generating counter-arguments. By contrast, the tendency to activate counter-arguments by individuals from less indulgent societies should be much more strongly affected by climate change knowledge and perceptions of seriousness because these individuals, on average, are less likely to act in accordance with their immediate needs.

H5_{a/b}. Indulgence moderates the relationship between (a) climate change knowledge/(b) perceived seriousness and counter-arguments: With higher levels of indulgence, the inhibiting influence of (a) climate change knowledge/(b) perceived seriousness on counter-arguments is less pronounced.

2.5.2. Collectivism/individualism

Hofstede's collectivism/individualism dimension (and related dimensions of other cultural concepts, e.g., embeddedness-autonomy, Schwartz, 1994; in-group collectivism, House & Hanges, 2004) has been included in several works. This cultural value may be indicative of the extent to which individuals give priority to solving the problems of the group vs. the self (Ralston et al., 2014). Cultural values such as collectivism/individualism are known to moderate the reasoning process (Husted & Allen, 2008). Thus, the impact of climate change

knowledge and perceived seriousness on counter-arguments may be qualified by the level of collectivism in a society. In more collectivistic countries, individuals' counter-arguing is expected to be less strongly connected to climate change knowledge and perceived seriousness. In these countries, the social consensus about the relevance (or irrelevance) of the problem should be more meaningful to the individual consumer. As public opinion is particularly relevant in such cultural contexts, individual consumers should be less likely to develop the need to align their held (or socially shared) counter-arguments when they have strong perceptions of seriousness or more knowledge about climate change. In countries with lower levels of collectivism, however, less emphasis is attached to the public opinion. Individuals' decisions will therefore be more heavily based on their individual beliefs and justifications of them, such that the proneness to counter-arguing is more closely linked to subjective knowledge and perceived seriousness.

H6_{a/b}. Collectivism moderates the relationship between (a) climate change knowledge/(b) perceived seriousness and counter-arguments: With lower levels of collectivism, the inhibiting influence of (a) climate change knowledge/(b) perceived seriousness on counter-arguments is more pronounced.

Hofstede's widely applied cultural concept suggests four more dimensions that are included as control variables in this research (Hofstede, 2011; Hofstede, Hofstede, & Minkov, 2010). Power distance (PDI) is defined as the extent to which inequalities and hierarchies are considered natural in a certain society. Uncertainty avoidance (UAI) captures how stressed individuals feel when faced with uncertain and unknown situations. The masculinity (MAS) dimension refers to the distribution of values between the genders. Long-term orientation, also termed as pragmatism (PRA), represents a society's ability to prepare for the future, preference for maintaining time-honored traditions, and attitude toward societal change.

3. Method

To test the hypotheses (H1 to H6_{a/b}), we combine different data sets and estimate our multi-layered conceptual model. Given that the moderating effects are expected to operate at different levels (individual vs. societal levels), we apply hierarchical linear modeling.

3.1. Individual-level data

3.1.1. Sample

Building on Ortega-Egea and Frutos (2013), individual-level data stem from the extensive cross-national data set of the Eurobarometer 69.2, Europeans' attitudes toward climate change. TNS Opinion & Social collected the data upon the request of

Table 2
Country descriptive statistics.

Country	n	GDP/capita (2008, in current USD)	Cultural dimensions						Means	
			PDI	COL	MAS	UAI	PRA	IND	CA	EMCR
Austria	645	39,300	11	45	79	70	60	63	1.74	2.37
Belgium	656	36,200	65	25	54	94	82	57	2.07	2.43
Bulgaria	182	11,800	70	70	40	85	69	16	1.75	1.85
Croatia	479	15,500	73	67	40	80	58	33	1.95	2.02
Czech Republic	601	24,500	57	42	57	74	70	29	1.95	2.27
Denmark	672	37,200	18	16	16	23	35	70	1.95	2.33
Estonia	424	21,800	40	40	30	60	82	16	1.99	2.25
Finland	636	36,000	33	37	26	59	38	57	1.89	2.30
France	632	32,600	68	29	43	86	63	48	2.37	2.45
Germany	1025	34,100	35	33	66	65	83	40	2.04	2.62
Great Britain	745	35,000	35	11	66	35	51	69	1.99	2.12
Greece	721	30,600	60	65	57	100	45	50	2.01	2.07
Hungary	520	19,300	46	20	88	82	58	31	2.33	2.10
Ireland	783	46,600	28	30	68	35	24	65	1.76	2.03
Italy	516	30,900	50	24	70	75	61	30	1.80	1.99
Latvia	298	17,700	44	30	9	63	69	13	2.02	2.05
Lithuania	267	16,800	42	40	19	65	82	16	2.14	1.83
Luxembourg	398	79,400	40	40	50	70	64	56	2.16	2.70
Malta	333	23,400	56	41	47	96	47	66	2.02	2.22
Netherlands	694	39,000	38	20	14	53	67	68	2.06	2.14
Poland	441	16,200	68	40	64	93	38	29	2.14	1.95
Portugal	558	21,800	63	73	31	99	28	33	2.33	1.86
Romania	444	11,100	90	70	42	90	52	20	1.90	1.96
Slovakia	738	20,200	100	48	100	51	77	28	2.15	2.16
Slovenia	792	28,000	71	73	19	88	49	48	2.35	2.14
Spain	678	33,600	57	49	42	86	48	44	2.02	1.75
Sweden	879	37,500	31	29	5	29	53	78	2.23	2.22
Turkey	338	12,000	66	63	45	85	46	49	2.26	1.77

Notes. GDP = Gross domestic product, PDI = power distance, COL = collectivism/individualism (Based on Hofstede's individualism/collectivism (IDV)-index: 100-IDV), MAS = masculinity/femininity, UAI = uncertainty avoidance, PRA = pragmatism, IND = indulgence.

the European Commission. The data set consists of 30,170 respondents representative of the European population (aged 15 and over) and residing in 32 European countries. Face-to-face-interviews were conducted in the respective national language and fieldwork were done in 2008. The data collection protocol screened participants first regarding EMCR actions: they were asked whether they undertook actions to fight climate change. Having answered this in the affirmative, respondents indicated concrete actions they had taken to reduce consumption; we use this information to measure the extent of EMCR. They also indicated reasons to engage in environmentally friendly consumption; this information serves as individual-level moderators in our model. At the national level, we removed four countries (Northern Ireland, Cyprus (Republic), Cyprus (Turkish Cypriot Community), Macedonia) because no data on the cultural orientation are available. The final data set for the multi-level analyses is based on 16,095 participants residing in 28 European countries (Table 2). To estimate our model, we match the individual-level data and the national-level cultural values. Note that robustness checks later also use the full sample.

3.1.2. Dependent variable

The measurement of the dependent variable EMCR is based on the rationale that a higher degree of EMCR is mirrored in a broader set of concrete actions that are taken to reduce consumption. The survey measured EMCR with four binary scaled items on which subjects indicated whether they undertook these actions. Two items reflect “household” EMCR behavior: (i) reduction of energy consumption at home and (ii) reduction of water consumption at home. Two more items refer to “purchase” EMCR behavior: (iii) reduction of the consumption of disposable items and (iv) reduction of car usage, for example, by car-sharing instead of buying cars. As an approximation of the extent of EMCR actions taken, a composite EMCR index was calculated ranging from 0 (none of the listed actions taken) to 4 (all listed actions taken).

3.1.3. Individual-level predictors, mediators, and moderators

The survey measured climate change knowledge (Cronbach's alpha = 0.91) using three items that capture the extent to which respondents were well informed about the causes, consequences, and ways to fight climate change. The survey measured each item (“Personally, you think that you are well informed or not about ...” 1: “...the different causes of climate change”, 2: “...ways in which we can fight climate change”, 3: “...the different consequences of climate change”) on a four-point scale ranging from 1 “very well informed” to 4 “not at all informed”. For a better interpretation of the data, we inverted the coding before combining the data into a scale. The survey measured perceived seriousness of climate change on a ten-point scale ranging from 1 “not a serious problem at all” to 10 “an extremely serious problem”. We included three items to assess counter-arguments (Cronbach's alpha = 0.67), covering (i) the small agent argument and the assumption of the exaggeration of climate change expressed through (ii) denial of the effect and (iii) denial of the cause: “Climate change is an unstoppable process, we cannot do anything about it”, “The seriousness of climate change has been exaggerated”, and “Emission of CO₂ (carbon dioxide) has only a marginal impact on climate change”. Respondents expressed their agreement with these items on a four-point scale ranging from 1 “totally agree” to 4 “totally disagree”. Again, items were reverse coded before the index was created. Finally, the survey asked the participants to indicate their environmental values. Drawing on Schultz (2000, 2001), egocentric values were represented by the item “You think that taking these actions will save you money,” and social-altruistic values were represented by “You are very concerned about the world that you will leave for the young and future generations”.

3.1.4. Individual-level control variables

As control variables, we incorporated gender, age, education (measured in the number of years to complete full-time education), and household composition into our model.

3.2. Societal-level data

3.2.1. Country sample

This study covers 28 European countries, including Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and Turkey (Table 1).

3.2.2. Cultural values

At the national level, we included Hofstede's six culture dimensions (i.e., PDI, UAI, COL, MAS, PRA, and IND) into the model as direct antecedents of EMCR. We derived country scores for each dimension from Hofstede's webpage (Hofstede, Hofstede, & Minkov, 2010).

3.2.3. Gross domestic product

We took several precautions to ensure the robustness of the estimation and to exclude alternative accounts of cultural influences. Certain cultural dimensions are known to correlate substantially with macro-economic variables, such as the level of economic development (Gouveia & Ros, 2000). A country's gross domestic product is further known as a source of differences in pro-environmental behavior. People from countries with greater GDP per capita show stronger engagement in various pro-environmental behaviors (e.g., Franzen & Meyer, 2009) and consumption reduction (Hoffmann, 2014). To rule out spurious correlations and a possible confounding of economic differences among the countries, the estimation controls for the respective country's GDP per capita. We are thus also able to confirm that potential cultural influences on counter-arguing and EMCR are

indeed incremental and thus unique. We extracted the data from the CIA World Factbook website (<https://www.cia.gov/library/publications/the-world-factbook>). Note that robustness checks will control for alternative calculations of GDP (production approach, expenditure approach, and income approach), providing further evidence for the stability of the results.

3.2.4. Country-specific consumption level

It is noteworthy to mention that we took further precautions to exclude distortions in the dependent variable EMCR. To check for the biasing impact of country-specific consumption levels, an additional model includes several control variables that cover the prevalence of all EMCR indicators at the country level, as the reduction of energy, water, waste, and car use might depend on the availability of related resources in the respective country. Whether individuals can reduce their consumption in certain domains (e.g., water consumption) depends on a society's disposability of these goods as well as the average consumption. Along this line, the diffusion of cars strongly varies among the countries in our sample. In Slovakia, 272 out of 1000 inhabitants own or use cars, whereas cars are more widespread among the population of Germany (566 cars/1000 inhabitants). To account for these differences, we installed various control variables capturing the usage and diffusion of the EMCR measures. More specifically, we accounted for the following indices (per capita): passenger cars, electric power consumption, waste generated, and renewable internal freshwater resources. We took the data (year 2007) from the World Bank (energy, water), Eurostat (waste), and Econstat (car use). In this way, we included normed indicators for the national supply and demand of each EMCR measure. We controlled for energy consumption by including electricity consumption per household (in kWh), water consumption by freshwater resources per inhabitant (in 1000 m³ per inhabitant), reduction of consumption of disposable items through an index measuring the generation of waste (in kg per inhabitant), and car use by passenger cars (per 1000 inhabitants). We standardized all index variables prior to calculation.

