Journal of Experimental Social Psychology 96 (2021) 104163

Contents lists available at ScienceDirect

Journal of Experimental Social Psychology

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

Situational materialism increases climate change scepticism in men compared to women☆

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ARTICLE INFO

Keywords:
Climate change
Gender roles
Masculinity
Materialism
Scepticism

ABSTRACT

Men appear to be more sceptical towards climate change and less pro-environmental than women. On the other hand, priming certain values (e.g., wealth) undermines support for pro-environmental behaviours. Based on these findings, we explored whether situational materialism may amplify the differences between women and men in scepticism towards climate change. In three experiments we presented participants with either images portraying luxury consumption or neutral images, and then we measured scepticism. Study 1 showed that men increased their scepticism over women when they were exposed to luxury consumption, but not to neutral images. Studies 2–3 replicated these results and further explored the influence of gender roles. Conformity to male roles was associated with greater scepticism in both studies, and such association was amplified by situational materialism, but only in Study 2. Thus, situational materialism in men and conformity to male roles, in general, might hamper the fight against climate change.

1. Introduction

Human activities are estimated to have caused approximately 1.0 °C of global warming above pre-industrial levels; if such warming continues to increase at the current rate, it is likely to reach 1.5 °C between 2030 and 2052 (IPCC, 2018). The main climate-related risks include increased frequency of heat waves, droughts, floods and wildfires, and the exacerbation of other stressors that have negative outcomes for livelihoods, especially for people living in poverty (Field et al., 2014). Despite the scientific evidence to the contrary, some people are sceptical of climate change (Hulme, 2009). In particular, scepticism towards climate change seems to be greater among men as compared to women (McCright, 2010; Poortinga, Whitmarsh, Steg, Böhm, & Fisher, 2019). This research aims to examine whether situational materialism might amplify this difference. Based on previous literature linking materialism and less pro-environmental attitudes and behaviours (e.g., Hurst, Dittmar, Bond, & Kasser, 2013), we anticipated that drawing attention to the acquisition of goods and luxury items might reinforce men's sceptical beliefs about climate change compared to women. To that end, we activated situational materialism through experimental exposure to images related to conspicuous consumption. Additionally, we explored the impact gender roles on this process.

1.1. Sex, masculine roles and climate change scepticism

Scepticism refers to disbeliefs in the scientific tenets about climate change (Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011). Climate scepticism is not equivalent to uncertainty, which involves a weak conviction in the existence of climate change, the severity of its consequences, or its anthropogenic origin (Poortinga et al., 2011). Sceptical beliefs do not appear to stem from a lack of information about climate, but are related to certain values and worldviews. Whitmarsh (2011) found that scepticism correlated most strongly with environmental and political values, such that individuals with low pro-environmental values and those ideologically oriented to the right showed greatest scepticism towards climate change.

According to different studies, there also seem to be sex differences in environmental concern and scepticism towards climate change. Men appear to be more sceptical towards climate change and less pro-environmental than women (Fielding, Head, Laffan, Western, & Hoegh-Guldberg, 2012; McCright, 2010; Poortinga et al., 2019; Xiao & McCright, 2012). Prescriptive gender stereotypes and roles might be

☆ This paper has been recommended for acceptance by Dr. Joris Lammers.

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https://doi.org/10.1016/j.jesp.2021.104163
Received 14 October 2020; Received in revised form 7 May 2021; Accepted 7 May 2021
Available online 19 May 2021

relevant in explaining differences between women and men with regard to their beliefs about climate change. Environmental protection seems to be cognitively linked to women because caretaking is a main component of traditional feminine roles (Diekman & Eagly, 2000; Eagly & Wood, 2012). As a result, men who endorse environmentalism are likely to be perceived as gender deviants (Swim, Geiger, Sweetland, & Fraser, 2018), and expressing pro-environmental behaviours that are inconsistent with gender prescriptions causes uncertainty about the actor's sexual orientation among observers (Swim, Gillis, & Hamaty, 2020). Because men do not want to appear feminine (Hunt, Fasoli, Carnaghi, & Cadinu, 2016), they might refrain from engaging in green behaviours associated to women to (re)affirm their masculinity (Brough, Wilkie, Ma, Isaac, & Gal, 2016). Beliefs about climate change seem to follow the same pattern of feminisation as green behaviours. Recently, Swim and Geiger (2018) found that opinion groups expressing more concern about climate change were attributed more feminine traits than less concerned groups.

In parallel to a feminisation of environmentalism, unsustainable behaviours seem to be most frequent among men. Men eat more meat, go to more restaurants, drive longer distances and use less fuel-efficient vehicles than women, which translates into higher energy expenditure (Räty & Carlsson-Kanyama, 2010). Women consume more clothes, shoes and culture, but men are more likely to purchase expensive and polluting goods such as yachts, motorbikes, motorcars, computers, etc. (Johnsson-Latham, 2007). This luxurious consumption may be useful to show off a high position in the social hierarchy and reinforce one's masculinity, insofar as male roles include high expectations about professional and economic achievements (Good & Sherrod, 2001). In fact, men tend to be more materialistic than women probably due to a differential socialisation in which men are expected to be mainly responsible for earning money, while women are expected to be more oriented towards caring for others (Kasser, 2005). Consequently, men would have more to lose than women both in pragmatic and symbolic terms from introducing more sustainable habits and reducing consumption, which might partly explain why they are more sceptical towards climate change.

