Green, greener, greenest

van Horen, Femke; van der Wal, Arianne; Grinstein, Amir

published in
Journal of Environmental Psychology
2018

DOI (link to publisher)
10.1016/j.jenvp.2018.08.007

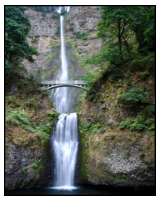
document version
Publisher's PDF, also known as Version of record

Journal of Environmental Psychology 59 (2018) 16–25

Contents lists available at ScienceDirect

Journal of Environmental Psychology

journal homepage: www.elsevier.com/locate/jep



Green, greener, greenest: Can competition increase sustainable behavior?

Femke van Horen[a,*], Arianne van der Wal[a,1], Amir Grinstein[a,b]

[a] Marketing Department, Vrije Universiteit Amsterdam, De Boelelaan 1105, 1081 HV, Amsterdam, the Netherlands
[b] Marketing Department, Northeastern University Hayden Hall 205, 360 Huntington Ave, Boston, 02115 MA, USA

ARTICLE INFO

Handling Editor: Jeff Joireman

Keywords:
Competition
Sustainability
Social Value Orientation
Pro-socials
Pro-selves

ABSTRACT

Today's world is confronted with alarming environmental problems and it becomes increasingly important to enhance people's sustainable behavior. It is therefore key for companies and policy makers to motivate sustainable behavior among both those who are naturally concerned about the welfare of others and are already more likely to be environmentally conscious ("pro-socials") *and* those who are generally less motivated to act sustainably, as they are more concerned with maximizing their own benefits or relative advantage over others ("pro-selves"). Contributing to research in persuasion and environmental psychology, the current work investigates a new strategy that could foster the motivation to behave sustainably across both segments of people: competition. Across four studies in the lab, online, and field we find that competition promotes sustainable behavior, as it corresponds with the underlying motivations of pro-selves and, when used as a mean to a sustainable end, it does not alienate pro-socials from continuing to behave sustainably.

1. Introduction

Concerns regarding the environment are increasing rapidly and it is critical to enhance people's sustainable behavior to maintain enough resources and a healthy environment for future generations (Penn, 2003). Yet, behavioral change among people in the context of sustainability has proven to be very difficult (Dietz, Ostrom, & Stern, 2003; Morren & Grinstein, 2016). Persuasion efforts thus far have yielded an upsurge in the adoption of environmental values and attitudes but were not able to significantly increase sustainable behavior (Kollmuss & Agyeman, 2002). One potential reason is that pro-environmental campaigns need to motivate people who are socially conscious and already committed to the sustainability agenda ("pro-socials"), as well as those who are more concerned about taking care of the self ("pro-selves"; Van Lange, 1999). The current research studies a new strategy that is potentially effective in increasing sustainable behavior among pro-selves while not alienating pro-socials from continuing to behave sustainably: competition. In addition, we examine the conditions under which competition is likely to be most effective.

We propose that competition could be a powerful strategy to promote sustainable behavior if positioned correctly. Competition is expected to be effective for pro-selves as it provides the opportunity to obtain benefits for the individual such as prizes/awards, positive self-image, prestige, pride, and excitement (Connelly, Tihanyi, Crook, & Gangloff, 2014; Lim, 2010; Terwiesch & Xu, 2008), independent of the type of outcome (sustainable or not). Importantly, we propose in addition that, although pro-socials are intrinsically less motivated to compete in a social dilemma (Balliet, Parks, & Joireman, 2009; Pletzer et al., 2018), competition might not hurt their motivation when the competition serves a sustainable end – fostering outcomes for the common good. Overall, we therefore predict that a competition-based strategy will enhance sustainable behavior by appealing to a broad public: both pro-selves *and* pro-socials.

The current research contributes in four ways to the existing literature. First, our research sheds light on the mixed perspectives regarding the relationship between competition and sustainable behavior, demonstrating the conditions under which competition as a strategy is expected to have a positive impact on sustainable behavior. Second, by applying Social Value Orientation (SVO; Van Lange, 1999) as a measure to capture the extent in which people are pro-socials versus pro-selves, we contribute to the social dilemma literature and show how the goals of pro-socials and pro-selves can be aligned through competition and reduce a conflict of interest between the self and the collective (Balliet, Mulder, Van Lange, 2011; Smith, 1979). Third, the current work also goes above and beyond research on signaling in the context of sustainability (i.e., Griskevicius, Tybur, & Van den Bergh, 2010). This

* Corresponding author.
E-mail addresses: femke.van.horen@vu.nl (F. van Horen), a.j.van.der.wal@fsw.leidenuniv.nl (A. van der Wal), a.grinstein@northeastern.edu, a.grinstein@vu.nl (A. Grinstein).
[1] Arianne van der Wal is now at the Social Psychology Department, Leiden University, Wassenaarseweg 52, 2333 AK, Leiden, The Netherlands, +31 71 527 2727.

https://doi.org/10.1016/j.jenvp.2018.08.007
Received 27 March 2018; Received in revised form 18 August 2018; Accepted 18 August 2018
Available online 21 August 2018
0272-4944/

previous research has focused on status signaling, which is only one potential outcome of competition, and has shown the effect only when the behavior studied is public. The current work differentiates itself by studying additional outcomes other than status (e.g., feeling good about oneself) as well as benefits for others, such as various environmental outcomes (e.g., reduced waste). In addition, as the winner is not publicly announced and as such there is no possibility to display one's achievement to others, it allows us to examine whether our effects are restricted to public settings, or also hold in private ones. Fourth, this work contributes to research on effective strategies to enhance pro-social behavior (especially sustainability), carrying meaningful implications for sustainable marketers, communication experts, and public policy makers.

2. Theoretical development

2.1. Sustainable behavior as a conflict of interest

Sustainable behavior is typically a type of behavior that is costly (at least in the short term) for the individual (e.g., heightened expenses, changing one's habits, de-consumption), but beneficial for the collective (e.g., reducing climate change, diminishing pollution, saving natural habitats), and can as such be categorized as a social dilemma. Social dilemmas are situations characterized by a conflict between immediate self-interest and longer term collective interest (Balliet et al., 2011; Van Lange, Joireman, Parks, & Van Dijk, 2013). Within such social dilemmas, environmental issues often take the form of a public goods dilemma or a resource dilemma. A public goods dilemma is a situation in which the group or society can benefit from the public good if all its members contribute to this common good (e.g., cheap public transportation, clean air). However, free-riding occurs when a large enough number of others contribute, but individuals themselves contribute as little as possible. In a resource dilemma, also referred to as the Tragedy of the Commons (Hardin, 1968), group members share a renewable resource and every member can decide how much to take from that resource. However, if everyone behaves greedily, then the resource will be exhausted and everybody suffers (e.g., exploitation of fishing grounds and metropolitan air pollution through motorized transport; Van Vugt, Van Lange, & Meertens, 1996).

How can such a conflict of interest be overcome such that people are motivated to act against their immediate self-interest in order to serve the collective interest? Past literature has demonstrated that the use of incentives (rewards and punishment) can be an effective strategy to promote cooperative behavior (Balliet et al., 2011). In addition, social structuring techniques have been successfully used to change existing social norms by giving group members social approval (and avoid disapproval) when they conform to anticompetitive and cooperative norms (Buckley, Burns, & Meeker, 1974). Also, research has demonstrated that maintaining a positive reputation enhances people's tendency to serve the collective interest. Situational cues such as whether behavior is public and whether evaluations are likely to be further shared and spread (i.e., gossip), influences the importance of reputation and thus the likelihood that people will cooperate (Wu, Balliet, & Van Lange, 2016). In the current research, we propose another way in which conflict between self- and the collective interest can be reduced: competition.