3.3. Validity and measurement invariance

To assess the validity and measurement invariance of the multi-item constructs on the individual level (knowledge and counter-arguments), we ran an initial confirmatory factor analysis (CFA, with AMOS 24.0) for the 28 countries, which demonstrated a satisfactory level of model fit [$\chi^2_{(224)} = 403.850$; comparative fit index CFI = 0.994, root mean square of sample approximation RMSEA = 0.008]. We confirmed discriminant validity (Fornell & Larcker, 1981) because the average variance extracted, that is the squared root of means of the squared latent variables loadings (knowledge: 0.75, counter-arguments: 0.40) were greater than the maximum correlations of latent variables ($r_{\max}^2 = 0.02$). We performed multi-group CFAs to test between-group (i.e., between-country) measurement invariance in several steps (Steenkamp & Baumgartner, 1998). The initial analysis confirmed configural invariance, meaning that the model with the same subset of indicators performs well with the same constructs in all countries. In subsequent nested models, we first constrained the measurement weights and then constrained the structural covariances. Due to the large sample size, we followed Cheung and Rensvold (2002), who state that changes in CFI for model fit comparisons with $\Delta CFI \leq 0.01$ indicate no significant difference, while ΔCFI between 0.01 and 0.02 indicates a marginal difference. As shown in Table 3, the metric invariance model (restricted measurement weights) does not significantly differ from the baseline model ($\Delta CFI = -0.004$), which indicates measurement invariance; that is, the measurement models perform similarly across the 28 countries in our sample. To support the robustness of this analysis, we additionally ran 28 multi-group CFAs, which contrasted each individual country against a model calculated with the rest of the sample. The maximum of all CFI differences in all nested model comparisons is $\Delta CFI_{\max} = 0.003$ indicating no variation across the models.

3.4. Model estimation

To estimate the society-specific cultural influences on the suggested relationships at the individual level, we applied a multi-level statistical technique (Brewer & Venaik, 2012). We specified two hierarchically nested levels with 16,095 individuals (level 1) nested within 28 countries (level 2). As it is inappropriate to apply ordinary least squares (OLS) regression to multi-level data, which provokes the "ecological fallacy" error (House & Hanges, 2004), we used hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002). The application of the iterative maximum likelihood estimation allows for an estimation of the effects of higher-order level variables (e.g., culture scores) on variables at lower levels of the analysis (e.g., individual behaviors) (Ozkaya, Dabas, Kolev, Hult, Dahlquist, and Manjeshwar, 2013). Assigning each variable to its appropriate level has several advantages, such as avoiding misjudgment of the units of analysis due to data aggregation, avoiding disaggregation of data, which leads to an artificial increase in the sample size, and avoiding the reduction of variance in the predictor variables (Ozkaya et al., 2013).

Centering plays a pivotal role in the interpretation of HLM analyses because the centering method influences the explanation of the obtained results (Kreft, De Leeuw, & Aiken, 1995; Longford, 1989). For the level 1 variables in particular, the decision to use

Table 3

Test of measurement invariance.

Model	χ^2	df	χ^2/df	RMSEA	CFI
Unconstrained	403.850	224	1.80	0.008	0.994
Measurement weights	635.936	332	1.92	0.008	0.990
Structural covariances	1263.063	413	3.06	0.012	0.973

Notes. Confirmative factor analysis (AMOS 24.0). RMSEA = root mean square error of approximation, CFI = comparative fit index.

grand-mean centering, group-mean centering, or the raw metric should be based on theoretical assumptions and the research question rather than on statistical choices (Kreft, De Leeuw, & Aiken, 1995). As individual scores should be interpreted relative to the group mean (Cronbach, 1976), we used group-mean centering at the individual level (i.e., we centered the individual-level predictors within countries). For the level 2 variables (index j for countries), we followed recommendations (e.g., Enders & Tofghi, 2007) to apply grand-mean centering for the national-level predictors. The mixed measurement models are formally described as follows. The individual-level model (level 1) captures the individual drivers of EMCR (subscript e for EMCR), as summarized in Eq. (E1):

$$EMCR_{ij} = \beta_{e0j} + \beta_{e1j} * (Seriousness_{ij}) + \beta_{e2j} * (Knowledge_{ij}) + \beta_{e3j} * (Knowledge_{ij} * Seriousness_{ij}) + \beta_{e4j} * (Counter - Arguments_{ij}) + \beta_{e5j} * (Gender_{ij}) + \beta_{e6j} * (Age_{ij}) + \beta_{e7j} * (Education_{ij}) + \beta_{e8j} * (Household Composition_{ij}) + e_{eij} \quad e_{eij} \sim N(0, \sigma_{e_{eij}}^2) \tag{E1}$$

where $EMCR_{ij}$ represents the extent of EMCR of consumer i in country j (superscript i denotes consumers, whereas j indexes the respective country). β_{e0j} represents the random intercept, β_{e1j} to β_{e8j} denote the regression slopes, and e_{eij} the individual-level errors. Our framework suggests that EMCR, as expressed in Eq. (E1), is affected in part by cultural influences. Consequently, we model these influences in the societal-level model (level 2) controlling for economic and resource-related factors (e.g., energy index or water index). The societal-level model is summarized in Eq. (E2), with $cov(e_{eij}, u_{e0j}) = 0$:

$$\beta_{e0j} = \gamma_{e00} + \gamma_{e01} * (Power Distance)_{1j} + \gamma_{e02} * (Masculinity)_{1j} + \gamma_{e03} * (Uncertainty Avoidance)_{1j} + \gamma_{e04} * (Pragmatism)_{1j} + \gamma_{e05} * (Indulgence)_{1j} + \gamma_{e06} * (Collectivism)_{1j} + \gamma_{e07} * (GDP/capita)_{1j} + \gamma_{e08} * (Index Car)_{1j} + \gamma_{e09} * (Index Energy)_{1j} + \gamma_{e010} * (Index Waste)_{1j} + \gamma_{e011} * (Index Water)_{1j} + u_{e0j} \quad u_{e0j} \sim N(0, \sigma_{u_{e0j}}^2) \tag{E2}$$

where γ_{e00} represents the country-level intercept, γ_{e01} to γ_{e06} indicate the country-level regression coefficients for the cultural dimensions and γ_{e07} to γ_{e011} the country-level regression coefficients for the control variables as well as u_{e0j} is the error term at the country level.

In a similar fashion, we specify the prediction of the activation of counter-arguments (subscript c for counter-arguments). The mechanisms operating at the individual level (summarized in Eq. C1) are nested within the societal-level model Eq. (C2) to estimate the cultural influences and to rule out competing explanations by national differences, with $cov(e_{cij}, u_{c0j}) = cov(e_{cij}, u_{c1}) = cov(e_{cij}, u_{c2}) = 0$:

$$Counter - Arguments_{ij} = \beta_{c0j} + \beta_{c1j} * (Seriousness_{ij}) + \beta_{c2j} * (Knowledge_{ij}) + \beta_{c3j} * (Knowledge * Seriousness_{ij}) + \beta_{c4j} * (Gender_{ij}) + \beta_{c5j} * (Age_{ij}) + \beta_{c6j} * (Education_{ij}) + \beta_{c7j} * (Household Composition_{ij}) + \beta_{c8j} * (Egocentric Values_j) + \beta_{c9j} * (Egocentric Values * Knowledge_{ij}) + \beta_{c10j} * (Egocentric Values * Seriousness_{ij}) + \beta_{c11j} * (Social - Altruistic Values_{ij}) + \beta_{c12j} * (Social - Altruistic Values * Knowledge_{ij}) + \beta_{c13j} * (Social - Altruistic Values * Seriousness_{ij}) + e_{cij} \quad e_{cij} \sim N(0, \sigma_{e_{cij}}^2) \tag{C1}$$

$$\beta_{c0j} = \gamma_{c00} + \gamma_{c01} * (Power Distance)_{1j} + \gamma_{c02} * (Masculinity)_{1j} + \gamma_{c03} * (Uncertainty Avoidance)_{1j} + \gamma_{c04} * (Pragmatism)_{1j} + \gamma_{c05} * (Indulgence)_{1j} + \gamma_{c06} * (Collectivism)_{1j} + \gamma_{c07} * (GDP/capita)_{1j} + u_{c0j} \quad u_{c0j} \sim N(0, \sigma_{u_{c0j}}^2) \tag{C2}$$

We furthermore tested the variability of the seriousness and knowledge slopes in all 28 countries, which were determined by the level of indulgence and collectivism (Hypotheses 5_{a/b} and 6_{a/b}):

$$\beta_{c1j} = \gamma_{c10} + \gamma_{c11} * (Collectivism)_{2j} + \gamma_{c12} * (Indulgence)_{2j} + u_{c1j} \quad u_{c1j} \sim N(0, \sigma_{u_{c1j}}^2) \tag{C3}$$

$$\beta_{c2j} = \gamma_{c20} + \gamma_{c21} * (Collectivism)_{2j} + \gamma_{c22} * (Indulgence)_{2j} + u_{c2j} \quad u_{c2j} \sim N(0, \sigma_{u_{c2j}}^2) \tag{C4}$$

4. Results

4.1. Prediction of EMCR

The analysis of our conceptual model and its different layers comprised several steps. First, to check for the effects at the individual level (e.g., to examine mediation), we initially ran fixed effects regressions (e.g., Models 1a–d, in Table 4) and a

Table 4
Prediction of environmentally motivated consumption reduction.

	1a) Fixed Effects Model			1b) Fixed Effects Model			1c) Fixed Effects Model			1d) Fixed Effects Model			1e) SEM			1f) HLM			1g) HLM			
	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	
<i>Individual-Level Controls</i>																						
Constant	1.13	***	19.15	1.19	***	20.26	1.19	***	20.25	1.26	***	20.32				1.90	***	47.06	1.90	***	47.29	
Gender	.23	***	12.72	.24	***	13.10	.24	***	13.07	.24	***	12.46	.10	***	12.55	.24	***	7.24	.23	***	7.76	
Age	.08	***	8.42	.11	***	11.01	.11	***	11.03	.12	***	11.28	.09	***	11.96	.12	***	7.00	.12	***	7.03	
Education	.20	***	10.33	.16	***	8.28	.16	***	8.28	.15	***	7.38	.06	***	8.11	.15	***	8.07	.15	***	8.02	
Household Composition	.08	**	3.23	.07	**	3.00	.07	**	3.03	.06	*	2.26	.02	*	2.30	.05	*	1.98	.05	*	2.15	
<i>Individual-Level Predictors</i>																						
Climate change Knowledge				.12	***	12.50	.12	***	12.42	.11	***	10.55	.08	***	9.81	.10	***	7.11	.11	***	7.27	
Seriousness of Climate Change				.14	***	15.78	.15	***	15.74	.07	***	6.30	.01	n.s.	.58	.07	***	4.40	.07	***	4.40	
Knowledge x Seriousness							.01	n.s.	.67	.00	n.s.	-.16	-.01	n.s.	-.99	.01	n.s.	.67	.01	n.s.	.75	
Counter-arguments										-.18	***	-16.80	-.21	***	-16.32	-.18	***	-10.04	-.18	***	-9.95	
<i>National-Level Controls: Culture and GDP</i>																						
Power Distance																-.01	n.s.	-.36	-.01	n.s.	-.12	
Masculinity																.04	n.s.	1.25	.02	n.s.	.77	
Uncertainty Avoidance																.01	n.s.	.37	.04	n.s.	1.00	
Pragmatism																.12	**	3.11	.10	**	2.85	
Indulgence																.14	**	2.87	.17	***	4.61	
Collectivism																.02	n.s.	.32	-.06	n.s.	-1.06	
GDP / capita																.10	**	3.00	.10	**	2.97	
<i>National-Level Control: Consumption Levels</i>																						
Index Car																			.01	n.s.	.26	
Index Energy																			.14	**	2.71	
Index Waste																			-.10	n.s.	-1.57	
Index Water																			-.04	n.s.	-.78	

Notes. Model 1a – 1d: fixed-effects regression, 1e: structure equation modeling (SEM) with country dummies, 1f-g: hierarchical linear models (HLM). HLM: Entries are estimations of standardized fixed effects with robust standard errors. Level of significance: + $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, n.s. not significant. We ran additional robustness checks, including alternative calculations of GDP (production approach, expenditure approach, income approach). The results remained stable.