In the current research, we explore whether these differences between women and men in scepticism might be intensified when certain values are activated (see Steg, Bolderdijk, Keizer, & Perlaviciute, 2014). Values are central beliefs that motivate action and guide one's assessment of people, decisions and policies across a variety of situations and domains (Schwartz, 2012). According to Poortinga et al. (2019), the Schwartz's theory of human values (Schwartz, 1992) and the Value-Belief-Norm model (VBN) (Stern, Dietz, Abel, Guagnano, & Kalof, 1999) are the most widely used theoretical frameworks to study the relationship between values and attitudes about climate. Although these two models are not equivalent, there is a remarkable correspondence between the Schwartz's self-enhancement cluster and the egoistic value orientation of the VBN model, whereas the Schwartz's self-transcendence cluster greatly overlaps with the social-altruistic value orientation of the VBN model. Research has consistently shown that people who are more oriented towards self-enhancement/egoistic values are less willing to perform pro-environmental behaviours and hold more sceptical views about climate change than those individuals who prioritise self-transcendence/altruistic values (Poortinga et al., 2019). In the current research we will focus on a more specific type of values, very related to the self-enhancement/egoistic orientation, materialistic values.

1.2. Materialism: dispositional vs situational activation

Materialism is defined as a value system that confers great importance to the acquisition and possession of material goods in order to achieve one's central life goals (Richins & Dawson, 1992). Materialism guides people's daily lives, their consumption decisions and their assessment of themselves and others (Richins, 2017). As with other constructs, a distinction can be made between *dispositional* and *situational* materialism (Bauer, Wilkie, Kim, & Bodenhausen, 2012; Kasser, 2016). Research about dispositional materialism indicates that, as compared to weakly materialistic individuals, those who hold strong material values tend to prioritise the acquisition of possessions over other goals, are more self-centred, feel less satisfied with their life and pursue material complexity, characterised by positive attitudes towards growth and technology and disregard for nature (Richins & Dawson, 1992). Their emphasis on material possessions is associated with less pro-environmental behaviour (Brown & Kasser, 2005: Richins & Dawson, 1992) and more scepticism (Tranter, 2011; Tranter & Booth, 2015). The negative association between materialism and environmental concerns reflects a conflict between value orientations: whereas materialism is part of the self-enhancement values -focused on the self and on extrinsic rewards-, environmental values are clear examples of self-transcendent values- characterised by a concern for others including the environment (Gatersleben, Jackson, Meadows, Soto, & Yan, 2018). Meta-analytical findings confirm that placing great importance on the environment is associated with less scepticism towards climate change (Hornsey, Harris, Bain, & Fielding, 2016).

Although less studied than its dispositional counterpart, the momentary activation of materialism (i.e. by priming) has been found to influence different attitudes and behaviours such as mistrust, competitiveness and selfishness in a dilemma (Bauer et al., 2012), financial aspirations (Zawadzka, Kasser, Borchet, Iwanowska, & Lewandowska-Walter, 2019), self-control (Kim, 2013) and self-objectification (Teng et al., 2016), among others. To date, few studies have experimentally manipulated the salience of materialism to examine their effect on environmental attitudes. Among the exceptions, Bauer et al. (2012) primed materialism through a linguistic task and then presented participants with a water-conservation dilemma. Results indicated that participants who were exposed to consumer cues displayed increased competitiveness and selfishness as compared to participants assigned to a neutral condition. Likewise, Sheldon, Nichols, and Kasser (2011) found that reminding participants of wealth and material gain undermined support for pro-environmental behaviours as compared to reminding them of generosity and family values.

Although we are not aware of any research that analyses whether sex moderates the relationship between materialism and pro-environmental awareness, we hypothesise that priming materialism could increase the difference between women and men in scepticism towards climate change. Previous evidence suggests that the situational activation of certain values elicits the co-activation of compatible values and behaviours while inhibiting the activation of incompatible values and behaviours (Maio, Pakizeh, Cheung, & Rees, 2009). Hence, according to the literature (Brown & Kasser, 2005; Kvaløy, Finseraas, & Listhaug, 2012; Richins & Dawson, 1992; Tranter, 2011; Tranter & Booth, 2015), the situational activation of materialism should promote a greater desire to consume, less concern for the environment and more scepticism towards climate change, among others. In the case of women, such a process might be short-circuited because their gender prescriptions compel them to protect the environment (Eagly & Wood, 2012). On the contrary, men could be especially sensitive to situational materialism because male roles emphasise power and material success (Good & Sherrod, 2001). To resolve the conflict between materialism and caring for the environment, they would express more scepticism towards climate change.

1.3. Overview

To test whether sex and situational materialism have an interaction effect on scepticism, we conducted three experiments in which we primed materialism following one of the Bauer et al.'s procedures (Bauer et al., 2012, Experiment 1). Participants were exposed to consumer cues in the form of images of luxurious goods that were thought to increase the availability of materialistic goals (see Förster et al., 2009). Although

Bauer et al. (2012) also developed other experimental manipulations based on semantic priming (e.g., a scrambled-sentence task), presenting depictions of luxury goods appears to be the most powerful method in view of the effect sizes produced by each manipulation. Additionally, a pilot study confirmed that the presentation of such images increases materialistic aspirations. Likewise, Teng et al. (2016) and Nagpaul and Pang (2017) also found that exposure to pictures of luxury goods increases materialism as compared to neutral images. Therefore, we used images of luxurious consumption (vs. neutral images) as stimuli and then measured scepticism towards climate change. In Studies 2–3 we measured conformity with traditional male roles, in the first place, to check whether it interacted with situational materialism on scepticism.

All measures, manipulations, and exclusions are disclosed, as well as the method of determining the final sample size. No additional data were collected after an initial data analysis.

2. Study 1

Study 1 was designed to explore whether situational materialism amplifies sceptical beliefs about climate change among men as compared to women. We also measured dispositional materialism to rule out its potential influence. We expected to find an interaction between sex and situational materialism, where the activation of materialism would lead men to increase scepticism towards climate change as compared to women. We did not expect differences according to prior levels of dispositional materialism.

2.1. Method

2.1.1. Participants and design

Four hundred and sixteen Spaniards (60.8% women, $M_{age} = 33.72$, $SD = 13.61$) participated in an online, experimental study with two conditions: control and experimental. Participants' sex was considered the predictor and the manipulation of situational materialism was the moderating variable. Participants were recruited using a snowball strategy. We asked undergraduate students in psychology from a distance learning university to give their acquaintances the link to a survey. Since there were no preceding studies, the sample size was not determined a priori. However, a large sample was recruited to ensure the possibility of detecting a small effect. A sensitivity analysis was performed using the G*Power program to determine the minimum effect detectable (Faul, Erdfelder, Buchner, & Lang, 2009). Assuming a significance level of 0.05 and 80% power, a sample size of 416 participants will detect a small-to-medium effect ($f = 0.14$).