2.2. Competition and sustainable behavior

Competition, or the motivation to compete, is a fundamental part of human nature (Buss, 1999). All over the world, competition is strongly present in societies (e.g., beauty contests, sports, elections, grant applications). Because of its ubiquity in life, the concept of competition and its definition is widely discussed in various disciplines including psychology, economics, and management. These literatures have identified three key characteristics of competition: it involves (a) a contest between two or more individuals, that (b) is motivated by the possibility to gain a variety of benefits (e.g., resources, prestige, increase in self-esteem), which (c) depends on participant's relative rather than absolute performance (Connelly et al., 2014; Nalebuff & Stiglitz, 1983).[2] In the current research, we differentiate between two fundamental parts of competition: the outcome of the competition (e.g., receiving an award, being recognized as the winner) and the competitive process itself (e.g., taking part in the competition, the prospect of winning a contest).

The idea that competition can increase sustainable behavior is not obvious. This is mainly due to the fact that competition is a major tenet of market economies and often drives businesses to pursue the largest market share. Competing for the largest profits often has negative environmental consequences, such as heightened pressure on natural resources and the use of cheap and polluting energy (Bennett, Pierce, Snyder, & Toffel, 2013). By simulating the dynamic behavior of fishers, research has shown that a competitive market led to a decline of all fish stocks and profits of most fishers (BenDor, Scheffran, & Hannon, 2009). In addition, when people have to compete for common resources, they often overharvest, especially under resource uncertainty (De Kwaadsteniet, Van Dijk, & De Cremer, 2006).

Furthermore, cooperation, and not competition, might be expected to be a more effective strategy when there is a shared outcome (striving for a sustainable environment). When there are shared benefits, consumers may comply more when joint effort is emphasized in order to achieve such a goal (Van Lange, Schippers, & Balliet, 2011). Further, it might be expected that a competition is not effective for promoting sustainable behavior because consumers might perceive competition as an inappropriate means to achieve the desired goal (like holding a raffle for a steak dinner to support a vegetarian group).

However, there is also evidence for the possible positive linkage between competition and sustainable behavior. First, viewing competition more broadly, not just in the context of sustainability, competition can have multiple advantages. It has been found that competition is very useful in creating deeper involvement and motivation among people (Lim, 2010). When competition was used among people to help solve an innovation-related problem, a more diverse set of solutions was generated (Terwiesch & Xu, 2008). In addition, the outcomes of a competition can be highly rewarding. For instance, when winning, it can provide individuals with monetary or nonmonetary prizes and awards, it can give a sense of fun and pleasure, and a sense of prestige and pride, which can reaffirm personal values and increase self-esteem (Connelly et al., 2014; Lim, 2010). Finally, it can also generate excitement due to the competitive process itself (e.g., the challenge, the comparison, the tournament; Liu, Geng, & Whinston, 2007). For these reasons, competition has more recently been used by practitioners who apply competitive initiatives to trigger pro-social behavior, including sustainable behavior.[3] These initiatives offer anecdotal evidence about the potential effectiveness of competition but they have not been examined in a systematic way thus causality cannot be inferred.

Here we posit that competition can be a valuable tool in the domain

[2] This definition of competition differs from two other concepts in related research streams: “competitors” and “defection”. Competitors (as one category of SVO) refers to people who are concerned with maximizing own outcomes relative to the outcomes of others. Defection refers to a non-cooperative, exploitative action to increase an individual's payoff in social dilemma games but that results in a socially inefficient outcome.

[3] Recent examples include Kill the Cup Challenge (encouraging students to bring reusable cups when they go to get their coffee or other beverages; https://www.planetforward.org/idea/your-tuesday-tip-kill-the-cup-challenge, last accessed March 2018) or Run for the Environment (where people run races to support a sustainability program; https://ilenviro.org/get-involved/young-professionals/run-for-the-environment/, last accessed June 2018), events that fit well with our three characteristics of competition and have triggered interest and attention.

of sustainable behavior when positioned correctly. We argue that especially two motivational components of competition – the outcome (e.g., personal benefits) and the competitive process (e.g., taking part in a competition, the prospect of winning) – fit with the motivational drive of a large group within society: pro-selves. As such, we argue that activating the motivational drivers associated with competition may encourage those people who are generally less concerned with sustainability issues (pro-selves), while at the same time do not alienate those who are naturally concerned about the environment (pro-socials). We will therefore next discuss how SVO, which represents the dispositional weight people assign to the well-being of others and themselves, may shed light on the way competition can be effectively used to promote sustainable behavior by aligning the goals of pro-socials and pro-selves.

2.3. Social Value Orientation

SVO is a well-established personality trait that indicates how people allocate resources between themselves and others and weigh the welfare of others in relation to their own. SVO distinguishes between pro-selves on the one end of the spectrum and pro-socials on the other end (Messick & McClintock, 1968; Van Lange, 1999). Pro-selves are comprised of individualists and competitors: individualists are concerned with enhancing their own outcomes in absolute terms, whereas competitors are concerned with enhancing their own outcomes in relative terms. Pro-socials, on the other hand, either want to maximize mutual outcomes or equality in outcomes. Across the population, about half of the people are categorized as pro-selves whereas the other half is categorized as pro-socials (Au & Kwong, 2004; Balliet et al., 2009).

Former work on SVO has demonstrated that pro-selves are typically less likely to act sustainably. For instance, pro-socials are more likely than pro-selves to report an intention to commute by public transportation (Van Vugt et al., 1996; cf. Joireman, Van Lange, & Van Vugt, 2004). Moreover, pro-selves perceive laws to protect the environment as limiting their own choice and infringing their personal freedom (Gärling, Fujii, Gärling, & Jakobsson, 2003) and they often show less support for environmental friendly initiatives (Cameron, Brown, & Chapman, 1998). In light of this research, an important question is how to increase pro-selves' sustainable behavior.

As pro-selves focus on maximizing their own personal benefits and relative advantage over others, using competition as a strategy to foster sustainable actions could be especially effective for them. First, competition provides the opportunity to obtain individual benefits, such as prizes/awards, prestige, and entertainment (Connelly et al., 2014; Lim, 2010). Moreover, for pro-selves, it is important to maintain a self-image of being better than others (Van Prooijen et al., 2008). As such, competing with others or the prospect of winning a contest is highly appealing to them.

Importantly, we further predict that competition in a sustainability domain may not harm pro-socials' motivations to behave sustainable. As a starting point, pro-socials, as compared to pro-selves, are much more motivated to behave in the interest of the common good and are thus more likely to behave in a sustainable manner (e.g., Joireman, Lasane, Bennett, Richards, & Solaimani, 2001). In addition, while pro-socials may generally prefer a strategy of cooperation over a strategy of competition (Balliet et al., 2009; Pletzer et al., 2018), we predict that a competition framed around goals that are sustainable and benefit the environment will have no adverse impact on the sustainable behavior of pro-socials.

In spite of the mixed perspectives with regard to the linkage between competition and sustainable behavior presented above, we argue that the benefits from competition can outweigh its downsides in the context of sustainable behavior. Specifically, given that (a sustainability) competition corresponds well with the motivations of *both* pro-socials and pro-selves, we predict that it will increase sustainable behavior overall. Formally stated:

H1. Relative to no competition, competition increases sustainable behavior.

We further posit that pro-selves will act more sustainably in a competitive setting as opposed to a non-competitive setting, as competition activates their drive to win (the competitive process itself motivates them regardless of the sustainable outcomes). On the other hand, we predict that competition does not hurt the sustainable behavior of pro-socials. In sum:

H2. The positive effect of competition on sustainable behavior is moderated by SVO. Specifically, pro-selves act more sustainably in a competitive setting than in a non-competitive setting, whereas pro-socials' (relatively higher) level of sustainable behavior is unaffected by competition.