SEM model to account for measurement error (e.g., Model 1e). In the second step, we ran a set of multi-level models to estimate cross-level effects on EMCR using HLM (e.g., Models 1f and 1g in Table 4).

The analyses clearly show that after controlling for sociodemographic information (Model 1a, overall $R^2 = 0.03$), both climate change knowledge and perceived seriousness increase EMCR (Model 1c, overall $R^2 = 0.05$). Counter-arguments additionally reduce EMCR (Model 1d, overall $R^2 = 0.07$), and this impact is incremental (i.e., additive) and robust. We tested societal-level influences in Models 1f ($R^2 = 0.11$, Snijders & Bosker, 1999) and 1g ($R^2 = 0.11$) by applying the multi-level analysis to account for intra-level variation. As expected, environmentally motivated actions leading to consumption reduction are more common in societies with higher GDP/capita, which substantiates the need to control for economic development. In regards to our overarching premise, cultural factors—more precisely, pragmatism and indulgence—exert significant positive effects, in addition to GDP/capita. Model 1f substantiates that the cultural imprint on EMCR is incremental and thus unique. Beyond pragmatism and indulgence, the remaining cultural dimensions exert no substantial main effects. Notably, the pattern of all effects remains stable when the controls of country-specific consumption levels are included (Model 1g). This demonstrates that the relationships are not disturbed by country specifics in the EMCR domains.

4.2. Mediating effect of counter-arguments

Next, we examine whether the influences of climate change knowledge and perceived seriousness on EMCR are (at least partly) mediated by the generation of counter-arguments. To this end, we follow a three-step procedure (Baron & Kenny, 1986) including the country-specific effects. First, as outlined in Model 1c, climate change knowledge and perceived seriousness of climate change exert significant positive direct effects on EMCR. Second, after controlling for sociodemographic information (Model 2a, overall $R^2 = 0.01$; Table 5), both predictors also significantly affect the mediator counter-arguments (Model 2c, overall $R^2 = 0.20$). Note that the impact of perceived seriousness outweighs that of climate change knowledge. The third step of the mediation analysis reveals partial mediation. When we include the mediator, the direct influence of perceived seriousness decreases considerably (Model 1d, overall $R^2 = 0.07$). It is noteworthy that this mediating effect remains stable when including the controls as well as the level 2 variables (Model 1f: $R^2 = 0.11$; Model 1g: $R^2 = 0.11$).

Furthermore, at the individual level 1, Preacher and Hayes (2008) bootstrapping procedure (10,000 samples) shows a significant indirect effect (indirect effect $IE = 0.07$, $SE = 0.005$, 95% confidence interval (95% CI): 0.068 to 0.087) of the perceived seriousness of climate change on EMCR via counter-arguments, supporting H2. We also observe a positive but weaker indirect effect (indirect effect $IE = 0.01$, $SE = 0.002$, 95% CI: 0.007 to 0.014) of climate change knowledge on EMCR operating through counter-arguments (H1).

4.3. Moderation of counter-arguments' effect

Next, we explore the moderation of counter-arguments at the individual and societal levels (Models 2d to 2g). Model 2d ($R^2 = 0.22$) demonstrates that the influence of perceived seriousness is qualified by individual values. With stronger egocentric values, elevating levels of perceived seriousness increasingly hamper the activation of counter-arguments. This interaction effect supports H3b regarding the effects of perceived seriousness ($R^2 = 0.17$).

Model 2g focuses on the moderating role of culture. The analysis reveals that collectivism mitigates the effect of seriousness. The negative relationship between perceived seriousness and counter-arguments is, on average, stronger in societies with lower degrees of collectivism, supporting H6_b. To illustrate this interaction, Fig. 2 depicts the collectivism scores and regression coefficients for the effects of perceived seriousness on counter-arguments (aggregated for each society). We observe a strong attenuating effect of perceived seriousness, particularly in societies in which consumers tend to be less tightly integrated into the in-group, as reflected in the rather loose ties between individuals—that is, societies with a lower degree of collectivism. Given that the activation of counter-arguing was shown to evoke a behavioral impact (Table 4), EMCR bears an imprint of this pattern.

To illustrate the implications of differential counter-arguing, we spotlight the prototypical countries that prioritize the respective cultural values. For this purpose, we pooled the ten countries with the highest collectivism scores and ten countries with the lowest collectivism scores and formed a binary variable (0 = archetypes of individualistic countries, 1 = collectivistic countries). Moderated mediation (10,000 bootstrapped samples) was conducted with perceived seriousness as independent variable, the developed counter-arguments as the mediators, EMCR as the dependent variable, and the pooled countries as the moderator as well as the individual controls. The results confirm the above conclusions by showing that the indirect effect of perceived seriousness on EMCR, operating through counter-arguing, is more pronounced in individualistic countries ($B = 0.088$, $SE = 0.007$, 95% CI: 0.076 to 0.101) than in more collectivistic countries ($B = 0.057$, $SE = 0.005$, 95% CI: 0.048 to 0.068). The index of moderated mediation confirms significant differences between the indirect effects of the two pools of countries ($B = -0.031$, $SE = 0.005$, 95% CI: -0.0402 to -0.022). The differences in indirect effects for climate change knowledge are much weaker between the individualistic countries ($B = 0.009$, $SE = 0.002$, 95% CI: 0.076 to 0.101) and the more collectivistic countries ($B = 0.006$, $SE = 0.003$, 95% CI: 0.000 to 0.012) and only directional. However, in contrast to the predictions of H5, the moderating influence of indulgence on a national level does not reach significance.

In a step-wise follow-up analysis, we test whether the remaining Hofstede dimensions interact with the predictors. To this end, we included all level 1 variables and ran single follow-up analyses for the interaction of each cultural dimension with each predictor (climate change knowledge and perceived seriousness). We found no significant interactions for the remaining Hofstede dimensions ($ps > 0.05$).

Table 5
Prediction of counter-arguments.

	2a) Fixed effects model			2b) Fixed effects model			2c) Fixed effects model			2d) Fixed effects model			2e) SEM			2f) HLM			2 g) HLM		
	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>
<i>Individual-level controls</i>																					
Constant	6.78	***	60.03	6.53	***	63.72	6.54	***	63.92	6.47	***	63.33				6.03	***	78.55	6.03	***	78.55
Gender	-0.19	***	-5.47	-0.11	***	-3.51	-0.10	**	-3.32	-0.10	**	-3.11	-0.03	***	-3.94	-0.11	***	-3.48	-0.10	***	-3.45
Age	0.13	***	6.97	0.08	***	4.65	0.08	***	4.44	0.08	***	4.94	0.04	***	5.02	0.08	***	3.62	0.08	***	3.59
Education	-0.26	***	-7.14	-0.18	***	-5.49	-0.18	***	-5.53	-0.16	***	-4.94	-0.04	***	-4.41	-0.16	***	-3.50	-0.16	***	-3.50
Household Composition	-0.04	n.s.	-0.86	-0.02	n.s.	-0.47	-0.03	n.s.	-0.66	-0.01	n.s.	-0.22	0.00	n.s.	0.24	-0.01	n.s.	-0.17	-0.01	n.s.	-0.18
<i>Individual-level predictors</i>																					
Climate change knowledge				-0.12	***	-7.15	-0.11	***	-6.52	-0.11	***	-6.28	-0.06	***	-6.15	-0.11	**	-2.90	-0.11	**	-2.96
Seriousness of climate change				-0.89	***	-54.44	-0.88	***	-53.42	-0.84	***	-50.38	-0.52	***	-45.90	-0.81	***	-17.83	-0.81	***	-18.75
Knowledge \times seriousness							-0.11	***	-7.17	-0.11	***	-6.76	-0.07	***	-6.96	-0.10	***	-4.54	-0.10	***	-4.54
<i>Individual level interactions</i>																					
Egocentric values										0.01	n.s.	0.73	0.01	n.s.	0.78	0.01	n.s.	0.59	0.01	n.s.	0.72
Egocentric values \times knowledge										0.03	+	1.86	0.02	*	2.00	0.03	+	1.72	0.03	+	1.86
Egocentric values \times seriousness										-0.06	***	-3.79	-0.03	***	-3.46	-0.05	**	-3.08	-0.05	**	-3.00
Social-altruistic values										-0.21	***	-12.82	-0.12	***	-13.25	-0.20	***	-8.87	-0.20	***	-9.05
Social-altruistic values \times know.										-0.00	n.s.	-0.17	0.00	n.s.	-0.25	0.00	n.s.	0.20	0.00	n.s.	0.16
Social-altruistic values \times seri.										-0.02	n.s.	-1.48	-0.01	n.s.	-0.88	-0.02	n.s.	-0.97	-0.02	n.s.	-1.02
<i>National-level controls: culture and GDP</i>																					
Power distance																0.16	*	1.97	0.16	*	1.97
Masculinity																-0.11	n.s.	-1.28	-0.21	+	-1.90
Uncertainty avoidance																-0.05	n.s.	-0.50	-0.11	n.s.	-1.28
Pragmatism																-0.10	n.s.	-1.22	-0.05	n.s.	-0.50
Indulgence																-0.29	*	-2.16	-0.10	n.s.	-1.22
Collectivism																-0.21	+	-1.90	-0.29	*	-2.16
GDP/capita																0.23	*	2.56	0.23	*	2.56
<i>Cross-level interactions</i>																					
Collectivism \times knowledge																			0.05	+	1.73
Collectivism \times seriousness																			0.12	**	2.70
Indulgence \times knowledge																			0.04	n.s.	1.21
Indulgence \times seriousness																			0.01	n.s.	0.34

Notes. Model 2a–2d: fixed-effects regression, 2e: structure equation modeling (SEM) with country dummies, 2f–g: hierarchical linear models (HLM). HLM: Entries are estimations of standardized fixed effects with robust standard errors. Level of significance: + $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, n.s. not significant. We ran additional robustness checks, including alternative calculations of GDP (production approach, expenditure approach, income approach). The results remained stable.