2.1.2. Procedure

Participants were invited to take an online study about climate change. The participants who were not Spaniards were diverted to a different study. First, materialism was measured by means of the six-item Material Values Scale by Richins (2004) ranging from 1 (strongly disagree) to 7 (strongly agree), $\alpha = 0.74$. Example items were: "I admire people who own expensive homes, cars, and clothes" and "Buying things gives me a lot of pleasure". Participants were then assigned either to the control or experimental condition following the manipulation of Bauer et al. (2012). Participants were told that they were going to see three images for 10 s each, and they had to imagine how they would feel in those situations as vividly as possible. Participants in the *experimental condition* saw three images related to expensive consumerism. These images were selected from several webpages and included a shopping mall, a yacht, and a luxury car. Participants in the *control condition* were exposed to three geometrical figures.

After the manipulation, participants completed Whitmarsh's (2011) scepticism scale, which consists of 12 items such as "Claims that human activities are changing the climate are exaggerated" or "The evidence for climate change is unreliable" ranging from 1 (strongly disagree) to 7 (strongly agree), $\alpha = 0.90$. After completing the questionnaire, participants contacted the students who had invited them to participate, who explained the objective of the study, the methodology (including the experimental manipulation) and the hypotheses, either face to face or by telematic means. This procedure was followed also in Studies 2–3.

2.2. Results

First, we conducted a regression analysis to verify whether condition, sex and dispositional materialism interactively predicted scepticism. Dispositional materialism did not interact with sex or condition, nor was its main effect significant, $ps > 0.163$. Therefore, we eliminated this variable from the analysis.

An ANOVA testing the effect of sex and condition showed a significant interaction effect, $F(1,412) = 13.46$, $p < .001$, $\eta^2_p = 0.03$ (see Fig. 1). Two *t*-tests showed that men reported more scepticism than women in the experimental condition, $t(203) = -6.44$, $p < .001$, 95% CI [−1.34, −0.71], but there were no differences between women and men in the control condition, $t(209) = -1.64$, $p = .102$, 95% CI [−0.52, 0.05]. Bonferroni post-hoc analyses indicated that men in the experimental condition showed more scepticism than men in the control condition and women in either condition, $ps < 0.004$. The main effect of sex was also significant, $F(1,412) = 34.56$, $p < .001$, $\eta^2_p = 0.08$, $Ms = 2.61$ vs. 1.99, $SDs = 1.27$ and 0.95 for men and women, respectively. The main effect of condition did not reach a significant level, $F(1,412) = 2.72$, $p = .100$, $\eta^2_p = 0.01$.

2.3. Discussion

As expected, Study 1 showed that the manipulation of situational materialism increased sceptical beliefs towards climate change among men. Men who saw images related to consumption expressed more scepticism towards climate change as compared to women. However, no differences emerged between women and men when they were exposed to neutral images. Dispositional materialism did not moderate the effect of the manipulation on scepticism, suggesting that the manipulation had a uniform effect on participants regardless of whether they were strongly or weakly materialistic.

Building on the observation that men express more scepticism towards climate change than women when situational materialism is activated, in Study 2 we explored the influence of gender roles in this process. As dispositional materialism did not moderate the effects, we did not include this variable in the next study.

3. Study 2

Study 2 aimed to replicate and extend the results of Study 1 by examining whether conformity to gender roles has a stronger influence than sex on scepticism when situational materialism is activated. In

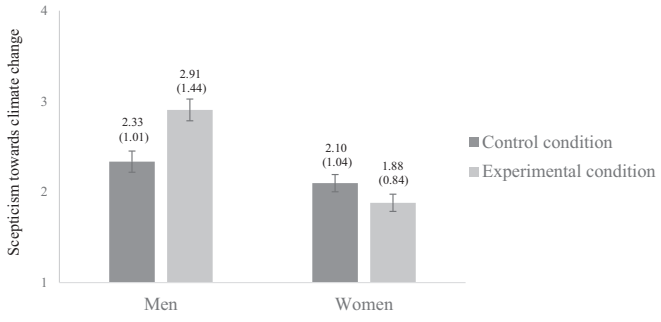

Fig. 1. Interaction between the effects of condition and sex on scepticism. Men exposed to materialism stimuli (experimental condition) showed stronger scepticism towards climate change than men who did not see those stimuli (in the control condition) or women in either condition.

particular, we tested whether conformity to male roles is associated to greater scepticism towards climate change even controlling for sex and whether such association is reinforced by the activation of situational materialism. As mentioned above, traditional female roles emphasise caring, that of others and also that of nature, while traditional male roles exalt power and material success (Diekman & Eagly, 2000; Eagly & Wood, 2012; Good & Sherrod, 2001). Therefore, those who most adhere to male roles might be most sensitive to situational materialism. Because the desire to accumulate possessions is rather incompatible with the change in lifestyle required by the fight against climate change, those who strongly (vs. weakly) adhere to male roles would have a greater need to deny climate change. Accordingly, we hypothesised that there would be an interaction between condition and conformity to male roles, such that exposure to consumer cues would amplify the differences in scepticism between those who adhere strongly and those who adhere weakly to male roles.

3.1. Method

3.1.1. Participants and design

Sample size was determined a priori considering the effect size found in Study 1 ($\eta^2_p = 0.03$) and using G*Power. Assuming a significance level of 0.05 and 80% power, we would need a sample size of 256 participants to detect an effect of $f = 0.175$. We recruited 287 Spanish participants (62.7% women, $M_{age} = 33.43$, $SD = 13.27$) using the same snowball strategy as in Study 1. Participants were randomly assigned to one of two conditions and were exposed to consumer stimuli (experimental) or geometrical figures (control). Conformity to male roles and sex were the predictors and the manipulation of situational materialism was the moderating variable.