2.4. The current research

Four studies test 1) the effect of competition on sustainable behavior and 2) the moderating effect of SVO. Study 1 tests the main effect of competition on sustainable behavior. In addition, it tests, aside from participants' intentions to behave sustainable, their actual sustainable behavior. Studies 2 and 3 investigate how SVO moderates the positive effect of competition on sustainable behavior. Specifically, Study 2 predicts that pro-selves act more sustainably under competition, than under no competition. Pro-socials' sustainable behavior, on the other hand, is not impacted by competition, as the end-outcome (sustainability) fits their motivational drive. Study 3 tests the hypothesis that pro-socials only respond well to competition when it is a mean to an end-outcome that serves the common good (e.g., sustainability) and not when it serves a self-interest end-outcome (e.g., leadership). In addition, Study 3 rules out possible demand characteristics. Study 4, finally, tests the external validity of our findings in a field study using a natural segmentation (economics vs. psychology students) as a proxy for SVO (Van Lange et al., 2011), rather than directly measuring SVO.

Across the studies, we manipulate competition consistent with our definition of the construct. Specifically, we induced competition by simply asking participants to imagine taking part in a competition against other players/students (contest (1)), to become the most sustainable student/player (relative standing (2)), and winning the competition focused on non-monetary benefits, such as increase in prestige, self-esteem, and excitement (personal benefits (3)). This manipulation approach was used for two reasons. First, if merely making the concept of competition accessible (through imagination) would be sufficient to obtain the expected results, it would demonstrate that competition can be used as an easy to implement tool, without incurring the extra costs of organizing a real competition. Second, when the expected effects are observed using non-monetary awards (i.e., prestige, increase of self-esteem, excitement), they are likely to be observed using monetary awards as well, therefore serving as a conservative test of our predictions.

3. Study 1: competition and sustainable behavior

Study 1 adopted a controlled experimental design, testing the causal link between competition and sustainable behavior. Specifically, we investigated whether sustainable behavior increases when competition is activated (vs. not activated). We tested the effect of competition on sustainable behavior on a wide range of sustainable behaviors: intentional sustainable grocery shopping, monetary donations to the World Wildlife Fund (WWF), and actual recycling behavior.

3.1. Method

3.1.1. Participants and design

Two hundred Dutch undergraduate students (M_{age} = 19.26,

SD = 1.44; 44.0% female) took part in the experiment for course credits. After giving their informed consent, they were randomly allocated to one of the two conditions of a two group (competition (N = 100) vs. no-competition (N = 100)) between-subjects design. The G*Power 3 program (Faul, Erdfelder, Lang, & Buchner, 2007) identified that a sample size of 128 was needed to detect a medium effect size of f = 0.25 with sufficient power (1-β > 0.80) for the main effect of an ANOVA with α = 0.05. However, we collected a somewhat larger sample than required as we tested a new effect.

3.1.2. Procedure and materials

Participants were first asked to read and write about a fictitious sustainable initiative from the University's Green Office (the sustainability platform of the university). They read: "The Green Office wants to promote sustainable behavior among students. In doing so, it wants to introduce a sustainability competition (discussion group). In this competition (discussion group), students can compete to become the most sustainable student (participate in discussions about the sustainability issue at hand). Each period a new round of competition (discussion session) will be initiated and a winner (the key points of previous discussions) will be announced. Now, think about how you could win the competition and become the most sustainable student (become the most knowledgeable student on the topic of sustainability) at the University." Thereafter participants were asked to write down their thoughts in as much detail as possible in about 2–3 min.

Subsequently, sustainable behavior was measured with a shopping and a donation task (in counterbalanced order). The shopping task was created to measure participants' tendency to buy sustainable products. Just as in a regular shopping situation, participants were shown several different grocery products (apples, cheese, etc., ten in total): a conventional and a sustainable option, accompanied with its actual price (e.g., conventional apples €1.33 per Kg and sustainable apples €3.79 per Kg). They were asked to pick five out of the twenty grocery products and to put them into a fictitious shopping basket. In order not to prompt any other concerns influencing their decision-making (e.g., monetary), no restrictions with regard to the amount of money they could spend or other instructions were provided (e.g., shopping goal). The number of sustainable products put into the basket served as our dependent variable.

In the donation task, participants were informed that €25 would be given to four randomly selected participants after the experiment was completed. They were then asked, if they would win the €25, how much of this money they would like to keep for themselves and how much they would be willing to donate to the WWF.[4] The amount of money (in €) participants were willing to donate to WWF served as our dependent variable. After the donation task, participants answered some demographic questions and had to indicate their level of agreement with the manipulation check statement on a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree): "The initiative from the University's Green Office involved a competition."

To measure recycling behavior, participants were given a small piece of paper at the beginning of the experiment. During the experiment they were asked twice to write down a three-digit number on this piece of paper. As a cover story, participants were told that this was done to check their attention. At the end of the experiment, participants were asked to come to the experimenter and throw away the piece of paper in a bin on the way out from the lab. Two identical bins were put next to the exit of the lab, one with a sign for waste and one for paper (whether the paper bin stood left or right from the waste bin was counterbalanced across time slots in which the experiment took place). Participants then chose in which bin to throw their piece of paper. Whether participants threw the paper in the paper bin (recycling) or not, served as our dependent variable.

[4] Four participants indeed won the €25. Each of them received the amount of money they wanted to keep for themselves and the rest of the money was donated to the WWF.

3.2. Results

3.2.1. Manipulation check

Univariate analysis revealed that the manipulation of competition was successful. Within the competition condition participants indicated to a higher extent that the initiative from the University's Green Office involved a competition (M = 5.28, SD = 1.35) than participants in the no-competition condition did (M = 3.66, SD = 1.52), F(1, 198) = 63.59, p < .001, Cohen's d = 1.13.

3.2.2. Shopping task

Univariate analysis revealed the hypothesized main effect of condition, F(1, 196) = 5.78, p = .017, Cohen's d = 0.34. No main effect of order in which the shopping and donation task appeared, F(1, 196) = 0.03, p = .859, Cohen's d = 0.02, and no interaction between order and condition was found, F(1, 196) = 1.78, p = .183, part. η^2 = 0.01. As predicted, participants in the competition condition added more sustainable products to their shopping basket (M = 1.91, SD = 1.75) than participants in the no-competition condition (M = 1.37, SD = 1.40).

3.2.3. Donation to WWF

Univariate analysis revealed no main effect of condition, F(1, 196) = 1.81, p = .180, Cohen's d = 0.19 and no main effect of order, F (1, 196) = 0.22, p = .636, Cohen's d = 0.07. There was however a marginal significant interaction between order and condition, F(1, 196) = 3.02, p = .084, part. η^2 = 0.02. Simple effect tests showed that participants in the competition condition donated significantly more money to WWF (M = 10.25, SD = 8.91) than in the no-competition condition (M = 6.78, SD = 7.37) when the donation task came first, F (1, 196) = 4.75, p = .031, part. η^2 = 0.02. This effect was neutralized when the shopping task preceded the donation task, F(1, 196) = 0.08, p = .782, part. η^2 < 0.001.

3.2.4. Recycling behavior

A binominal logistic regression showed that in the competition condition a significantly higher proportion of participants recycled their paper (98.0%) than in the no-competition condition (92.0%), χ^2(1, N = 200) = 4.04, p = .044, part. η^2 = 0.02. This shows that, despite the fact that recycling behavior seems to be the norm (92% percent recycled in the no-competition condition), competition can increase recycling behavior even further.