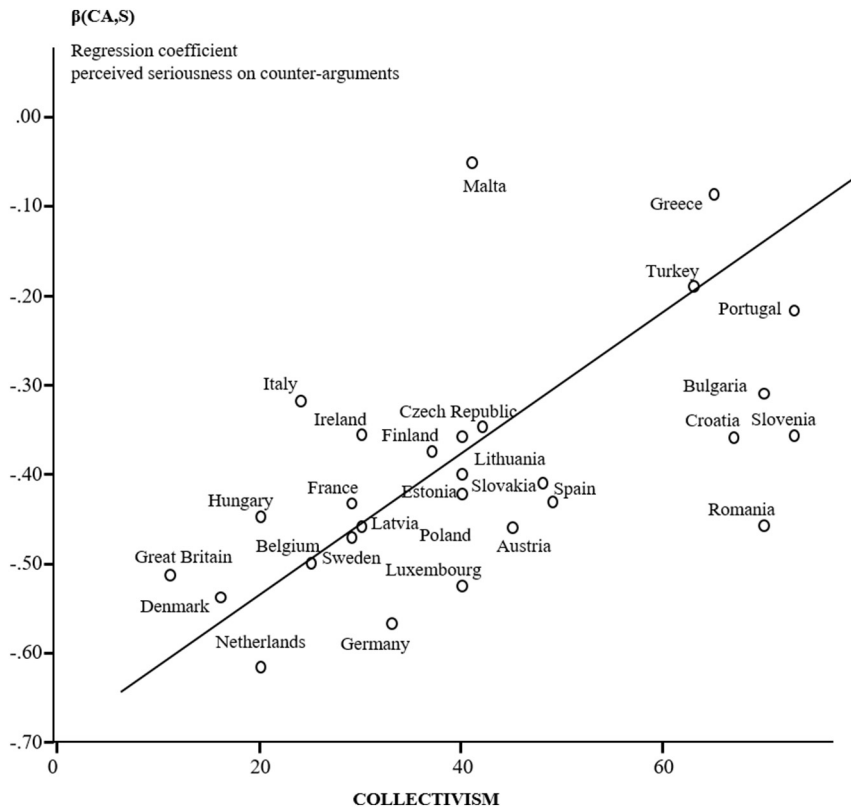


Fig. 2. Influence of perceived seriousness on counter-arguments depending on the level of collectivism.

Table 6
Composite construct and single items of counter-arguments as independent variables.

Dependent variable: EMCR	Counter-arguments			Denial of the cause			Denial of the effect			Small agent		
	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>	β	<i>p</i>	<i>t</i>
<i>Individual-level controls</i>												
Constant	1.90	***	47.29	1.90	***	44.05	1.90	***	46.86	1.90	***	49.26
Gender	0.23	***	7.76	0.24	***	7.84	0.23	***	7.60	0.24	***	7.85
Age	0.12	***	7.03	0.12	***	7.02	0.12	***	7.20	0.12	***	6.94
Education	0.15	***	8.02	0.15	***	8.60	0.16	***	8.60	0.15	***	8.13
Household Composition	0.05	*	2.15	0.05	*	2.21	0.06	*	2.41	0.05	*	2.20
<i>Individual-level predictors</i>												
Climate change knowledge	0.11	***	7.27	0.11	***	7.02	0.11	***	7.55	0.11	***	7.39
Seriousness of climate change	0.07	***	4.40	0.12	***	6.35	0.08	***	4.41	0.11	***	6.31
Knowledge \times seriousness	0.01	n.s.	0.75	0.02	n.s.	1.29	0.01	n.s.	0.87	0.01	n.s.	1.17
Counter-arguments	-0.18	***	-9.95	-0.11	***	-6.07	-0.16	***	-8.81	-0.12	***	-7.28
<i>National-level controls: culture and GDP</i>												
Power distance	-0.01	n.s.	-0.12	0.02	n.s.	0.30	-0.01	n.s.	-0.18	-0.05	n.s.	-0.94
Masculinity	0.02	n.s.	0.77	-0.02	n.s.	-0.53	0.02	n.s.	0.64	0.06	*	1.97
Uncertainty avoidance	0.04	n.s.	1.00	0.05	n.s.	1.07	0.04	n.s.	0.87	0.03	n.s.	0.62
Pragmatism	0.10	**	2.85	0.09	*	2.26	0.10	**	2.71	0.13	***	3.58
Indulgence	0.17	***	4.61	0.17	***	4.84	0.17	***	4.50	0.17	***	4.74
Collectivism	-0.06	n.s.	-1.06	-0.11	+	-1.69	-0.06	n.s.	-1.00	0.01	n.s.	0.20
GDP/capita	0.10	**	2.97	-0.02	n.s.	-0.34	-0.03	n.s.	-0.49	-0.02	n.s.	-0.40
<i>National-level control: consumption levels</i>												
Index car	0.01	n.s.	0.26	0.00	n.s.	0.09	0.01	n.s.	0.19	-0.01	n.s.	-0.28
Index energy	0.14	**	2.71	0.15	**	2.81	0.15	**	2.75	0.14	**	2.83
Index waste	-0.10	n.s.	-1.57	-0.09	n.s.	-1.46	-0.10	n.s.	-1.54	-0.07	n.s.	-1.30
Index water	-0.04	n.s.	-0.78	-0.06	n.s.	-0.94	-0.05	n.s.	-0.84	-0.06	n.s.	-1.17

Notes. Level of significance: + $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, n.s. not significant.

4.4. Contrasting different counter-arguments

The main analysis uses a summary construct to assess the mediating effect of counter-arguments. Adopting the procedure used by Klein et al. (2004), we estimate several additional models, each containing one of three specific facets of counter-arguments (small agent, denial of effect, denial of cause) to predict EMCR. These additional analyses confirm that the results remain stable when including the three types of counter-arguments instead of the composite construct (Table 6). Still, it appears that denial of cause is most strongly inhibited by elevating levels of perceived seriousness of climate change.

We furthermore test whether the effects of the regressors on the developed counter-arguments vary when including the three types of counter-arguments as single dependent variables. The results remain widely stable (Table 7) and the mechanisms appear to be relatively universal for the different types of counter-arguments. Remarkably, the negative influence of knowledge even vanishes when denial of the effect is the dependent variable. Furthermore, the interaction between collectivism and seriousness is significant when denial of the effect and denial of the cause are the dependent variables, whereas there is only a statistically significant interaction between collectivism and knowledge when we test for the influence of the independent variables on the small agent argument.

4.5. Robustness checks

We conducted a series of robustness checks to address a number of issues that might have affected our findings, such as (i) the restricted sample, (ii) the measure of EMCR, (iii) the different facets of the construct, (iv) selection bias, and (v) the biasing effect of measurement error. As regards (i), the main analyses excluded respondents who did not take action against climate change as these respondents were not asked about the EMCR measures in the sampling protocol. These respondents by default were also not asked to indicate their social-altruistic or egocentric values. For this reason, we could not estimate our conceptual model with the full sample because of missing information. To ensure that the selection did not affect the findings, we ran several alternative tests using the full sample (N = 27,860). We assumed that those individuals who indicated that they do not take action against climate change do not reduce their consumption level, and thus, coded their EMCR = 0. Both, the influences at level 1 (individual) as well as the influence at the societal level 2 remain stable (Appendix A1).

Next, we used another but less fine-grained proxy for EMCR (ii). We tested our model with “taken actions” instead of EMCR as dependent variable (1 = respondents took any action against climate change, regardless of the EMCR-measures; 0 = respondents did not take actions against climate change at all), which allows estimating the model with the full sample. Given the binary

Table 7
Composite construct and single items of counter-arguments as dependent variables.

Dependent variable	Counter-arguments			Denial of the cause			Denial of the effect			Small agent		
	β	p	t	β	p	t	β	p	t	β	p	t
<i>Individual-level controls</i>												
Constant	6.03	***	78.55	2.08	***	56.36	1.88	***	65.35	2.07	***	85.64
Gender	-0.10	***	-3.45	-0.02	n.s.	-1.34	-0.06	***	-4.53	-0.03	+	-1.75
Age	0.08	***	3.59	0.03	**	2.77	0.02	**	2.76	0.03	**	2.64
Education	-0.16	***	-3.50	-0.06	**	-3.03	-0.03	*	-2.30	-0.07	**	-3.09
Household composition	-0.01	n.s.	-0.18	0.00	n.s.	0.07	0.02	n.s.	0.76	-0.03	n.s.	-1.44
<i>Individual-level predictors</i>												
Climate change knowledge	-0.11	**	-2.96	-0.05	**	-2.95	-0.02	n.s.	-1.41	-0.04	**	-2.78
Seriousness of climate change	-0.81	***	-18.75	-0.66	***	-13.27	-1.10	***	-21.10	-0.66	***	-16.94
Knowledge × seriousness	-0.10	***	-4.54	-0.03	**	-2.93	-0.04	***	-5.92	-0.03	*	-2.16
<i>Individual level interactions</i>												
Egocentric values	0.01	n.s.	0.72	0.01	n.s.	0.67	0.00	n.s.	0.13	0.01	n.s.	0.64
Egocentric values × knowledge	0.03	+	1.86	0.01	n.s.	1.48	0.01	n.s.	1.07	0.01	n.s.	1.45
Egocentric values × seriousness	-0.05	**	-3.00	-0.01	+	-1.80	-0.01	**	-2.78	-0.02	+	-1.91
Social-altruistic values	-0.20	***	-9.05	-0.07	***	-5.96	-0.07	***	-10.24	-0.06	***	-5.40
Social-altruistic values × knowledge	0.00	n.s.	0.16	0.01	n.s.	0.98	0.00	n.s.	-0.03	0.00	n.s.	-0.07
Social-altruistic values × seriousness	-0.02	n.s.	-1.02	-0.01	n.s.	-1.07	0.00	n.s.	-0.08	-0.01	n.s.	-1.06
<i>National-level controls: culture and GDP</i>												
Power distance	0.16	*	1.97	0.03	n.s.	0.64	0.07	**	2.72	0.06	**	2.68
Masculinity	-0.21	+	-1.90	-0.02	n.s.	-0.27	-0.13	**	-3.15	-0.07	*	-2.46
Uncertainty avoidance	-0.11	n.s.	-1.28	-0.04	n.s.	-0.86	-0.03	n.s.	-1.16	-0.04	n.s.	-1.65
Pragmatism	-0.05	n.s.	-0.50	-0.03	n.s.	-0.60	0.01	n.s.	0.31	-0.03	n.s.	-1.10
Indulgence	-0.10	n.s.	-1.22	-0.03	n.s.	-0.64	-0.04	n.s.	-1.35	-0.03	n.s.	-1.36
Collectivism	-0.29	*	-2.16	-0.06	n.s.	-0.90	-0.08	+	-1.75	-0.15	***	-3.69
GDP/capita	0.23	*	2.56	0.06	n.s.	1.03	0.11	***	3.87	0.05	*	2.55
<i>Cross-level interactions</i>												
Collectivism × knowledge	0.05	+	1.73	0.00	n.s.	-0.09	0.02	n.s.	1.61	0.03	*	2.05
Collectivism × seriousness	0.12	**	2.70	0.05	**	3.02	0.04	*	2.00	0.00	n.s.	-0.01
Indulgence × knowledge	0.04	n.s.	1.21	0.00	n.s.	0.16	0.02	*	2.21	0.03	+	1.79
Indulgence × seriousness	0.01	n.s.	0.34	0.01	n.s.	0.41	0.00	n.s.	0.01	0.00	n.s.	-0.15

Notes. Level of significance: + p ≤ .10, * p ≤ .05, ** p ≤ .01, *** p ≤ .001, n.s. not significant.

nature of this EMCR measure, we used a Bernoulli sampling and applied a logit link function. Again, results remained stable, even when including the single types of counter-arguments (Appendix A2).

EMCR is a multi-faceted construct (iii) pertaining to the reduction of purchases and consumption. We therefore isolated both dimensions, finding results that are very similar for consumption reduction and purchase reduction (Appendix A3). Additionally, we ran an SEM model that includes the multiple mediated paths via the three counter-arguments (Appendix A4, Model A). The results remain stable and all three mediations are fully tested within one model. We furthermore ran a SEM model which includes the four-item measurement model of EMCR (see Appendix A4, Model B). We also included country-fixed effects into the SEM (Appendix A4, model B). The pattern of results does not change.