3.1.2. Procedure

Participants were invited to collaborate in an online study about climate change. Those participants who were not Spaniards were diverted to a different study. First, we measured conformity to male gender roles by means of the eight-item Male Role Attitudes Scale (MRAS, Pleck, Sonenstein, & Ku, 1994), ranging from 1 (strongly disagree) to 7 (strongly agree). Example items were: "I admire a man who is totally sure of himself" and "It bothers me when a man acts like a woman", $\alpha = 0.75$. Participants were then shown the same consumer stimuli (experimental) or geometrical figures (control) as used in Study 1. Then, we measured scepticism as in Study 1, $\alpha = 0.92$.

In Studies 2–3 we also measured support for pro-environmental policies by means of four items developed for the purpose of this study. Participants were asked to what extent they would be willing to support the following actions: "to ban mining in protected areas", "to allocate a significant amount of resources to the implementation of wastewater treatment plants", "to improve the network of bike lanes in cities", and "to subsidise non-profit entities for the promotion of renewable energy", $\alpha = 0.73$. This scale ranged from 1 (not willing at all) to 7 (absolutely willing).The results for this variable in the two studies were not consistent, so they are not included below. However, interested readers can find them in the Supplementary Materials.

3.2. Results

3.2.1. Sex

An ANOVA considering sex and condition as predictors yielded a significant effect of the interaction between sex and condition, $F(1,283) = 5.41$, $p = .021$, $\eta^2_p = 0.02$ (see Fig. 2). Two t-tests showed that men reported more scepticism than women in the experimental condition, $t(139) = -3.44$, $p = .001$, 95% CI [−1.23, −0.33], but there were no differences between women and men in the control condition, $t(144) = -0.84$, $p = .401$, 95% CI [−0.46, 0.18]. Bonferroni post-hoc analyses indicated that men in the experimental condition showed more scepticism than men in the control condition and women in either condition,

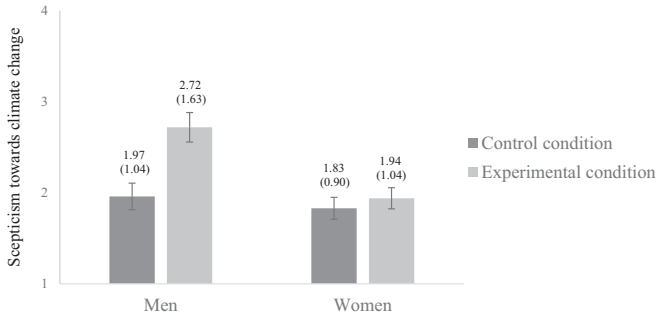

Fig. 2. Interaction between the effects of condition and sex on scepticism. Men exposed to materialism stimuli (experimental condition) showed stronger scepticism towards climate change than men who did not see those stimuli (in the control condition) or women in either condition.

$ps < 0.004$. The main effects of condition, $F(1,283) = 10.18$, $p = .002$, $\eta^2_p = 0.04$, and sex, $F(1,283) = 11.00$, $p = .001$, $\eta^2_p = 0.04$, were also significant.

3.2.2. Conformity to male roles

To study the effect conformity to male roles and condition on scepticism while controlling for sex, we performed a regression analysis considering conformity (centred), condition (0 control, 1 experimental), and the two-way interaction ConformityXCondition as predictors. Sex (0 women, 1 men) and the two-way interaction SexXCondition were included as covariates since their effects were significant in the previous analysis. The regression on scepticism yielded a significant effect of the interaction between conformity with male roles and condition, $b = 0.28$, $t(281) = 2.45$, $p = .015$, 95% CI [0.054, 0.496] (see Fig. 3). Breaking down the interaction showed that conformity to male roles had a stronger positive effect on scepticism in the experimental condition, $b = 0.66$, $t(281) = 8.67$, $p < .001$, 95% CI [0.510, 0.809], than in the control condition, $b = 0.38$, $t(281) = 4.65$, $p < .001$, 95% CI [0.221, 0.547]. The main effect of conformity with male roles was also significant, $b = 0.38$, $t(281) = 4.65$, $p < .001$, 95% CI [0.221, 0.547]. No other effects were significant, $ps > 0.115$.

3.3. Discussion

Study 2 replicated the results of Study 1 in that the manipulation of situational materialism increased sceptical beliefs towards climate change among men as compared to women. In contrast, no differences emerged between women and men in the control condition. A limitation is that the interaction between sex and condition on scepticism was smaller than the two main effects, which make it uninterpretable (Garcia-Marques, Garcia-Marques, & Brauer, 2014), but this concern does not apply to the analysis of the effect of conformity to male roles. Conformity to male roles was positively associated with scepticism, but such relationship was stronger in the experimental condition than in the control condition. Besides, when conformity to male roles was included as a predictor, the simple or interaction effects of sex on scepticism vanished.

In the first two studies we have used the same three stimuli to activate materialism. It could be argued that these stimuli only constitute a small sample of the luxury goods category or that they have a male gender bias, which would explain why men and people who adhere to male roles are most reactive to the manipulation. To check whether the three stimuli were gendered, we conducted a pilot study with 60 Spanish volunteers (27 woman and 33 men). Using a bipolar scale, participants were asked to evaluate each stimulus considering that 0 meant that it was most associated with women and 6 meant that the stimulus was most associated with men. Three t-tests revealed that two of the stimuli (a car and a yacht) were significantly more associated to men ($Ms = 3.42$