3.3. Discussion

The findings of Study 1 supported H1 by demonstrating the positive effect of competition on sustainable behavior in a controlled setting. The generalizability of the effect was demonstrated across three different types of sustainable behavior: buying intentions of sustainable grocery products, donations to WWF (but only when the donation task came before the shopping task), and actual recycling behavior. As such, the current experiment is a strong test of our hypothesis, as merely activating competition seems to increase sustainable behavior in domains clearly related to the competition (i.e., shopping, donations) and even to behavior less clearly related to the competition (i.e., recycling).

4. Study 2: the role of Social Value Orientation

Study 2 extends Study 1 by examining how SVO moderates the effect of competition on sustainable behavior. We predict that competition, as compared to no-competition, results in higher sustainability behaviors among pro-selves, while having no adverse impact on the relatively higher sustainable behavior of pro-socials, when the

competition is positioned as a means to a sustainable end.

4.1. Method

4.1.1. Participants and design

Three hundred thirty-two Dutch undergraduate students (M_{age} = 20.01, SD = 1.89; 30.4% female) took part in an experiment for course credits. After giving their informed consent, they were randomly allocated to one of the two conditions of a two group (competition (N = 166) vs. no-competition (N = 166)) between-subjects design. Power analysis (Faul et al., 2007) with an estimated effect size of part. η^2 = 0.024 (based on the average effect size of Study 1) identified that a sample of N = 322 was needed to reach sufficient power (0.80) for the main and interaction effects of an ANOVA with α = 0.05. Due to limited availability of participants in the behavioral lab, the study needed to be run in three different waves to obtain this amount. The first wave (N = 203) was run in December 2016 as an online study in which students could take part for course credits. The second wave (N = 36) was run in January 2017 on voluntary basis: all Economics and Business Administration students were invited via an official email from the communications department. The third wave (N = 93) was run in the behavioral lab in March 2017 for course credits.

4.1.2. Materials

We measured SVO using the slider measure (Murphy, Ackermann, & Handgraaf, 2011). This measure is comprised of six items with nine different self-other payoff combinations (e.g., for one item the choices would be [Choice 1: Points to Self = 50, Points to Other = 100], [2 = 54, 89], …, [8 = 81, 26], [9 = 85, 15]). How people allocate the specified points between themselves and an anonymous person determines how people weigh the welfare of others in relation to the welfare of themselves. For instance, the choice of own outcome 54 and other's outcome 89 is considered to be more pro-social, whereas the choice of own outcome 81 and other's outcome 26 is more pro-self. Based on the six allocations people make, a continuous SVO score (angle degree) was calculated by the official formula: SVO = arctan $[(x_{other} - 50)/(x_{self} - 50)]$ (Murphy et al., 2011). Lower SVO scores indicate a more pro-self orientation and higher SVO scores indicate a more pro-social orientation.

4.1.3. Procedure

Participants were first asked to fill out the SVO measure. Thereafter, they were randomly assigned to either the competition or no-competition condition. In both conditions, participants were informed about a fictitious sustainable initiative from a coffee store on campus (Doppio Espresso). Participants read: "Doppio Espresso has started a competition (initiative) to foster sustainable behavior. The goal of the competition (initiative) is to make customers compete to reduce waste by bringing their own reusable coffee cups (to make customers reduce waste by stimulating them to bring their own coffee cups). Start joining the competition by reducing most waste and win the sustainability competition (joining the initiative and help reduce waste to foster a sustainable world). Each week Doppio will announce the winner of the competition (how much waste is reduced in total)."

In order to measure participants' sustainable behavior, they were asked to indicate on a Likert scale how much they were willing to buy a reusable coffee cup (without price indication), from 1 (*not at all willing*) to 7 (*very willing*). Then, as manipulation check, participants were asked to indicate the extent in which they agreed with the following statement "The initiative from Doppio Espresso involved a competition", from 1 (*strongly disagree*) to 7 (*strongly agree*), As no-competition variables, participants were asked to indicate how much they like coffee, from 1 (*not at all*) to 7 (*very much*) and their evaluation of Doppio Espresso, from 1 (*very negative*) to 7 (*very positive*). Finally, participants provided demographics.

4.2. Results

4.2.1. Manipulation check

Univariate analysis revealed that the competition manipulation was successful. Within the competition condition participants indicated to a higher extent that the initiative from Doppio Espresso involved a competition (M = 4.72, SD = 1.73) in comparison to the no-competition condition (M = 2.82, SD = 1.67), $F(1, 330)$ = 103.14, $p < .001$, Cohen's d = 1.12.

4.2.2. Willingness to buy a reusable coffee cup

A univariate analysis with a categorical (condition) and a continuous variable (SVO) was conducted. Wave was included as a covariate. The analyses revealed a significant main effect of condition, $F(1, 326)$ = 5.61, p = .018, Cohen's d = 0.24, a marginally significant main effect of SVO, $F(1, 326)$ = 3.65, p = .057, part. η^2 = 0.01, and a significant main effect of wave, $F(2, 326)$ = 19.61, $p < .001$, part. η^2 = 0.11. As predicted, participants in the competition condition were more willing to buy a reusable coffee cup (M = 3.42, SD = 2.03) compared to participants in the no-competition condition (M = 2.95, SD = 1.80). In addition, the more pro-social participants were, the more they were willing to buy a reusable coffee cup (b = 0.14).

Importantly, and as predicted in H2, the interaction between condition and SVO was also significant, $F(1, 326)$ = 5.18, p = .024, part. η^2 = 0.02. To follow up the interaction, we conducted a floodlight analysis (Spiller, Fitzsimons, Lynch, & McClelland, 2013) to test the effect of the predictor (condition) at all possible levels of SVO (e.g., Joireman & Liu, 2014). The Johnson–Neyman technique was used to identify regions in the range of SVO over which the effect of condition (competition versus no-competition) was significant ($p < .05$). To aid in the interpretation, we note that the continuous SVO angle from the slider measure can be used to create groups of pro-selves (with angles ≤ 22.45°) and pro-socials (with angles > 22.45°). As shown in Fig. 1, the Johnson–Neyman value for significance at a 95% confidence level was 23.14 or lower on the SVO scale. Consistent with our predictions, the results reveal that participants scoring low on the SVO scale (pro-selves) are more willing to buy a reusable coffee cup in the competition condition than in the no-competition condition. This effect is most pronounced at the lower end of the scale. The findings show further that there was no effect of competition on the willingness to buy a reusable coffee cup for participants scoring high on the SVO scale (pro-socials).

4.2.3. Control variables

The control variables 'liking coffee' and 'evaluation of the coffee shop "Doppio Espresso"' were separately included as covariates. Results revealed a main effect of 'liking coffee', $F(1, 325)$ = 20.27, $p < .001$, part. η^2 = 0.06 and of 'evaluation of the coffee shop "Doppio Espresso"', $F(1, 325)$ = 25.65, $p < .001$, part. η^2 = 0.07. Importantly, however, the pattern of results of the predicted main effect of condition and

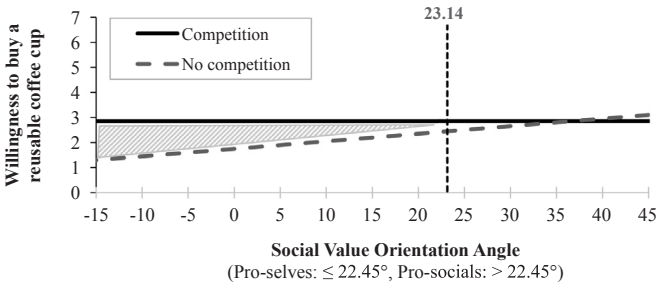


Fig. 1. Effect of competition vs. no competition on willingness to buy a reusable coffee cup moderated by SVO (Study 2).
Note. Effect of competition is significant ($p < .05$) within the shaded (Johnson-Neyman) regions.

interaction between condition and SVO remained the same in both analyses (all *Fs* > 4.49).