We also double-checked and corrected for the possibility of a distortion by unobservables in the selection (iv) by running a Heckman selection model. Heckman's two-step procedure confirms that for both EMCR and counter-arguments, selection bias does not seem an issue. The estimate of the inverse Mills ratio is low and insignificant for EMCR ($\lambda = 0.007$, $SE = 0.218$, $t = 0.030$, $p = 0.976$) and for counter-arguments ($\lambda = -0.020$, $SE = 0.156$, $t = -0.126$, $p = 0.900$), suggesting that no (unobserved) factors beyond our predictors made it more likely that participants indicated having actually taken actions.

Finally, we conducted a check to account for measurement error in the constructs (v), as otherwise parameter estimates can be biased, especially for the relevant interaction effects. We ran structural equation modeling (SEM) with the full sample (Web Appendix W1) and for each country sample separately (Web Appendix W2). Also, these results support the previous findings. Additionally, we conducted multi-group SEM contrasting again the ten countries with the highest degree of collectivism vs. the ten countries with the lowest collectivism values. A basic model, in which we constraint all measurement weights and structural weights across the two groups shows a good model fit ($\chi^2_{(315)} = 3200.943$; $CFI = 0.968$, $RMSEA = 0.030$). As a multi-group moderation test, we allowed the structural path of seriousness on counter-arguments to vary freely across the two group, which resulted in a highly significant difference ($\Delta\chi^2 = 33.287$, $\Delta df = 1$, $p < 0.001$). In the high collectivism group, the path coefficient (which accounts for measurement error in the constructs) is -0.399 , while it is -0.594 in the low collectivism group. Overall, our series of robustness checks excluded potential bias and largely corroborated our findings.

5. Discussion

To reduce the harmful implications of climate change, a drastic cut in resource waste is urgently needed. It is trite to say that the waste of resources is closely linked to overconsumption of certain products or services. Especially in industrialized countries, a heated debated has evolved around the issue of finding ways to reduce patterns of excessive consumption. To tackle this issue, several initiatives have been launched addressing technological innovations or policies (e.g., the ban of incandescent light bulbs by the Commission of the European Union). This paper shifts the spotlight to the consumer by exploring the motives that drive individuals to reduce their consumption patterns and the aspects that prevent them from doing so. Considering the fact that changes are required across several countries, this research takes an international, multi-country perspective to explore whether the underlying psychological processes are universal or vary across countries calling for differentiated actions. Beyond motivational factors, we expected cultural background to modify the mechanisms that guide consumption reduction behaviors and the tendency to justify lack of initiative by motivated reasoning.

Using a comprehensive data set of 28 countries, this research has demonstrated that the role of neutralizing counter-arguments partly explains why improving knowledge about climate change alone falls short in stimulating EMCR on a large scale. In particular, the perception of seriousness, rather than knowledge, is shown to effectively defeat this cognitive defense mechanism. Our multi-level analysis reveals notable inter-individual variance in the activation of counter-arguments, with egocentric moderators being the critical catalyst. This research thus extends previous findings that solely focused on the promoters of EMCR in isolated single-country designs. From a theoretical standpoint, this study has demonstrated that the motivated reasoning (Kunda, 1990) is a relevant mechanism that prevents consumers from translating their knowledge about the harmful consequences of consumption patterns into practice. Besides the denial of effect and the small agent argument, the denial of cause was found to be particularly inhibited by perceptions related to the seriousness of climate change. This can be explained by the fact that both perceived seriousness and the denial are related to the same object (i.e., humans as facilitators accelerating climate change). Counter-arguing, as a rationalization process, is even influenced by factors that operate at different levels, namely, individually held values (esp. egocentric values) and cultural values shared in the consumer's society (esp. social values, namely, collectivism). These catalyzing effects anchored at different levels shape the activation of counter-arguments that consumers employ as a neutralization technique to liberate themselves. Nonetheless, some of our hypotheses were not supported by the data. For example, the expected moderating effect of the cultural dimension indulgence was not supported. This, and the non-significant results for moderation by the other cultural dimensions, suggest that the collectivism/individualism dimension is the most relevant cultural dimension qualifying the impact of counter-arguments on EMCR. This is an interesting finding, especially because some of these dimensions have been previously linked with environmentally friendly behaviors in the past (e.g., Gregory-Smith, Manika, & Demirel, 2017; Sarigöllü, 2009; Leonidou, Leonidou, & Kvasova, 2010). For example, Leonidou, Leonidou, & Kvasova (2010) found significant results for collectivism and pragmatism, Husted (2005) and Parboteeah, Addae, & Cullen (2012) demonstrated significant influences of collectivism. Remarkably, we also found direct effects of indulgence and pragmatism on EMCR, but the collectivism/individualism is the only variable that influences the mediation process of counter-arguments. Overall, our findings suggest that the egocentric moderators operate predominantly at the individual level, whereas the social moderators are more powerful at the societal (i.e., country) level.

6. Managerial implications

This research has several vital implications for international marketing managers who aim to uncover environment-based business opportunities in foreign markets, such as the implementation of eco-friendly export marketing strategies in international markets (Leonidou, Leonidou, and Kvasova, 2010). In general, companies must consider country segments and international consumer segments based on domain-specific behavioral variables given their strategic importance (e.g., Bijmolt, Paas, & Vermunt, 2004; Gielens & Steenkamp, 2007; Wu, 2013). With cognitions of climate change (knowledge, seriousness), this research examined the characteristics of consumer segments that strongly drive the thinking (counter-arguing) and behaviors of the consumer (EMCR).

6.1. Knowledge is essential, but perceived seriousness matters

Companies producing and selling environmentally friendly products or services should consider that the consumer's tendency toward self-serving rationalization partly counteracts the positive implications of raising knowledge. This investigation corroborates the role of motivated reasoning as an obstacle to transforming consumer behaviors. To bridge this barrier, prevention initiatives or social marketing campaigns often center on increasing consumer knowledge. Sometimes, these campaigns may come across as moral-laden or paternalistic to the average consumer who aspires to retain consumption habits. As we showed in this research, counter-arguments that liberate consumers from taking the necessary actions are only very weakly related to climate change knowledge. Hence, educating consumers alone is not sufficient to reduce doubts and to transform behaviors sustainably and in the long run. Making the seriousness of climate change more salient proved to be a much stronger lever to achieve this goal and should be the primary target.

6.2. It is one world but many markets

6.2.1. Consequences of the variation in EMCR across different societies

In regard to consumption reduction, mainly the cultural dimensions of long-term orientation and indulgence account for national differences in EMCR. It is important to add that these cultural influences go beyond economic variance among countries (i.e., in addition to GDP). For this reason, cultural aspects should be taken into account, and market segmentation seems appropriate when operating in different countries. Similarly, we find indications that EMCR is a post-materialistic issue as these consumption patterns are more likely to be observed in countries with stronger economic performance (i.e., higher GDP/capita). Thus, in lower-income countries, environmentally friendly products or services may be marketed with a focus on certain utilitarian benefits (e.g., “the green washing powder is gentler on your clothes and washing machine”) rather than stressing environmental or social aspects. The present findings are also in line with suggestions to adopt multi-country strategies (Lemmens, Croux, & Dekimpe, 2007), as our results support the need to adapt (rather than standardize) environmental marketing measures with regard to the targeted country, on both cultural and economic grounds. As we discuss next, this also has implications for policy makers.

6.2.2. Affecting seriousness and knowledge as the primary target across societies

The observed country differences in EMCR and cultural effects imply that private and public organizations seeking to stimulate environmental changes cross-nationally (e.g., the European Commission, Greenpeace, or Patagonia) need to adapt their strategies in accordance with cultural (and economic) characteristics. This investigation has demonstrated that climate change knowledge and perceived seriousness indirectly influence EMCR as they reduce consumers' tendency to generate counter-arguments. Again, triggering knowledge is less effective in reducing counter-arguments than triggering perceptions of seriousness. When policy makers and social marketers design campaigns to raise perceived seriousness (or climate change knowledge), they need to tailor these campaigns to the value structures of the targeted consumers. Consumers with strong social values are generally less prone to generating counter-arguments, whereas egocentric values serve as a catalyst that determines whether raising perceived seriousness (or knowledge) powerfully inhibits counter-arguing. When policy makers target consumers with strong egocentric values, strengthening perceived seriousness (knowledge) will have a stronger (slightly weaker) dampening effect for the activation of counter-arguments than when they target consumers who do not share these values.

Nonetheless, the above-described motive for making the seriousness of climate change and related aspects more salient must be fine-tuned to the respective market because the effectiveness of reducing counter-arguing is evidently dependent on the recipient's cultural background, and thus, the values prioritized in the respective country. To aid managerial decision making, we visualize this in Fig. 3, mapping the relative impact and absolute level of the two inhibitors of counter-arguing. According to these impact-level maps, the link between climate change knowledge and counter-arguments is weak in almost all countries analyzed in this study (left-hand side of Fig. 3). By contrast, we find a marked attenuating effect of perceived seriousness on counter-arguments (right-hand side of Fig. 3). Nonetheless, its magnitude varies considerably across countries. While there is a strong effect in Germany, the tool indicates an even stronger effect in the Netherlands; however, the absolute level of perceived seriousness is comparably low in the latter country. Consequently, this impact-level map pinpoints that there is a strong lever for intensifying EMCR in the Netherlands by raising the perceived seriousness, whereas in Germany, there is less room to maneuver. In this way, impact-level maps based on the study results (such as Fig. 3) provide the necessary empirical basis to fine-tune (social) marketing strategies for a large number of markets and country clusters, instead of relying on intuition.

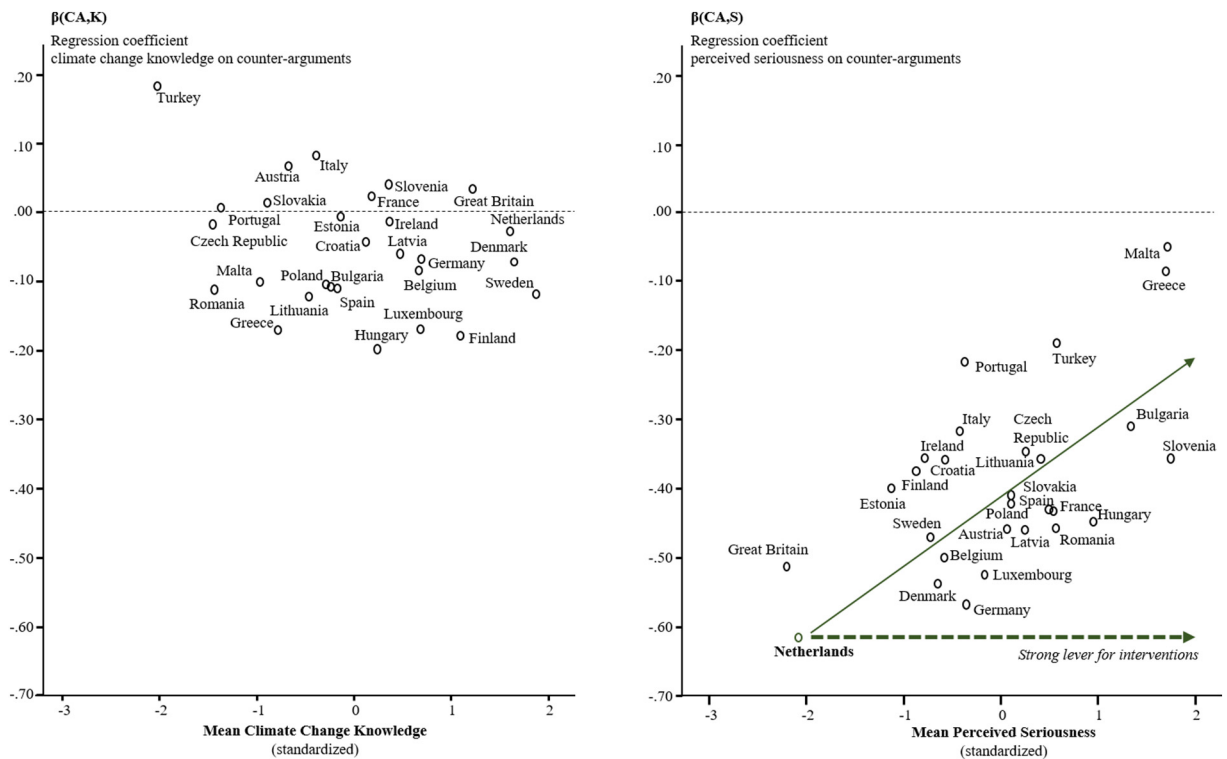


Fig. 3. Impact-level-maps for climate change knowledge and perceived seriousness on counter-arguments.