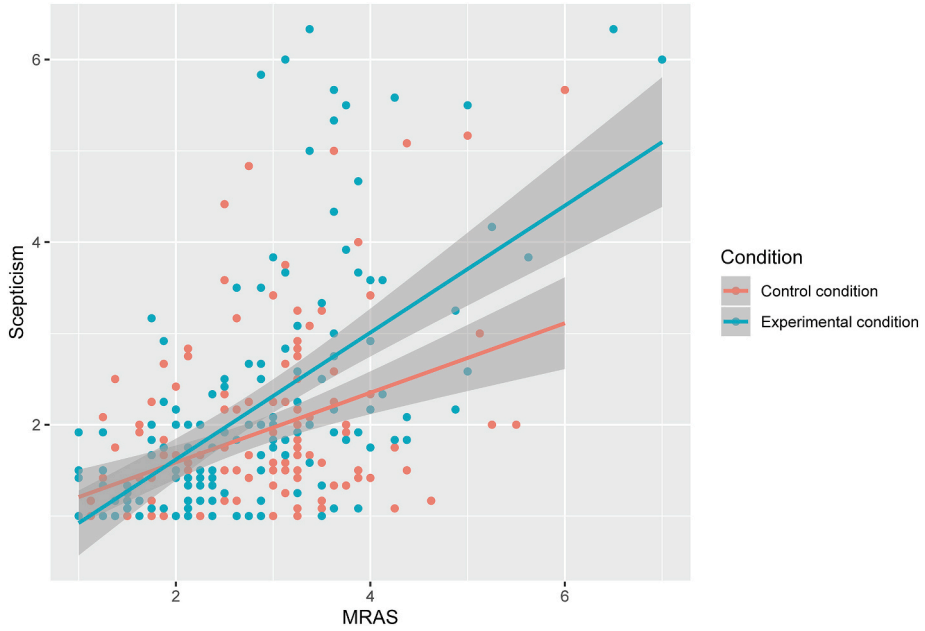

Fig. 3. Interaction between condition and conformity with male roles on scepticism. Exposure to materialism stimuli reinforces the effect of conformity with male roles on scepticism.

and 3.98, *SD*s = 0.96 and 1.14), whereas the third one (a mall) was more associated to women ($M = 2.55$, $SD = 0.91$), $ps < 0.001$. Based on these results, one could wonder whether women did not react to the experimental manipulation because they did not feel as challenged by stimuli as men. To solve this limitation, we conducted a final pre-registered experiment in which we used a stimulus sampling approach and customised the stimuli for women and men.

4. Study 3

Study 3 aimed to replicate the results of Studies 1–2 by including a larger sample of stimuli. Additionally, to better match the stimuli with participants' sex, we presented stereotypically masculine stimuli to men and stereotypically feminine stimuli to women. As in previous studies, we hypothesised that exposure to consumer cues would increase scepticism among men as compared to women. As in Study 2, we also predict that conformity to male roles will interact with situational materialism on scepticism.

4.1. Method

4.1.1. Participants and design

Sample size was determined a priori considering the effect size found in Study 2 and using G*Power. Assuming a significance level of 0.05 and 80% power, we would need a sample size of 403 participants to detect an effect of $f = 0.14$. We recruited 450 Spanish participants using the same snowball strategy as in previous studies. According to the pre-registration, we excluded from the analysis 12 participants who took more than two hours to complete the questionnaire. The final sample consisted of 438 participants (62.8% women, $M_{age} = 33.62$, $SD = 13.80$). They were randomly assigned to one of two conditions and were exposed to stimuli with luxurious (experimental) or non-luxurious products (control). Conformity to male roles and sex were the predictors and the manipulation of situational materialism was the moderating variable.

4.1.2. Procedure

Participants were invited to collaborate in an online study about climate change. Those participants who were not Spaniards were diverted to a different study. First, we measured conformity to male gender roles as in Study 2, $\alpha = 0.70$. Participants were then assigned either to the control or to the experimental condition.

4.1.2.1. Materials. In both conditions, participants were shown five images taken randomly from a bigger sample of 50 images for five seconds each. To ensure that participants received stimuli that match their sex, we used four different sets of images. Luxury images were gained by entering in the Google search engine the phrase (in Spanish): "luxury gifts for women" or "luxury gifts for men". This yielded luxury goods such as expensive men's shoes or watches (for men) and images of expensive women's bags or jewellery (for women). Participants in the control condition were shown non-luxury, basic goods such as shaving tools or socks (for men) or hair pins or feminine hygiene items (for women). The latter selection was based on our own intuitive assessment that these are non-luxury goods that fit either women or men.

4.1.2.2. Dependent variables. After the manipulation, we measured scepticism, $\alpha = 0.88$, and support for pro-environmental policies, $\alpha = 0.63$, as in Study 2. Since the alpha of this last scale was low, the results must be interpreted with caution (see the results for this variable in the Supplementary Materials).

4.2. Results

To determine whether mixed models were necessary, we first checked whether there was some sort of clustering in the data based on the stimuli presented. To that end, we ran two intercept only models using the *lme4* package of R software. The intraclass correlations were very low, 0.022 and 0.021 for scepticism and support for pro-environmental actions, respectively, suggesting no clustering. Therefore, we proceeded with fixed effects models.

4.2.1. Sex

An ANOVA considering sex and condition as predictors yielded a significant effect of the interaction between sex and condition, $F(1,434) = 13.24$, $p < .001$, $\eta^2_p = 0.03$ (see Fig. 4). Two *t*-tests showed that men reported more scepticism than women in the experimental condition, $t(211) = -4.17$, $p < .001$, 95% CI [−0.91, −0.33], but there were no

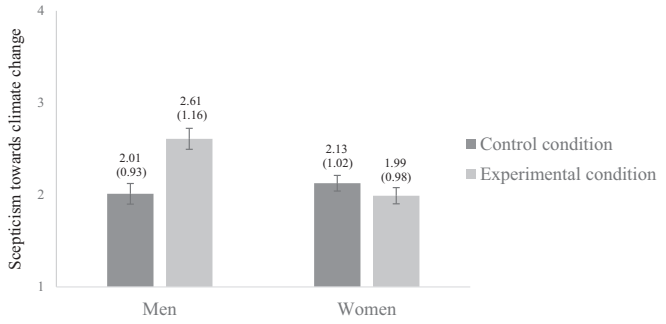

Fig. 4. Interaction between the effects of condition and sex on scepticism. Men exposed to materialism stimuli (experimental condition) showed stronger scepticism towards climate change than men who did not see those stimuli (in the control condition) or women in either condition.

differences between women and men in the control condition, $t(223) = 0.84$, $p = .402$, 95% CI [−0.15, 0.38]. Bonferroni post-hoc analyses indicated that men in the experimental condition showed more scepticism than men in the control condition and women in either condition, $ps < 0.005$. The main effects of condition, $F(1,434) = 5.26$, $p = .022$, $\eta^2_p = 0.01$, and sex, $F(1,434) = 6.25$, $p = .013$, $\eta^2_p = 0.01$, were also significant but small.