4.3. Discussion

Study 2 again supported H1, demonstrating a positive effect of competition on sustainable behavior. In addition, it supports H2, showing that pro-selves positively react to competition, such that their intention to behave sustainable was higher in a competitive setting than in a non-competitive setting. Pro-socials' relatively higher intention to behave sustainable, on the other hand, was not affected by competition. This finding implies that through the activation of competition, a wider range of people can be mobilized to act sustainably, including those people who are typically less concerned with serving the common good and more concerned with maximizing their personal benefits (pro-selves).

5. Study 3: pro-self versus pro-social competition

In Study 3 we manipulate the type of the competition and test the assumption that competition does not negatively affect the behavior of pro-socials when it serves a common end-goal (i.e., sustainability), but does when it serves a self-interested end-goal (i.e., leadership). The behavior of pro-selves, on the other hand, will not be affected by competition type (sustainability vs. leadership). Study 3 contributes additionally to Studies 1 and 2, by ruling out the alternative explanation that the effects are driven by demand characteristics (merely following the instructions to compete). For this purpose, a neutral performance task (solving anagrams) was used as the dependent variable, which was framed either around a sustainability competition or a leadership competition. If the results of Studies 1 and 2 would be due to respondents merely following the instructions to compete, then, after activation of competition, performance of both pro-selves and pro-socials should increase in both domains.

5.1. Method

5.1.1. Participants and design

One hundred seventy-four M-Turk participants (M_{age} = 36.64, *SD* = 12.04; 47.1% female, all from the United-States of America) took part in a 2 (condition: leadership competition vs. sustainable competition) x 2 (SVO: pro-selves vs. pro-socials) between-subjects design study. After giving their informed consent, they were randomly allocated to either the leadership competition (*N* = 85) or the sustainable competition condition (*N* = 89). The G*Power 3 program (Faul et al., 2007) identified that a sample size of 128 was needed to detect a medium effect size of *f* = 0.25 with sufficient power (1-β > 0.80) for the main and interaction effects of an ANOVA with α = 0.05. However, we collected a somewhat larger sample than required to ensure sufficient power in an online, nonlaboratory environment.

5.1.2. Materials

To measure participants' SVO we used the extended triple-dominance questionnaire of social values (Eek & Gärling, 2006). In comparison to the Slider Measure of SVO, the extended triple-dominance questionnaire is a categorical measure in which participants are classified into one of four groups (competitors and individualists (pro-selves), pro-socials and altruists (pro-socials)) depending on the allocation of points between to the self and an anonymous other. In six successive decision tasks, participants were presented with four choices, each with a different payoff structure. For example, own outcome 500 and other's outcome 100 (competitor); own outcome 560 and other's outcome 300 (individualists); own outcome 500 and other's outcome 500 (pro-socials); and own outcome 500 and other's outcome 800 (altruists). Participants saw these four alternative point divisions simultaneously and had to indicate which they preferred most. Each decision task presented slightly different payoff combinations. When a participant consistently preferred one of the four alternatives in at least two-thirds of their choices they could be classified as belonging to one of the four SVO categories (e.g., Balliet et al., 2009; Eek & Gärling, 2006; Van Lange, Otten, De Bruin, & Joireman, 1997). Within our sample, 9.8% of the participants were classified as competitors (*N* = 17), 40.8% as individualists (*N* = 71), 35.6% as pro-socials (*N* = 62), and 7.5% as altruists (*N* = 13). Due to the small number of competitors and altruists, we combined competitors and individualists to form the pro-selves (*N* = 88, 54%), and pro-socials and altruists to form the pro-socials (*N* = 75, 46%), as has been done in past research (e.g., Au & Kwong, 2004; Balliet & Joireman, 2010; Bogaert, Boone, & Declerck, 2008).

5.1.3. Procedure

Participants first read instructions corresponding the condition (leadership vs. sustainable competition) they were assigned to: “Within this study you will take part in a leadership (sustainability) contest where you have to compete with other players. People who are more successful in this competition tend to be more successful in becoming a leader of a group (preserving the ecological environment) than people who are less successful in this competition. A key reason is that competing well and being successful in this contest is related to a high level of abstract thinking, which is beneficial for gaining a leadership position (effective environmental preservation).” In order to compare behavior across conditions, participants' performance was then measured with a neutral anagram task.

Participants were asked to solve 6 anagrams. An anagram is a word game in which players have to build a word formed from another word by rearranging its letters. For example, “resist” is an anagram of “sister.” The anagrams used for this study were: grown-wrong, fringe-finger, former-reform, hinge-neigh, married-admirer, and toaster-rotates. Participants were instructed that if they were unable to solve the anagram, they could skip to the next anagram, but that this would lower their performance in the overall competition. Performance was measured by the number of anagrams solved correctly, on a scale ranging from 0 to 6, with 6 having solved all anagrams correctly. The higher the score, the more motivation participants exhibited to win the (leadership/sustainability) competition. Thereafter, participants answered the extended triple-dominance questionnaire of social values (Eek & Gärling, 2006) in order to assess their SVO. Subsequently, participants answered the manipulation check question: “The goal of the competition within this study was about …” on a 9-point scale with the labels environment (1) and leadership (9) at the endpoints. Finally, participants answered some demographic questions.

5.2. Results

5.2.1. Manipulation check

Univariate analysis revealed that the manipulation was successful. Within the sustainable competition condition participants indicated more that the competition was about the environment (*M* = 2.57, *SD* = 2.53), whereas participants in the leadership competition condition that it was about leadership (*M* = 8.47, *SD* = 1.34), *F*(1, 172) = 363.79, *p* < .001, Cohen's *d* = 2.91.

5.2.2. Anagram task performance

The mean number of anagrams participants solved correctly was *M* = 3.94 (*SD* = 1.73). Univariate analysis of the anagram task performance revealed a main effect of competition type, *F*(1, 163)[5] = 5.26, *p* = .023, Cohen's *d* = 0.22, a main effect of SVO, *F*(1, 163) = 16.56, *p* < .001, Cohen's *d* = 0.57, and, as predicted, an interaction between condition and SVO, *F*(1, 163) = 5.13, *p* = .025, part. η^2 = 0.03.

[5] Seven participants could not be categorized as either pro-social or pro-self.

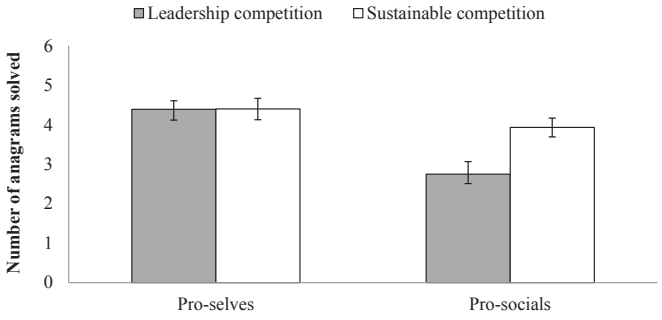


Fig. 2. Effect of competition type on performance (number of anagrams solved) moderated by SVO (Study 3)
Note. Error bars indicate ± 1SE of the Mean.