While this country-specific perspective should be particularly interesting to policy makers from these countries or companies interested in a specific market, internationally operating firms and supra-national political entities will be more interested in answers to the question of which countries can be addressed similarly and what measures are effective in the respective clusters.

Table 8
Tailoring the target of marketing campaigns to three country segments.

	Cluster 1	Cluster 2	Cluster 3
Description			
Countries	Austria, Belgium, Denmark, Finland, France, Malta, Netherlands, Spain	Czech Republic, Great Britain, Greece, Hungary, Ireland, Latvia, Luxembourg, Romania, Sweden	Bulgaria, Croatia, Estonia, Germany, Italy, Lithuania, Poland, Portugal, Slovakia, Slovenia, Turkey
Unique cultural characteristic	Highest level of indulgence	Moderate levels of indulgence and collectivism	Highest level of collectivism
Collectivism score	33	37	52
Indulgence score	59	46	33
Other cultural dimensions	No differences across the three clusters for power distance, masculinity, uncertainty avoidance, and pragmatism		
GDP per capita	34,662	33,522	20,827
Effect on EMCR and counter-arguing			
Level of EMCR	Moderate (2.00)	Slightly weak (1.81)	Slightly weak (1.70)
Extent of counter-arguing	No differences across the three clusters (2.33 to 2.36)		
Counter-arguments influential?	Yes (-0.18)	Yes (-0.16)	No (-0.06)
Greatest lever	Seriousness (direct and indirect)	Knowledge (direct and indirect)	Knowledge (direct)
Incremental effect of			
– knowledge (direct/indirect)	0.10/0.01	0.13/0.02	0.18/0.01
– seriousness (direct/indirect)	0.12/0.12	0.02/0.07	0.10/0.06

6.2.3. Country clusters that allow standardized approaches to address climate change cognitions and counter-arguing

To provide policy makers with advice on *which* measure is most effective *where*, we post hoc clustered the examined countries by applying a hierarchical cluster analysis (Ward's method) on the incremental influences. We included the country-specific coefficients of knowledge, seriousness, and counter-arguments to run the cluster analysis. Our analysis indicates that policy makers and marketers should adjust their marketing campaigns to at least three different segments of European countries. As Table 8 demonstrates, counter-arguing tendencies are equally prevalent across all clusters (means ranging from 2.33 to 2.36), but ways to tackle this neutralization technique are substantially different. Marketers can most effectively address Cluster 1, which contains societies with high indulgence scores (e.g., Denmark, the Netherlands), with campaigns that raise consumers' perceptions of seriousness. In these societies, raising perceived seriousness will reduce counter-arguing, which is indirectly mirrored in elevating levels of EMCR. Additionally, seriousness uplifts EMCR directly. By contrast, for the societies in Cluster 2 (e.g., Hungary, Latvia), this lever (seriousness) is less effective, and marketers are advised to implement measures that address consumers' knowledge in order to uplift EMCR directly and indirectly via reduced counter-arguments. For Cluster 3 (e.g., Italy, Slovenia), which has the highest level of collectivism, the detrimental impact of counter-arguing seems less of an issue because in these societies, the neutralization technique only weakly drives EMCR. Campaigns raising knowledge therefore primarily directly impact the relatively weak level of EMCR in this cluster, but perceptions of seriousness are also a viable target here.

In a nutshell, this research identifies critical predictors of more and less environmentally friendly consumption patterns and thereby characterizes the primary targets for campaigns. When addressing the cognitions about climate change examined in this research, managers and policy makers are well advised to consider the catalysts (esp. egocentric values) that are held individually but can also be socially shared. Adjusting the proposed levers in a flexible, country-specific approach using the provided tools might be a first step in tackling this pressing global issue.

7. Limitations and further research

As with all empirical research, the present study has some limitations that future research should address. Perhaps the most evident limitation is the use of Eurobarometer's predefined items. Future studies should ideally use a multi-item scale of EMCR that continuously measures the extent to which consumers have reduced their consumption level. Nevertheless, the data provide the huge benefit of comparison with a high number of countries that were sampled with a standardized procedure and sampling frame. This enhances certainty and limits potential method-related confounds when determining the cultural influences on the underlying (psychological) mechanisms. All sampled countries were part of Europe. Despite their close regional proximity, European countries are marked by substantial cultural differences. As shown in Table 1, cultural values vary considerably among the sampled countries across all cultural dimensions. For example, Denmark and Germany are at the opposite ends of the indulgence dimension (values of 70 and 40, respectively), although they are neighboring countries. Future research should enhance our findings by sampling countries from other global regions (i.e., Western vs. Eastern countries).

Another restriction refers to the possibility of a reverse relationship between GDP and EMCR. This research develops a recursive model with unidirectional effects. Building on previous accounts (e.g., Franzen & Meyer, 2009; Hoffmann, 2014), GDP is modeled as the source of the differences in pro-environmental behavior across countries. People from countries with a greater GDP are shown to exhibit stronger engagement in various pro-environmental actions and consumption reduction. It is important to note that our framework includes this variable as a control to substantiate that the expected effects of cultural values are indeed incremental (i.e., unique) and occur in addition to the GDP impact. This allowed us to exclude the possibility that the effects of the cultural values might only be the result of hidden confounds by economic performance. From a long-term, macro-level perspective, changing consumption patterns might again convert into changes in economic performance, which, with a certain lag, might be reflected in the national GDP/capita. As the current project specifically considered economic performance to control for the uniqueness of culture effects, such dynamics and reverse effects should be modeled in follow-up studies using a nonrecursive dynamic approach. Nonetheless, we double-checked for the biasing effect of a feedback loop. A two-stage least squares regression with level 2 data (GDP_{t-1} as an instrumental variable) shows that the influence of GDP holds. With the Corruption Perceptions Index (Transparency International 2008), which is considered a key contributor to GDP, we used an alternative instrumental variable producing the same finding. Moreover, partial correlation analyses with the countries' mean EMCR values and GDP in the following year (separate analyses for production, income, and expenditure approach) revealed no significant effect (expenditure approach: $p = .20$, income approach: $p = .45$, production approach: $p = .20$) when current GDP was included as a control variable. Overall, we can exclude the assumption that a reduction in EMCR might impact GDP.

Our results suggest that all three types of counter-arguments are affected by the inhibitors (climate change knowledge, seriousness of climate change) and the contingency variables. Still, we find a stronger inhibiting effect of the denial of cause, compared to the other types. Future research should therefore delve deeper into the differential mediating processes. The impact of the types of counter-arguments might further vary across different (anti-)consumption domains, such as the usage of electric vehicles, motivations of consumers to engage in precycling and recycling as well as sustainable consumption. The mitigating effect of collectivism on the link between perceived seriousness and counter-arguments varies among the different types of counter-arguing (e.g., the denial of the cause significantly interacts with collectivism, and the denial of the effect has a marginally significant interaction). Research should uncover and empirically validate why the small agent argument is not

moderated by collectivism. One possible explanation is that individuals in both collectivistic and individualistic societies develop the need to align their generated counter-arguments, but for different reasons: Individuals in collectivistic societies might see themselves as a small part in a bigger societal structure that cannot change the current environmental situation, whereas individuals in individualistic societies may feel that they are able to affect only their immediate environment and assume that others share similar beliefs. Moreover, future research should elaborate on the underlying mechanism of the impact of perceived seriousness (or knowledge) and counter-arguing. In the not-so-distant future, for example, climate change may be perceived as such a hazardous issue that individuals are disillusioned and feel unable to do anything about this problem, rather than counter-arguing the need to change their behaviors.

This research assessed EMCR as a composite construct that is composed of concrete actions consumers undertook to reduce their consumption. The measurement is based on the rationale that a high degree of EMCR is reflected in a broader set of actions taken. While the current project thus focused on the width of the array of actions taken, depth is another relevant dimension (i.e., frequency or intensity), and the distinction between the width versus depth provides interesting avenues. It would be worthwhile to study the incremental effects of the width and the depth of the EMCR array as well as the interplay between the two dimensions. We further encourage researchers to develop a refined EMCR scale that captures both aspects simultaneously. Future research should also dig deeper into the magnitude of consumption reduction across different domains, as potential spillover effects between the single EMCR domains may be uncovered. Note that this research focused on those aspects that humans are able to verbalize and reflect in a rational manner. However, it is possible that the effects of the pro-environmental cognitions and counter-arguing also operate automatically and spontaneously (Mai, Hoffmann, Lasarov, & Buhs, 2017). Finally, further individual (budget constraints) or cultural aspects (e.g., the use of other culture concepts, such as GLOBE; House & Hanges, 2004) may also color neutralization techniques, such as counter-arguing.

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Appendix A

Appendix A1

Full sample robustness check, DV: EMCR adjusted.

	β	<i>p</i>	<i>t</i>
<i>Individual-level controls</i>			
Constant	1.25	***	34.17
Gender	0.24	***	7.38
Age	0.14	***	8.43
Education	0.18	***	9.12
Household composition	0.06	*	2.25
<i>Individual-level predictors</i>			
Seriousness of climate change	0.13	***	8.99
Climate change knowledge	0.26	***	19.15
Knowledge \times seriousness	0.01	n.s.	0.72
Counter-arguments	-0.17	***	-8.19
<i>National-level controls: culture and GDP</i>			
Power distance	0.06	n.s.	1.23
Masculinity	0.12	***	3.57
Uncertainty avoidance	-0.08	*	-1.99
Pragmatism	0.07	*	2.01
Indulgence	0.22	***	4.25
Collectivism	0.12	*	1.98
GDP/capita	0.22	***	3.72
<i>National-level control: consumption levels</i>			
Index car	-0.06	*	-2.56
Index energy	-0.03	n.s.	-0.48
Index waste	-0.02	n.s.	-0.44
Index water	0.01	n.s.	0.12

Notes. Dependent variable: EMCR adjusted (no action taken \rightarrow EMCR = 0). Level of significance: $^+p \leq .10$, $*p \leq .05$, $^{**}p \leq .01$, $^{***}p \leq .001$, n.s. not significant.

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Appendix A2

Full sample robustness check, EMCR binary coded (taken actions yes/no).