4.2.2. Conformity to male roles

To study the effect of conformity to male roles and condition on scepticism while controlling for sex, we performed a regression analysis considering conformity (centred), condition (0 control, 1 experimental), and the two-way interaction ConditionXConformity as predictors. Sex (0 women, 1 men) and the two-way interaction ConditionXSex were included as covariates since their effects were significant in the previous analysis. The regression on scepticism yielded a significant effect of the interaction between sex and condition, $b = 0.63$, $t(432) = 3.25$, $p = .001$, 95% CI [0.247, 1.005], as explained before, but not of the interaction between conformity with male roles and condition, $b = 0.11$, $t(432) = 1.12$, $p = .261$, 95% CI [−0.083, 0.306]. The main effect of conformity of male roles was significant, $b = 0.31$, $t(432) = 4.75$, $p < .001$, 95% CI [0.184, 0.444], whereas the other effects were not, $ps > 0.186$.

4.3. Discussion

Study 3 replicated the results of previous studies in that situational materialism increased sceptical beliefs towards climate change among men as compared to women. However, no differences emerged between women and men when they were exposed to neutral stimuli. Contrary to what we expected and what we found in Study 2, in this case conformity with male roles does not seem to explain the differences between men and women in the experimental condition.

5. General discussion

Although climate change is a pressing problem for humanity and there is substantial evidence supporting its anthropocentric origin, some people still express scepticism and oppose measures to combat climate change. Previous correlational research has already documented the association of sceptical beliefs with different factors such as values, age, sex, ideological orientation, etc. (Hornsey, Harris, & Fielding, 2018; Poortinga et al., 2019; Whitmarsh, 2011). However, few studies have experimentally manipulated those factors to stablish causality. This study focused on the causal effect of a specific kind of values – materialistic values – on sceptical beliefs towards climate change.

In three studies we found that activating materialism through exposure to images related to luxury consumption increased scepticism towards climate change among men as compared to women. In contrast, in a condition in which neutral images were presented no differences emerged between women and men. Study 1 revealed that the activation of materialism equally affected strongly and weakly materialistic participants. Studies 2 and 3 suggest that adherence to traditional gender roles might also play a significant role. Those who adhere strongly to male roles seem to be more sceptical of climate change than those who show weak conformity with those roles.

5.1. Relationship to literature and implications

Our results align with previous research indicating that materialism is negatively associated with environmental beliefs and behaviours (Kasser, Ryan, Couchman, & Sheldon, 2004; Kilbourne & Pickett, 2008). However, this study showed for the first time, to our knowledge, that activating materialism through exposure to luxury consumption *causes* an increase in sceptical beliefs among men as compared to women. This finding is of the utmost importance, since every day we are exposed to advertising messages that operate as situational activators of materialism and stimulate consumption (Bauer et al., 2012). Chronic exposure to these messages may consolidate a value system focused on material possessions, which in turn could increase men's scepticism towards climate change and the acceptance of actions and policies that ultimately harm the environment (Kasser et al., 2004).

Previous evidence suggests that men are less concerned about the environment and more sceptical towards climate change than women (McCright, 2010; Poortinga et al., 2019). Surprisingly, contrary to our expectations, none of the three studies detected differences between men and women in the control condition. Thus, our results indicate that an exposure to luxury consumption is necessary for men to express more sceptical beliefs than women. Perhaps the Spanish context is less materialistic than others in which differences between men and women have been found, which would explain why men and women did not differ in neutral conditions. Future studies could be conducted in societies with different levels of materialism to check if this factor generates differences between men and women in scepticism.

Our results also indicate that conformity to male roles is associated with more scepticism towards climate change. These results are consistent with previous evidence demonstrating that greenness is cognitively linked to femininity (Brough et al., 2016) and that gender roles influence different pro-environmental behaviours (Swim et al., 2018). In Study 2, situational materialism reinforced the relationship between conformity to male roles and scepticism, cancelling even the differences between men and women. However, Study 3, in which different stimuli were used for men and women, did not replicate this finding. This discrepancy could be due to the stimuli presented in each case. While in Studies 1 and 2 we only presented three images, that were more associated to men and were the same for women and men, in Study 3 we used a larger sample of stimuli that, in addition, was customised for men and women. Thus, in Study 3 those women who strongly adhere to male roles only saw stereotypically feminine stimuli, whereas men who weakly adhere to those roles only saw stereotypically masculine stimuli. This difference with respect to Study 2 might have counteracted the interaction effect between conformity with male roles and situational materialism found in Study 2. Future studies could simultaneously manipulate the salience of male roles and materialism to test their interaction effect on scepticism. It would also be interesting to check whether presenting men performing pro-environmental behaviours may counteract the negative effects of the activation of materialism. Additional studies could also evaluate conformity to female roles and/or gender self-stereotyping, as well as other factors that differ significantly among women and men (Zelezny, Chua, & Aldrich, 2000) and influence pro-environmental concerns such as social dominance orientation or empathy (Milfont & Sibley, 2016).