Specifically, simple effect tests showed that, as predicted, pro-selves solved as many anagrams correctly in the leadership ($M = 4.39$, $SD = 1.55$) and sustainable competition conditions ($M = 4.40$, $SD = 1.72$), $F(1, 163) = 0.01$, $p = .982$, part. $\eta^2 < 0.001$. Pro-socials, on the other hand, solved more anagrams correctly in the sustainable competition condition ($M = 3.93$, $SD = 1.59$) as opposed to the leadership competition condition ($M = 2.75$, $SD = 1.80$), $F(1, 163) = 9.49$, $p = .002$, part. $\eta^2 = 0.06$. Furthermore, in the leadership competition condition, pro-selves solved more anagrams correctly than pro-socials, $F(1, 163) = 19.44$, $p < .001$, part. $\eta^2 = 0.11$. No difference between pro-selves and pro-socials was found for the sustainable competition, $F(1, 163) = 1.68$, $p = .196$, part. $\eta^2 = 0.01$. Fig. 2 illustrates these results.

5.3. Discussion

Complementing the findings of the first two studies, Study 3 shows that pro-socials are more motivated to improve their performance when competition serves a common end outcome (sustainability, but not leadership), whereas the relatively higher performance of pro-selves under competition is not impacted by the end outcome (sustainability or leadership). Firstly, even though a cooperation strategy may fit better with the general interests of pro-socials, these findings demonstrate that competition does not alienate pro-socials as long as it serves the common good: enhancing sustainable behavior. In addition, the performance of pro-selves is not affected by competition type, as the competitive process (independent of the outcome) corresponds with their underlying motivation to maximize their own personal benefits. Secondly, the results show that our findings cannot be alternatively explained by demand characteristics, as instructions of the competition condition did not increase performance across both groups in both domains (sustainability or leadership).

6. Study 4: field study

In order to investigate the moderating role of SVO on the relationship between competition and sustainable behavior, Studies 2 and 3 both used a fully validated measurement of SVO. These measures are, however, not directly implementable in a real-life setting. Hence, in Study 4 we make use of a natural segmentation of the population that distinguishes between pro-selves and pro-socials: economics students versus psychology students respectively. Previous research has shown that these two student groups can be used as a proxy for pro-selves vs. pro-socials, as economics students are generally more interested in maximizing their own outcomes, whereas psychology students are generally more interested in maximizing the outcomes of the group (Van Lange et al., 2011). We predict that competition, as compared to no-competition, increases students' engagement with a sustainability-related message of the University's sustainability platform. In addition, we predict, following the results of Study 2, that economics students' engagement will be higher after competition is activated relatively to no competition, whereas psychology students' relatively higher engagement will not be affected by competition.

6.1. Method

6.1.1. Participants and design

Eleven hundred thirty-one Dutch undergraduate students took part in the study. It involved a 2 (condition: competition vs. no-competition) x 2 (department: economics vs. psychology) between-subjects design. As an email was sent out by the communication department of the two faculties (economics and psychology), we were not able to determine the sample size a priori. But, as Study 4 is a replication of Study 2, the final sample size clearly exceeded the estimated sample size of $N = 322$ as identified by the power analysis of Study 2. Within department, participants were randomly allocated to one of the two conditions ($N_{CompPsy} = 298$; $N_{CompEcon} = 268$; $N_{NoCompPsy} = 297$; $N_{NoCompEcon} = 268$).

6.1.2. Procedure

An email from the economics (psychology) department of a Dutch University was sent to undergraduate economics (psychology) students ($N = 536$; $N = 595$, respectively). The email was titled “Join the green competition (initiative) of the economics (psychology) department.” and the email itself showed the following text: “As the economics (psychology) department we want to promote sustainable behavior among our students. In doing so, we want to introduce the green competition (initiative) that is organized by the Green Office. Join this competition (initiative) and try to become the most (a more) sustainable economics (psychology) student!”. Students could then click through to be informed about the possibilities at the University to become more sustainable, such as buying an organic food box or volunteering for the Green Office. As a very limited amount of students clicked through (0.8% (economics) and 1.3% (psychology)), opening the email after it appeared in their inbox served as our dependent variable.

6.2. Results

Binomial logistic regression analysis (condition: contrast coded −1 no-competition, 1 competition; department: −1 economics, 1 psychology) revealed a marginally significant main effect of condition, $\chi^2(1, N = 1131) = 3.43$, $p = .064$, part. $\eta^2 = 0.003$, and a marginally significant main effect of department, $\chi^2(1, N = 1131) = 3.22$, $p = .073$, part. $\eta^2 = 0.003$, on email opening. As predicted, students in the competition condition opened the email more often (24.6%) compared to students in the no-competition condition (20.7%). Psychology students opened the email more often (24.5%) compared to economic students (20.5%).

Furthermore, consistent with Studies 2 and 3, results revealed a significant interaction between condition and department, $\chi^2(1, N = 1131) = 6.92$, $p = .009$, part. $\eta^2 = 0.006$. Specifically, economics students opened the email more often in the competition condition (25.7%) than in the no-competition condition (15.3%), $\chi^2(1, N = 536) = 8.80$, $p = .003$, part. $\eta^2 = 0.02$, whereas no difference between conditions was found for psychology students (respectively, 23.5% and 25.6%), $\chi^2(1, N = 595) = 0.35$, $p = .552$, part. $\eta^2 < 0.001$. In addition, in the competition condition there was no difference between psychology students and economics students in opening the email, $\chi^2(1, N = 566) = 0.39$, $p = .534$, part. $\eta^2 < 0.001$. On the other hand, psychology students opened the email more often than economics students in the no-competition condition, $\chi^2(1, N = 565) = 8.92$, $p = .003$, part. $\eta^2 = 0.02$. Fig. 3 shows the frequency of opening the email for both the no-competition and competition conditions moderated by type of student (economics students as a proxy for pro-selves, or psychology students as a proxy for pro-socials).

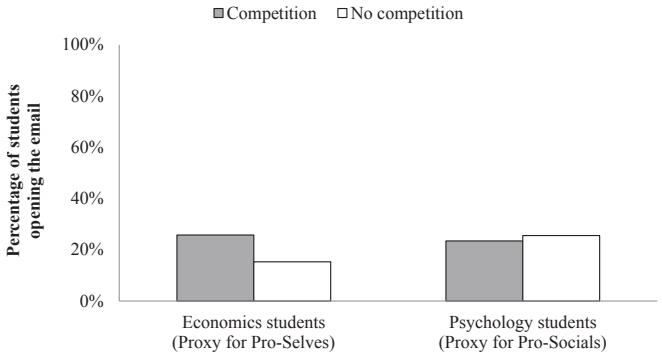


Fig. 3. Effect of competition vs. no competition on opening the email for economics students (proxy for pro-selves) and psychology students (proxy for pro-socials) (Study 4).

6.3. Discussion

Consistent with earlier research showing that pro-socials are more prevalent among psychology students, whereas pro-selves are more prevalent among economics students (Van Lange et al., 2011), we observe the same effects as in Studies 1 and 2, using economics and psychology students as a proxy for SVO. Consistent with our earlier findings, the results show that economics students are more engaged in sustainability issues when competition, as compared to no-competition, is induced, whereas competition has no adverse impact on the relatively higher engagement of psychology students (H2). It showed that even very subtle reminders of competition (in a title of an email), motivate economics students to be more engaged in sustainable issues. It may however be the case that the effect of competition on sustainable behavior is driven by other factors that distinguish economic from psychology students, aside SVO.