	Counter-arguments			Denial of the cause			Denial of the effect			Small agent		
	β	<i>p</i>	t	β	<i>p</i>	t	β	<i>p</i>	t	β	<i>p</i>	t
<i>Individual-level controls</i>												
Constant	2.69	***	106.49	2.69	***	104.92	2.69	***	106.84	2.69	***	106.73
Gender	0.08	***	5.58	0.08	***	5.85	0.08	***	5.66	0.08	***	5.72
Age	0.06	***	6.34	0.05	***	6.27	0.05	***	6.04	0.06	***	6.46
Education	0.07	***	5.02	0.08	***	5.18	0.08	***	5.06	0.07	***	5.12
Household composition	0.02	n.s.	1.23	0.02	n.s.	1.39	0.02	n.s.	1.35	0.02	n.s.	1.18
<i>Individual-level predictors</i>												
Climate change knowledge	0.21	***	18.63	0.22	***	18.69	0.22	***	18.81	0.21	***	18.53
Seriousness of climate change	0.11	***	12.47	0.13	***	12.23	0.12	***	13.10	0.12	***	11.43
Knowledge \times seriousness	0.00	n.s.	-0.31	0.00	n.s.	0.07	0.00	n.s.	-0.06	0.00	n.s.	-0.18
Counter-arguments	-0.04	**	-2.59	0.00	n.s.	0.30	-0.02	n.s.	-1.23	-0.06	***	-5.38
<i>National-level controls: culture and GDP</i>												
Power distance	0.09	**	3.13	0.09	***	3.44	0.09	**	2.98	0.08	**	2.73
Masculinity	0.07	***	3.43	0.07	***	3.50	0.07	***	3.50	0.07	***	3.48
Uncertainty avoidance	-0.03	n.s.	-1.20	-0.04	n.s.	-1.45	-0.03	n.s.	-1.18	-0.03	n.s.	-0.90
Pragmatism	-0.05	*	-2.42	-0.04	*	-2.21	-0.05	**	-2.63	-0.04	+	-1.89
Indulgence	0.18	***	5.31	0.18	***	5.14	0.16	***	4.76	0.18	***	5.26
Collectivism	0.03	n.s.	0.71	0.05	n.s.	1.09	0.05	n.s.	1.05	0.04	n.s.	0.82
GDP/capita	0.19	***	3.56	0.19	***	3.70	0.18	***	3.43	0.19	***	3.44
<i>National-level control: consumption levels</i>												
Index Car	-0.08	***	-5.71	-0.10	***	-6.69	-0.08	***	-5.49	-0.09	***	-5.77
Index Energy	-0.06	n.s.	-1.02	-0.07	n.s.	-1.08	-0.06	n.s.	-0.90	-0.08	n.s.	-1.17
Index Waste	0.02	n.s.	0.90	0.02	n.s.	1.11	0.03	+	1.67	0.02	n.s.	1.04
Index Water	0.06	n.s.	1.15	0.05	n.s.	1.06	0.06	n.s.	1.09	0.06	n.s.	1.10

Notes. Dependent variable: EMCR binary coded (0 = no EMCR, 1 = EMCR). Since we dummy coded EMCR, we used a Bernoulli sampling and applied a logistic link function. Level of significance: + $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, n.s. not significant.

Appendix A3

EMCR split and separate analyses for purchase domains and consumption domains.

	Purchase			Consumption		
	β	<i>p</i>	t	β	<i>p</i>	t
<i>Individual-level controls</i>						
Constant	0.62	***	34.81	2.12	***	49.83
Gender	0.06	**	2.92	0.10	***	6.22
Age	0.02	*	2.14	0.06	***	9.29
Education	0.11	***	10.06	0.06	***	4.22
Household composition	0.05	**	2.59	0.02	n.s.	1.41
<i>Individual-level predictors</i>						
Climate change knowledge	0.04	***	5.97	0.05	***	5.04
Seriousness of climate change	0.03	**	3.31	0.03	***	3.53
Knowledge \times seriousness	0.01	n.s.	0.00	0.00	n.s.	0.00
Counter-arguments	-0.05	***	-4.80	-0.10	***	-9.90
<i>National-level controls: culture and GDP</i>						
Power distance	-0.03	n.s.	-1.60	0.03	n.s.	0.00
Masculinity	0.01	n.s.	0.00	0.02	n.s.	0.00
Uncertainty avoidance	0.05	*	2.19	-0.01	n.s.	0.00
Pragmatism	0.06	***	3.45	0.03	n.s.	1.05
Indulgence	0.08	***	4.44	0.07	*	2.39
Collectivism	-0.03	n.s.	-1.26	0.02	n.s.	0.00
GDP/capita	0.05	+	1.71	-0.02	n.s.	0.00
<i>National-level control: consumption levels</i>						
Index car	0.07	***	6.24	0.08	***	4.41
Index energy	0.01	n.s.	0.00	0.09	+	1.93
Index waste	0.01	n.s.	0.00	-0.06	n.s.	-1.60
Index water	0.06	**	2.93	-0.11	*	-2.18

Notes. Level of significance: + $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, n.s. not significant.

Appendix A4
SEM results.

	Model A									Model B		
	Small agent			Denial of the effect			Denial of the cause			β	p	C.R.
	β	p	C.R.	β	p	C.R.	β	p	C.R.			
<i>Counter-arguments</i>												
Climate change knowledge	-0.07	***	-8.02	-0.07	***	-7.95	-0.03	***	-3.87	-0.06	***	-6.09
Seriousness of climate change	-0.25	***	-30.07	-0.27	***	-33.27	-0.45	***	-58.49	-0.52	***	-46.14
Egocentric values	0.01	n.s.	1.04	0.01	n.s.	0.60	0.01	n.s.	0.87	-0.01	n.s.	-1.57
Egocentric values × knowledge	0.01	n.s.	0.79	0.00	n.s.	0.43	0.01	+	1.70	0.02	*	2.22
Egocentric values × seriousness	-0.02	*	-2.27	-0.01	+	-1.74	-0.02	*	-2.15	-0.03	***	-3.53
Social-altruistic values	-0.08	***	-9.34	-0.09	***	-10.94	-0.08	***	-10.99	-0.14	***	-15.30
Social-altruistic values × knowledge	-0.01	n.s.	-0.70	0.00	n.s.	0.00	-0.00	n.s.	-0.07	0.00	n.s.	-0.27
Social-altruistic values × seriousness	-0.01	n.s.	-1.15	-0.01	n.s.	-1.26	-0.00	n.s.	-0.32	-0.01	n.s.	-1.02
Knowledge × seriousness	-0.03	***	-3.57	-0.05	***	-5.22	-0.06	***	-7.12	-0.07	***	-6.97
Age										0.05	***	5.21
Sex										-0.03	***	-3.88
Education										-0.04	***	-4.41
Household composition										0.00	n.s.	0.29
<i>EMCR</i>												
Counter-arguments	-0.07	***	-7.72	-0.06	***	-6.70	-0.09	***	-9.12	-0.37	***	-16.45
Climate change knowledge				0.10	***	11.00				0.12	***	9.07
Seriousness of climate change				0.04	***	3.97				-0.02	n.s.	-1.42
Knowledge × seriousness				-0.01	n.s.	-0.67				-0.02	n.s.	-1.47
Age										0.13	***	10.16
Sex										0.11	***	8.67
Education										0.09	***	7.08
Household composition										0.03	*	2.17

Notes. AMOS 24.0. Maximum likelihood estimation. Standardized coefficients. Level of significance: +p≤.10, *p≤.05, **p≤.01, ***p≤.001; n.s. not significant. Model A: Multiple mediation via the indicators of counter-arguments: $\chi^2_{(129)} = 6201.164$; CFI = 0.948, RMSEA = 0.058. Proportion of mediation (POM, Hoffmann 2013): seriousness: 64.6% (small agent: 15.2%, denial of effect: 34.7%, denial of the cause: 14.6%), knowledge: 10.4% (small agent: 4.2%, denial of effect: 2.5%, denial of cause: 3.7%).

Model B: EMCR reflectively specified, including individual controls and country dummies (not shown): $\chi^2_{(1355)} = 48,366.573$; CFI = 0.713, RMSEA = 0.050. Level of significance: +p≤.10, *p≤.05, **p≤.01, ***p≤.001, n.s. not significant.

Appendix B. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijresmar.2018.11.005>.

References

Ahluwalia, R. (2000). Examination of psychological processes underlying resistance to persuasion. *Journal of Consumer Research*, 27(2), 217–232.

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27(1), 14–25.

Banbury, C., Stinerock, R., & Subrahmanyam, S. (2012). Sustainable consumption: Introspecting across multiple lived cultures. *Journal of Business Research*, 65(4), 497–503.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173.

Barr, S., & Gilg, A. (2006). Sustainable lifestyles: Framing environmental action in and around the home. *Geoforum*, 37(6), 906–920.

Bersoff, D. M. (1999). Why good people sometimes do bad things: Motivated reasoning and unethical behavior. *The Next Phase of Business Ethics: Integrating Psychology and Ethics* (pp. 239–262). Emerald Group Publishing Limited.

Bhattacharjee, A., Berman, J. Z., & Reed, A. (2012). Tip of the hat, wag of the finger: How moral decoupling enables consumers to admire and admonish. *Journal of Consumer Research*, 39(6), 1167–1184.

Bijmolt, T. H., Paas, L. J., & Vermunt, J. K. (2004). Country and consumer segmentation: Multi-level latent class analysis of financial product ownership. *International Journal of Research in Marketing*, 21(4), 323–340.

Black, I. R., & Cherrier, H. (2010). Anti-consumption as part of living a sustainable lifestyle: Daily practices, contextual motivations and subjective values. *Journal of Consumer Behaviour*, 9(6), 437–453.

Bolderdijk, J. W., Gorsira, M., Keizer, K., & Steg, L. (2013). Values determine the (in) effectiveness of informational interventions in promoting pro-environmental behavior. *PLoS One*, 8(12), e83911.

Boulstridge, E., & Carrigan, M. (2000). Do consumers really care about corporate responsibility? Highlighting the attitude–Behaviour gap. *Journal of Communication Management*, 4(4), 355–368.

Brewer, P., & Venaik, S. (2012). On the misuse of national culture dimensions. *International Marketing Review*, 29(6), 673–683.

Burgess, S. M., & Steenkamp, J. B. E. (2013). Introduction to the special issue on marketing in emerging markets. *International Journal of Research in Marketing*, 1(30), 1–3.

Carrigan, M., & Attalla, A. (2001). The myth of the ethical consumer—do ethics matter in purchase behaviour? *Journal of Consumer Marketing*, 18(7), 560–578.

Chatzidakis, A., Hibbert, S., & Smith, A. P. (2007). Why people don't take their concerns about fair trade to the supermarket: The role of neutralisation. *Journal of Business Ethics*, 74(1), 89–100.

Chatzidakis, A., & Lee, M. S. (2013). Anti-consumption as the study of reasons against. *Journal of Macromarketing*, 33(3), 190–203.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255.

Choi, J., Chang, Y. K., Li, Y. J., & Jang, M. G. (2016). Doing good in another neighborhood: Attributions of CSR motives depend on corporate nationality and cultural orientation. *Journal of International Marketing*, 24(4), 82–102.

Connolly, J., & Prothero, A. (2008). Green consumption: Life–politics, risk and contradictions. *Journal of Consumer Culture*, 8(1), 117–145.