Consistent with previous research (e.g., Whitmarsh, 2011), scepticism scores were low in all three studies. It seems that people tend to accept the scientific evidence on climate change, at least in a western,

post-industrial context. In countries with other political systems or with lower levels of educational or economic development, climate scepticism could be higher. For instance, awareness of climate change and the belief in its anthropocentric origin are greater in countries that have more wealth and a higher level of education (Knight, 2016). We do not believe that the level of scepticism per se affected the direction of the effects, but perhaps certain country-level factors could moderate the effect sizes. For instance, it is possible that the activation of situational materialism has a stronger effect on the scepticism expressed by men in societies with more masculine values and with greater differentiation of roles between men and women. Future studies could test whether materialism and masculine values also interact at the country level to promote climate scepticism.

Although most people in western countries tends to accept scientific evidence, it is not convenient to think that scepticism is the problem of a few. If the sceptical discourse is assumed by some political elites, it is a matter of time before scepticism increases in the general population, and with it, the reluctance to introduce changes that must be made peremptorily to stop climate change. Furthermore, the problem may be exacerbated if scepticism towards climate change is combined with so-called delay discourses, which encompass different beliefs such as, for example, that technology will save us or, on the contrary, that it is too late to stop climate change and we must accept our destiny (Lamb et al., 2020).

Based on these results, several lines of action could be adopted to help prevent and reduce climate scepticism. At the educational level, we should provide citizens with strategies to critically analyse advertisements, reflect on the needs and values that they induce and weigh the environmental impact of the products they consume. Simultaneously, at the institutional level, environmental communications should be designed to activate transcendental values (e.g., with messages related to health protection; de Vries, 2020) thus reducing the influence of materialistic values. Such communications could feature men (preferably with a traditional male image) engaging in pro-environmental behaviours or advocacy, which would help weaken traditional gender mandates that might lead men to focus excessively on acquiring wealth and to worry less about caring for the planet compared to women. Of course, working more generally and from childhood on dismantling gender stereotypes, particularly those that promote the domination of others and of nature, would be beneficial to curb outrageous consumption and protect the environment, among many other advantages.

5.2. Limitations

Although we relied on the presentation of images associated with consumption in accordance with Bauer et al.'s methodology (Bauer et al., 2012), our research was hindered by the lack of availability of appropriate stimuli to manipulate situational materialism. Having a comprehensive set of standardised images of luxury and basic products would be useful for future research on this topic. We hope that our stimuli may serve as a starting point. Besides, in future studies more dynamic stimuli such as real advertising could be used to examine whether the effects remain constant or are even reinforced.

As we did not include a manipulation check, we cannot be sure that in the experimental condition, in which images associated with luxury consumption were presented, materialism was really activated. Although different studies (e.g., Bauer et al., 2012; Teng et al., 2016) have already demonstrated the efficacy of this method, in future studies it would be advisable to measure materialism after the experimental manipulation. More importantly, in recent times the validity of priming methodologies has been questioned mainly based on replication failures as discussed by Cesario (2014). This author states that complete invariance would be inconsistent with our current understandings of the human mind and behaviour, but he calls for more theorising and more direct replications. In the present investigation we have found consistent effects on scepticism considering different stimuli. However, new studies with different samples and methodologies will be helpful to establish the generalisability of the effects detected.

We also acknowledge other limitations that could be addressed through additional research. First, the snowball technique that we used to recruit participants does not guarantee the representativeness of the sample because our students might tend to invite people with whom they share beliefs, traits and characteristics. To increase the independence of observations as much as possible, we asked our students to find participants of different age, sex, social class, and ideology. Furthermore, we explicitly warned that other psychology students could not participate. Second, we did not collect objectively quantifiable parameters to verify whether sceptical beliefs lead to irresponsible habits and consumption. Further research could include information such as participants' monthly household energy usage, water expenditure, mobility patterns, etc. Finally, it would also be interesting to explore empirically how we can neutralise the adverse effects of situational materialism on scepticism towards climate change. Based on Maio et al.'s (2009) conclusions, we hypothesise that priming values incompatible with materialism (e.g., self-transcendence) could perhaps inhibit behaviours that are harmful to the environment.

6. Conclusion

In conclusion, the current research shows that the activation of materialism produces differences between women and men in scepticism towards climate change. Men became more sceptical than women after being exposed to images of luxury consumption. Although the effect sizes were modest, results were consistent across three experiments including different stimuli. In real life, in which we are frequently and unavoidably exposed to messages and personalised advertising oriented towards consumption through various media (e.g., television, movies, social networks, etc.) (Zuboff, 2019), the process studied here may be even more influential. Constant exposure to consumer cues could make materialism chronically activated leading to unsustainable behaviours particularly in men. In addition to materialism, strategies to reduce scepticism and promote alternative lifestyles need to account for the influence of gender roles. We conclude, therefore, that the response to climate change may require significant changes in prevailing values and gender roles.

Open science

Data, questionnaires, experimental stimuli, supplementary materials, and pre-registration for Study 3 are available at:
https://osf.io/emfj9/?view_only=49a2ef22da7d4289bd09945e4a2bb0c9

Declaration of Competing Interest

None.

Acknowledgements

For support we thank the Spanish Ministry of Science, Innovation and Universities (grant RTI2018-098576-A-I00) and the Community of Madrid (grant S2015/HUM-3427). These sponsors had no part in the design or performance of our studies.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jesp.2021.104163.

References

Bauer, M. A., Wilkie, J. E., Kim, J. K., & Bodenhausen, G. V. (2012). Cuing consumerism: Situational materialism undermines personal and social well-being. *Psychological Science, 23*, 517–523. https://doi.org/10.1177/0956797611429579.

Brough, A. R., Wilkie, J. E., Ma, J., Isaac, M. S., & Gal, D. (2016). Is eco-friendly unmanly? The green-feminine stereotype and its effect on sustainable consumption. *Journal of Consumer Research, 43*, 567–582. https://doi.org/10.1093/jcr/ucw044.

Brown, K. W., & Kasser, T. (2005). Are psychological and ecological well-being compatible? The role of values, mindfulness, and lifestyle. *Social Indicators Research, 74*, 349–368. https://doi.org/10.1007/s11205-004-8207-8.