7. General discussion

The environmental problems the world faces today are serious and complex. Therefore, it is of great importance to encourage consumers to behave in a more sustainable manner. This is a challenging task, as many people express an intention to act sustainably but often do not act upon this intention (Kollmuss & Agyeman, 2002). The current research investigated how competition can promote sustainable behavior. In particular, we examined whether competition can be used as a strategy which appeals to pro-selves who are generally less motivated to act sustainably, while at the same time not alienating pro-socials. Four studies provided support for our predictions across different types of intentional and actual sustainable behaviors (e.g., shopping for green products, donations, recycling) and across different empirical settings and populations (lab, online, field). In addition, SVO was measured using three different validated methods: the slider method (Murphy et al., 2011), the extended triple dominance measure (Eek & Gärling, 2006), and by comparing different segments of the population as proxies for pro-selves and pro-socials (Van Lange et al., 2011), all attesting to the generalizability and robustness of the findings.

7.1. Theoretical implications

The current findings contribute to research in environmental psychology, economics, and management by addressing the mixed perspectives on the linkage between competition and sustainable behavior. To our knowledge, this research is the first to demonstrate the causal impact of competition on sustainable behavior. In addition, we shed light on the conditions under which competition can promote sustainable actions relatively to no-competition.

Contributing to the social dilemma literature, the current findings demonstrate that conflicts between the collective and immediate self-interest can be overcome through competition, complementing work demonstrating the positive effects of incentives (Balliet et al., 2011), social approval (Buckley et al., 1974), and maintenance of a positive reputation (Wu et al., 2016). Competition is shown to be effective to promote sustainable behavior because it aligns the goals of pro-socials (fostering outcomes for the common good) and pro-selves (obtaining individual benefits). Research on persuasion strategies to increase sustainable behavior focus mainly on urging people to value the collective interest (Penn, 2003) which are expected to be effective among pro-socials, who are already more motivated to act sustainably. Hence, such efforts preach to the choir, missing out on those consumers who are generally less motivated to act sustainably: pro-selves. Here we provide evidence that competition is a strategy that can effectively mobilize *pro-selves* to behave more sustainable.

A theoretical explanation of the effectiveness of competition as a strategy to promote sustainable behavior can be related to the idea that competition taps into people's innate motivation to compete (Buss, 1999). As these innate motives are strong and rather subconscious behavioral drivers, inducing competition is an appeal to sustainable action consumers are less aware of and might therefore be more successful to narrow the intention-behavior gap in a sustainability context (Kollmuss & Agyeman, 2002). Moreover, tapping into people's innate motivations is especially relevant as many persuasion strategies used to influence people's sustainable behavior do not match with humans' evolved behavioral tendencies (e.g., asking people to value the collective interest over the individual interest; Penn, 2003), and are therefore likely to be ineffective.

Because of its focus on competition, the current research importantly extends previous work on signaling and competitive altruism (e.g., Griskevicius et al., 2010). Griskevicius and colleagues have shown that status can motivate people to act sustainably, but that this positive effect only holds when behavior is publicly displayed. Our work demonstrates, on the other hand, that competition increases sustainable behavior not only in a public setting, but also privately – in situations where it is not possible to display one's achievement to others and the winner in the competition is not publicly announced. In addition, in the current work the outcome of competition was not restricted to increased feelings of status, but (in principle) reach further, ranging from positive outcomes to the self (e.g., prestige, heightened self-esteem, excitement) to positive outcomes for the self and others (e.g., reduced waste). As such, the competitive process is positioned as a broader phenomenon, of which signaling and status are potential outcomes. Moreover, research has shown the downside effect of merely using status motives to enhance sustainable behavior, as people use non-sustainable means (e.g., buying a branded plastic shopping bag from a high-status sustainable grocery store) in order to publicly display their sustainable behavior (Van der Wal, Van Horen, & Grinstein, 2016).

7.2. Practical implications

The key success factor of the current strategy to use competition to increase sustainable behavior lies in reaching a broader public: both pro-socials and pro-selves. These findings may offer significant implications for public policy makers, communication experts, managers, and NGOs who are interested in promoting sustainable behavior. Competition as a strategy may be useful in political and policy contexts to persuade people to behave more sustainable. For instance, since drought is a rising problem due to climate change, competition to use the smallest amount of water among community members might help reduce water shortages (e.g., Shower With Friends[6]). Moreover, within an educational context, competition in the form of a game can be used

[6] https://techcrunch.com/2014/09/07/shower-with-friends-lets-you-gamify-water-consumption/?guccounter=1, last accessed June 2018

to teach children about sustainability problems and let them, for example, compete to maximize waste reduction through recycling. Besides political and policy contexts, businesses can make use of competition as well. For example, a CO_2 reduction competition could be set up among employees commuting to work or a competition could be announced to create the best logo on a sustainable sweater or t-shirt. Furthermore, if companies with a customer database consisting predominantly of pro-selves (e.g., investment banks) want to sell sustainable products or services, they are advised to use competitive elements in their marketing strategies.

In addition, the findings suggest (but did not demonstrate directly) that, consistent with earlier research (i.e., Van Lange et al., 2011), social (psychology students) and economic (economics students) sectors can be used as a natural segmentation to distinguish across people with varying levels of SVO. Previous research has demonstrated that SVO also relates to certain demographic variables, such as age, education, and political preferences (Van Lange, Bekkers, Chirumbolo, & Leone, 2012; Van Lange et al., 1997). Such natural segmentation and demographic variables could be used to determine which type of persuasion strategy will be more or less successful within specific segments.

7.3. Limitations and future research directions

While contributing novel insights, the current studies have several limitations that should be acknowledged. First, in all of our studies, we focused on individuals. Since competition also strongly exists between groups, it would be useful to attempt to extend our findings from individuals to groups (e.g., by studying the effect of competition on sustainable behaviors at the team or company level). Potentially, a relevant step in that direction can be found in studying the Dow Jones Sustainability Index, as it functions as an implicit form of competition among companies to become the most sustainable company and gain the highest ranking. Similarly, sustainable competition between groups in non-organizational social contexts may be valuable to study (e.g., among neighborhoods, schools, and countries).

Second, we reported multiple types of sustainable behavior, including intentional and actual behavior. Despite the broad range of sustainable outcomes, future work could study more systematically the impact of competition on specific types of sustainable behavior. For example, it would be valuable to study the effect of competition on consumption goals (e.g., winning the competition means buying most sustainable products) as compared to conservation goals (e.g., winning the competition means reducing most CO_2 emissions). Interestingly, it could be investigated whether competition is more effective when goals are framed as a gain (consumption goal) as compared to when framed as a loss (conservation goal).

Lastly, following the SVO literature (Au & Kwong, 2004; Balliet & Joireman, 2010; Bogaert et al., 2008), the current research combined the two groups (individualists and competitors) comprising pro-selves. Future research could investigate whether the effectiveness of competition differs across those two groups. Indeed, the findings of Study 2 seem to indicate that competition has a stronger impact on pro-selves at the lower end of the scale (i.e., competitors). In addition, future research could investigate which specific elements of the competition appeal more to competitors as compared to individualists. For instance, in the current studies a single-winner format was used. Motivation to act sustainably may however differ depending on the type of winner format (single versus multiple). Competitors, who strive to maximize their own outcomes but seek to minimize others' outcomes, may be more motivated when a single format is used, whereas individualists, who are only concerned with maximizing their own outcomes, may be motivated to the same extent, independent of the type of format.

Funding sources

This research was supported by a grant from the Association for Consumer Research (specifically Transformative Consumer Research) and the Sheth Foundation.

Acknowledgements

This project was developed in collaboration with VODW Marketing Consultancy, the Netherlands, particularly Isolde Schram (Hop, Step & Leap Company). Data collection was partially realized through the Research Participation Project of the School of Business and Economics, Vrije Universiteit Amsterdam, The Netherlands. The authors want to thank the editor Jeff Joireman and the two anonymous reviewers for their valuable feedback during the review process.