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- Corral-Verdugo, V., Carrus, G., Bonnes, M., Moser, G., & Sinha, J. B. (2008). Environmental beliefs and endorsement of sustainable development principles in water conservation: Toward a new human interdependence paradigm scale. *Environment and Behavior*, 40(5), 703–725.
- Cronbach, L. J. (1976). *Research on classrooms and schools: Formulation of questions, design and analysis*. Stanford University.
- De Maya, S. R., López-López, I., & Munuera, J. L. (2011). Organic food consumption in Europe: International segmentation based on value system differences. *Ecological Economics*, 70(10), 1767–1775.
- Deng, J., Walker, G. J., & Swinnerton, G. (2006). A comparison of environmental values and attitudes between Chinese in Canada and Anglo-Canadians. *Environment and Behavior*, 38(1), 22–47.
- Desiraju, R., Nair, H., & Chintagunta, P. (2004). Diffusion of new pharmaceutical drugs in developing and developed nations. *International Journal of Research in Marketing*, 21(4), 341–357.
- Earth Overshoot Day (2018). Global footprint network. <https://www.overshootday.org/>. Accessed date: 6 July 2018.
- Enders, C. K., & Tofghi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, 12(2), 121.
- Ertz, M., Karakas, F., & Sarigöllü, E. (2016). Exploring pro-environmental behaviors of consumers: An analysis of contextual factors, attitude, and behaviors. *Journal of Business Research*, 69(10), 3971–3980.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
- Fransen, M. L., Verlegh, P. W., Kirmani, A., & Smit, E. G. (2015). A typology of consumer strategies for resisting advertising, and a review of mechanisms for countering them. *International Journal of Advertising*, 34(1), 6–16.
- Franzen, A., & Meyer, R. (2009). Environmental attitudes in cross-national perspective: A multilevel analysis of the ISSP 1993 and 2000. *European Sociological Review*, 26(2), 219–234.
- Gielens, K., & Steenkamp, J. B. E. (2007). Drivers of consumer acceptance of new packaged goods: An investigation across products and countries. *International Journal of Research in Marketing*, 24(2), 97–111.
- Gifford, R. (2011). The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, 66(4), 290.
- Gouveia, V. V., & Ros, M. (2000). Hofstede and Schwartz's models for classifying individualism at the cultural level: Their relation to macro-social and macro-economic variables. *Psicothema*, 12(Su1).
- Gregory-Smith, D., Manika, D., & Demirel, P. (2017). Green intentions under the blue flag: Exploring differences in EU consumers' willingness to pay more for environmentally-friendly products. *Business Ethics: A European Review*, 26(3), 205–222.
- Gruber, V., & Schlegelmilch, B. B. (2014). How techniques of neutralization legitimize norm- and attitude-inconsistent consumer behavior. *Journal of Business Ethics*, 121(1), 29–45.
- Hoffmann, S. (2013). Are boycott motives rationalizations? *Journal of Consumer Behaviour*, 12(3), 214–222.
- Hoffmann, S. (2014). Does national culture impact consumer boycott prevalence? A multi-country study. *European Journal of International Management*, 8(2), 141–159.
- Hoffmann, S., & Schlicht, J. (2013). The impact of different types of concernment on the consumption of organic food. *International Journal of Consumer Studies*, 37(6), 625–633.
- Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture*, 2(1), 8.
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind. Revised and expanded third edition*. New York.
- House, R. J., & Hanges, P. J. (2004). Research design. In R. J. House, P. J. Hanges, M. Javidan, P. W. Dorfman, & V. Gupta (Eds.), *Culture, leadership and organizations: The GLOBE Study of 62 Societies* (pp. 95–101). Thousand Oaks: Sage.
- Huang, M. H., & Rust, R. T. (2011). Sustainability and consumption. *Journal of the Academy of Marketing Science*, 39(1), 40–54.
- Huneke, M. E. (2005). The face of the unconsumer: An empirical examination of the practice of voluntary simplicity in the United States. *Psychology & Marketing*, 22(7), 527–550.
- Husted, B. W. (2005). Culture and ecology: A cross-national study of the determinants of environmental sustainability. *Management International Review*, 349–371.
- Husted, B. W., & Allen, D. B. (2008). Toward a model of cross-cultural business ethics: The impact of individualism and collectivism on the ethical decision-making process. *Journal of Business Ethics*, 82(2), 293–305.
- Hutter, K., & Hoffmann, S. (2013). Carrotmob and anti-consumption: Same motives but different willingness to make sacrifices? *Journal of Macromarketing*, 33(3), 217–231.
- John, A., & Klein, J. (2003). The boycott puzzle: Consumer motivations for purchase sacrifice. *Management Science*, 49(9), 1196–1209.
- Kaiser, F. G., Byrka, K., & Hartig, T. (2010). Reviving Campbell's paradigm for attitude research. *Personality and Social Psychology Review*, 14(4), 351–367.
- Klein, J. G., Smith, N. C., & John, A. (2004). Why we boycott: Consumer motivations for boycott participation. *Journal of Marketing*, 68(3), 92–109.
- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239–260.
- Kreft, I. G., De Leeuw, J., & Aiken, L. S. (1995). The effect of different forms of centering in hierarchical linear models. *Multivariate Behavioral Research*, 30(1), 1–21.
- Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, 108(3), 480–498.
- Lemmens, A., Croux, C., & Dekimpe, M. G. (2007). Consumer confidence in Europe: United in diversity? *International Journal of Research in Marketing*, 24(2), 113–127.
- Leonidou, L. C., Katsikeas, C. S., Fotiadis, T. A., & Christodoulides, P. (2013). Antecedents and consequences of an eco-friendly export marketing strategy: The moderating role of foreign public concern and competitive intensity. *Journal of International Marketing*, 21(3), 22–46.
- Leonidou, L. C., Leonidou, C. N., & Kvasova, O. (2010). Antecedents and outcomes of consumer environmentally friendly attitudes and behaviour. *Journal of Marketing Management*, 26(13–14), 1319–1344.
- Longford, N. T. (1989). To center or not to center. *Multilevel Modelling Newsletter*, 1(3), 7.
- Lorenzoni, I., Nicholson-Cole, S., & Whitmarsh, L. (2007). Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change*, 17(3), 445–459.
- Mai, R., & Hoffmann, S. (2015). How to combat the unhealthy = tasty intuition: The influencing role of health consciousness. *Journal of Public Policy & Marketing*, 34(1), 63–83.
- Mai, R., Hoffmann, S., Lasarov, W., & Buhs, A. (2017). Ethical products = less strong: How explicit and implicit reliance on the lay theory affects consumption behaviors. *Journal of Business Ethics*, 1–19.
- Milfont, T. L., Duckitt, J., & Cameron, L. D. (2006). A cross-cultural study of environmental motive concerns and their implications for proenvironmental behavior. *Environment and Behavior*, 38(6), 745–767.
- Nasif, E. G., Al-Daeaj, H., Ebrahimi, B., & Thibodeaux, M. S. (1991). Methodological problems in cross-cultural research: An updated review. *MIR: Management International Review*, 79–91.
- Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology*, 23(4), 339–347.
- Ortega-Egea, J. M., & Frutos, N. G. (2013). Toward consumption reduction: An environmentally motivated perspective. *Psychology & Marketing*, 30(8), 660–675.
- Ozkaya, H. E., Dabas, C., Kolev, K., Hult, G. T. M., Dahlquist, S. H., & Manjeshwar, S. A. (2013). An assessment of hierarchical linear modeling in international business, management, and marketing. *International Business Review*, 22(4), 663–677.
- Parboteeah, K. P., Addae, H. M., & Cullen, J. B. (2012). Propensity to support sustainability initiatives: A cross-national model. *Journal of Business Ethics*, 105(3), 403–413.
- Poortinga, W., Steg, L., Vlek, C., & Wiersma, G. (2003). Household preferences for energy-saving measures: A conjoint analysis. *Journal of Economic Psychology*, 24(1), 49–64.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891.
- Ralston, D. A., Egri, C. P., Furrer, O., Kuo, M. H., Li, Y., Wangenheim, F., & Fu, P. P. (2014). Societal-level versus individual-level predictions of ethical behavior: A 48-society study of collectivism and individualism. *Journal of Business Ethics*, 122(2), 283–306.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods. Vol. 1*. Thousand Oaks: Sage.
- Richetin, J., Perugini, M., Conner, M., Adjali, I., Hurling, R., Sengupta, A., & Greetham, D. (2012). To reduce and not to reduce resource consumption? That is two questions. *Journal of Environmental Psychology*, 32(2), 112–122.

- Rousseau, D. M., & Tijoriwala, S. A. (1999). What's a good reason to change? Motivated reasoning and social accounts in promoting organizational change. *Journal of Applied Psychology*, 84(4), 514.
- Sarigöllü, E. (2009). A cross-country exploration of environmental attitudes. *Environment and Behavior*, 41(3), 365–386.
- Schultz, P. (2000). New environmental theories: Empathizing with nature: The effects of perspective taking on concern for environmental issues. *Journal of Social Issues*, 56(3), 391–406.
- Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology*, 21(4), 327–339.
- Schwartz, S. H. (1977). Normative influences on altruism. *Advances in Experimental Social Psychology*, 10, 221–279.
- Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, 50(4), 19–45.
- Seegebarth, B., Peyer, M., Balderjahn, I., & Wiedmann, K. P. (2016). The sustainability roots of anticonsumption lifestyles and initial insights regarding their effects on consumers' well-being. *Journal of Consumer Affairs*, 50(1), 68–99.
- Sharp, A., Høj, S., & Wheeler, M. (2010). Proscription and its impact on anti-consumption behaviour and attitudes: The case of plastic bags. *Journal of Consumer Behaviour*, 9(6), 470–484.
- Slangen, A. H., & Dikova, D. (2014). Planned marketing adaptation and multinationals' choices between acquisitions and greenfields. *Journal of International Marketing*, 22(2), 68–88.
- Snijders, T., & Bosker, R. (1999). *Multilevel analysis: An introduction to basic and applied multilevel analysis*. Thousand Oaks: Sage.
- Soyez, K. (2012). How national cultural values affect pro-environmental consumer behavior. *International Marketing Review*, 29(6), 623–646.
- Soyez, K., Hoffmann, S., Wuenschmann, S., & Gelbrich, K. (2009). Proenvironmental value orientation across cultures: Development of a German and Russian scale. *Social Psychology*, 40(4), 222–233.
- Steenkamp, J. B. E., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research*, 25(1), 78–90.
- Steenkamp, J. B. E., & Ter Hofstede, F. (2002). International market segmentation: Issues and perspectives. *International Journal of Research in Marketing*, 19(3), 185–213.
- Steg, L., Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *Journal of Environmental Psychology*, 38, 104–115.
- Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, 50(3), 65–84.
- Stern, P. C., Dietz, T., & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and Behavior*, 25(5), 322–348.
- Sykes, G. M., & Matza, D. (1957). Techniques of neutralization: A theory of delinquency. *American Sociological Review*, 22(6), 664–670.
- Thompson, S. C. G., & Barton, M. A. (1994). Ecocentric and anthropocentric attitudes toward the environment. *Journal of Environmental Psychology*, 14(2), 149–157.
- Transparency International (2008). Corruption Perceptions Index. <https://www.transparency.org/research/cpi> (accessed June 20, 2018).
- Tsang, J. A. (2002). Moral rationalization and the integration of situational factors and psychological processes in immoral behavior. *Review of General Psychology*, 6(1), 25.
- van den Broek, K., Bolderdijk, J. W., & Steg, L. (2017). Individual differences in values determine the relative persuasiveness of biospheric, economic and combined appeals. *Journal of Environmental Psychology*, 53, 145–156.
- van der Linden, S. L., Leiserowitz, A. A., Feinberg, G. D., & Maibach, E. W. (2015). The scientific consensus on climate change as a gateway belief: Experimental evidence. *PLoS One*, 10(2).
- Vanclay, J. K., Shortiss, J., Aulsebrook, S., Gillespie, A. M., Howell, B. C., Johanni, R., & Yates, J. (2011). Customer response to carbon labelling of groceries. *Journal of Consumer Policy*, 34(1), 153–160.
- Varadarajan, R. (2014). Toward sustainability: Public policy, global social innovations for base-of-the-pyramid markets, and demarketing for a better world. *Journal of International Marketing*, 22(2), 1–20.
- Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values. *Ecological Economics*, 64(3), 542–553.
- Wu, J. (2013). Marketing capabilities, institutional development, and the performance of emerging market firms: A multinational study. *International Journal of Research in Marketing*, 30(1), 36–45.