References

Au, W., & Kwong, J. Y. Y. (2004). Measurement and effects of social value orientation in social dilemmas: A review. In R. Suleiman, D. Budescu, I. Fischer, & D. Messick (Eds.). *Contemporary Psychological Research on Social Dilemmas* (pp. 71–98). Cambridge, UK: Cambridge University Press.

Balliet, D., & Joireman, J. (2010). Ego depletion reduces proselfs' concern with the well-being of others. *Group Processes & Intergroup Relations, 13*, 227–239.

Balliet, D., Mulder, L. B., & Van Lange, P. A. M. (2011). Reward, punishment, and cooperation: A meta-analysis. *Psychological Bulletin, 137*, 594–615.

Balliet, D., Parks, C., & Joireman, J. (2009). Social value orientation and cooperation in social dilemmas: A meta-analysis. *Group Processes & Intergroup Relations, 12*, 533–547.

BenDor, T., Scheffran, J., & Hannon, B. (2009). Ecological and economic sustainability in fishery management: A multi-agent model for understanding competition and cooperation. *Ecological Economics, 68*, 1061–1073.

Bennett, V. M., Pierce, L., Snyder, J. A., & Toffel, M. W. (2013). Customer-driven misconduct: How competition corrupts business practices. *Management Science, 59*(8), 1725–1742.

Bogaert, S., Boone, C., & Declerck, C. (2008). Social value orientation and cooperation in social dilemmas: A review and conceptual model. *British Journal of Social Psychology, 47*, 453–480.

Buckley, W., Burns, T., & Meeker, L. D. (1974). Structural resolutions of collective action problems. *Systems Research and Behavioral Science, 19*, 277–297.

Buss, D. (1999). *Evolutionary psychology: The new science of the mind.* Boston: Allyn & Bacon.

Cameron, L. D., Brown, P. M., & Chapman, J. G. (1998). Social value orientations and decisions to take proenvironmental action. *Journal of Applied Social Psychology, 28*(8), 675–697.

Connelly, B. L., Tihanyi, L., Crook, T. R., & Gangloff, K. A. (2014). Tournament theory: Thirty years of contests and competitions. *Journal of Management, 40*, 16–47.

De Kwaadsteniet, E. W., Van Dijk, E., Wit, A., & De Cremer, D. (2006). Social dilemmas as strong versus weak situations: Social value orientations and tacit coordination under resource size uncertainty. *Journal of Experimental Social Psychology, 42*, 509–516.

Dietz, T., Ostrom, E., & Stern, P. C. (2003). The struggle to govern the commons. *Science, 302*(5652), 1907–1912.

Eek, D., & Gärling, T. (2006). Prosocials prefer equal outcomes to maximizing joint outcomes. *British Journal of Social Psychology, 45*, 321–337.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175–191.

Gärling, T., Fujii, S., Gärling, A., & Jakobsson, C. (2003). Moderating effects of social value orientation on determinants of proenvironmental behavior intention. *Journal of Environmental Psychology, 23*, 1–9.

Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Going green to be seen: Status, reputation, and conspicuous conservation. *Journal of Personality and Social Psychology, 98*, 392–404.

Hardin, G. (1968). The tragedy of the commons. *Science, 162*, 1243–1248.

Joireman, J. A., Lasane, T. P., Bennett, J., Richards, D., & Solaimani, S. (2001). Integrating social value orientation and the consideration of future consequences within the extended norm activation model of proenvironmental behaviour. *British Journal of Social Psychology, 40*, 133–155.

Joireman, J., & Liu, R. L. (2014). Future-oriented women will pay to reduce global warming: Mediation via political orientation, environmental values, and belief in global warming. *Journal of Environmental Psychology, 40*, 391–400.

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*, 239–260.

Lim, N. (2010). Social loss aversion and optimal contest design. *Journal of Marketing Research, 47*, 777–787.

Liu, D., Geng, X., & Whinston, A. B. (2007). Optimal design of consumer contests. *Journal of Marketing, 71*, 140–155.

Messick, D. M., & McClintock, C. G. (1968). Motivational bases of choice in experimental games. *Journal of Experimental Social Psychology, 4*, 1–25.

Morren, M., & Grinstein, A. (2016). Explaining environmental behavior across borders: A meta-analysis. *Journal of Environmental Psychology, 47*, 91–106.

Murphy, R. O., Ackermann, K. A., & Handgraaf, M. (2011). Measuring social value orientation. *Judgment and Decision Making, 6*, 771–781.

Nalebuff, B. J., & Stiglitz, J. E. (1983). Prizes and incentives: Towards a general theory of

compensation and competition. *The Bell Journal of Economics,* 21–43.
Penn, D. J. (2003). The evolutionary roots of our environmental problems: Toward a Darwinian ecology. *The Quarterly Review of Biology, 78*, 275–301.
Pletzer, J. L., Balliet, D., Joireman, J., Kuhlman, D. M., Voelpel, S. C., & Van Lange, P. A. (2018). Social value orientation, expectations, and cooperation in social dilemmas: A meta-analysis. *European Journal of Personality, 32*, 62–83.
Spiller, S. A., Fitzsimons, G. J., Lynch, J. G., Jr., & McClelland, G. H. (2013). Spotlights, floodlights, and the magic number zero: Simple effects tests in moderated regression. *Journal of Marketing Research, 50*, 277–288.
Terwiesch, C., & Xu, Y. (2008). Innovation contests, open innovation, and multiagent problem solving. *Management Science, 54*, 1529–1543.
Van Dijk, E., De Cremer, D., & Handgraaf, M. J. (2004). Social value orientations and the strategic use of fairness in ultimatum bargaining. *Journal of Experimental Social Psychology, 40*, 697–707.
Van Lange, P. A. M. (1999). The pursuit of joint outcomes and equality in outcomes: An integrative model of social value orientation. *Journal of Personality and Social Psychology, 77*, 337.
Van Lange, P. A. M., Bekkers, R., Chirumbolo, A., & Leone, L. (2012). Are conservatives less likely to be prosocial than liberals? From games to ideology, political preferences and voting. *European Journal of Personality, 26*, 461–473.
Van Lange, P. A. M., Joireman, J. A., Parks, C. D., & Van Dijk, E. (2013). The psychology of social dilemmas: A review. *Organizational Behavior and Human Decision Processes, 120*, 125–141.
Van Lange, P. A. M., Otten, W., De Bruin, E. N. M., & Joireman, J. A. (1997). Development of prosocial, individualistic, and competitive orientations: Theory and preliminary evidence. *Journal of Personality and Social Psychology, 73*, 733–746.
Van Lange, P. A. M., Schippers, M., & Balliet, D. (2011). Who volunteers in psychology experiments? An empirical review of prosocial motivation in volunteering. *Personality and Individual Differences, 51*, 279–284.
Van Prooijen, J. W., De Cremer, D., Van Beest, I., Ståhl, T., Van Dijke, M., & Van Lange, P. A. M. (2008). The egocentric nature of procedural justice: Social value orientation as moderator of reactions to decision-making procedures. *Journal of Experimental Social Psychology, 44*, 1303–1315.
Van Vugt, M., Van Lange, P. A. M., & Meertens, R. M. (1996). Commuting by car or public transportation? A social dilemma analysis of travel mode judgements. *European Journal of Social Psychology, 26*, 373–395.
Van der Wal, A. J., Van Horen, F., & Grinstein, A. (2016). The paradox of 'green to be seen': Green high-status shoppers excessively use (branded) shopping bags. *International Journal of Research in Marketing, 33*, 216–219.
Wu, J., Balliet, D., & Van Lange, P. A. (2016). Reputation, gossip, and human cooperation. *Social and Personality Psychology Compass, 10*, 350–364.