Cesario, J. (2014). Priming, replication, and the hardest science. *Perspectives on Psychological Science, 9*, 40–48. https://doi.org/10.1177/1745691613513470.

Diekman, A. B., & Eagly, A. H. (2000). Stereotypes as dynamic constructs: Women and men of the past, present, and future. *Personality and Social Psychology Bulletin, 26*, 1171–1188. https://doi.org/10.1177/0146167200262001.

Eagly, A. H., & Wood, W. (2012). Social role theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Vol. 2. Handbook of theories of social psychology* (pp. 458–476). Sage Publications Ltd.. https://doi.org/10.4135/9781446249222.n49

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G* power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149–1160. https://doi.org/10.3758/BRM.41.4.1149.

Field, C. B., Barros, V. R., Mastrandrea, M. D., Mach, K. J., Abdrabo, M. K., Adger, N., … Burkett, V. R. (2014). Summary for policymakers. In *Climate change 2014: impacts, adaptation, and vulnerability. Part A: global and sectoral aspects*. In *Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 1–32). Cambridge University Press.

Fielding, K. S., Head, B. W., Laffan, W., Western, M., & Hoegh-Guldberg, O. (2012). Australian politicians' beliefs about climate change: Political partisanship and political ideology. *Environmental Politics, 21*, 712–733. https://doi.org/10.1080/09644016.2012.698887.

Förster, J., Liberman, N., & Friedman, R. S. (2009). What do we prime? On distinguishing between semantic priming, procedural priming, and goal priming. In E. Morsella, J. A. Bargh, & P. M. Gollwitzer (Eds.), *Social cognition and social neuroscience. Oxford handbook of human action* (pp. 173–192). Oxford University Press.

Garcia-Marques, L., Garcia-Marques, T., & Brauer, M. (2014). Buy three but get only two: The smallest effect in a 2× 2 ANOVA is always uninterpretable. *Psychonomic Bulletin & Review, 21*, 1415–1430. https://doi.org/10.3758/s13423-014-0640-3.

Gatersleben, B., Jackson, T., Meadows, J., Soto, E., & Yan, Y. L. (2018). Leisure, materialism, well-being and the environment. *European Review of Applied Psychology, 68*, 131–139. https://doi.org/10.1016/j.erap.2018.06.002.

Good, G. E., & Sherrod, N. B. (2001). The psychology of men and masculinity: Research status and future directions. In R. K. Unger (Ed.), *Handbook of the psychology of women and gender* (pp. 201–214). John Wiley & Sons, Inc.

Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. *Nature Climate Change, 6*, 622–626. https://doi.org/10.1038/nclimate2943.

Hornsey, M. J., Harris, E. A., & Fielding, K. S. (2018). Relationships among conspiratorial beliefs, conservatism, and climate scepticism across nations. *Nature Climate Change, 8*, 614–620. https://doi.org/10.1038/s41558-018-0157-2.

Hulme, M. (2009). *Why we disagree about climate change: Understanding controversy, inaction, and opportunity*. UK: Cambridge University Press.

Hunt, C. J., Fasoli, F., Carnaghi, A., & Cadinu, M. (2016). Masculine self-presentation and distancing from femininity in gay men: An experimental examination of the role of masculinity threat. *Psychology of Men & Masculinity, 17*, 108–112. https://doi.org/10.1037/a0039545.

Hurst, M., Dittmar, H., Bond, R., & Kasser, T. (2013). The relationship between materialistic values and environmental attitudes and behaviors: A meta-analysis. *Journal of Environmental Psychology, 36*, 257–269. https://doi.org/10.1016/j.jenvp.2013.09.003.

IPCC. (2018). Global warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Summary for Policy Makers. http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf.

Johnsson-Latham, G. (2007). A study on gender equality as a prerequisite for sustainable development. In *Report to the environment advisory council*. Retrieved from https://pdfs.semanticscholar.org/a5ff/9b476c4437e5c0df6a854e240f20f65730ad.pdf.

Kasser, T. (2005). Frugality, generosity, and materialism in children and adolescents. In K. A. Moore, & L. H. Lippman (Eds.), *What do children need to flourish? Conceptualizing and measuring indicators of positive development (pp. 357–373)*. Springer Science.

Kasser, T. (2016). Materialistic values and goals. *Annual Review of Psychology, 67*, 489–514.

Kasser, T., Ryan, R. M., Couchman, C. E., & Sheldon, K. M. (2004). Materialistic values: Their causes and consequences. In T. Kasser, & A. D. Kanfer (Eds.), *Psychology and consumer cultures: The struggle for a good life in a materialistic world* (pp. 11–28). American Psychological Association.

Kilbourne, W., & Pickett, G. (2008). How materialism affects environmental beliefs, concern, and environmentally responsible behavior. *Journal of Business Research, 61*, 885–893. https://doi.org/10.1016/j.jbusres.2007.09.016.

Kim, H. (2013). Situational materialism: How entering lotteries may undermine self-control. *Journal of Consumer Research, 40*, 759–772. https://doi.org/10.1086/673191.

Knight, K. W. (2016). Public awareness and perception of climate change: A quantitative cross-national study. *Environmental Sociology, 2*, 101–113. https://doi.org/10.1080/23251042.2015.1128055.

Kvaløy, B., Finseraas, H., & Listhaug, O. (2012). The publics' concern for global warming: A cross-national study of 47 countries. *Journal of Peace Research, 49*, 11–22. https://doi.org/10.1177/0022343311425841.

Lamb, W. F., Mattioli, G., Levi, S., Roberts, J. T., Capstick, S., Creutzig, F., … Steinberger, J. K. (2020). Discourses of climate delay. *Global Sustainability, 3*, Article E17. https://doi.org/10.1017/sus.2020.13.

Maio, G. R., Pakizeh, A., Cheung, W. Y., & Rees, K. J. (2009). Changing, priming, and acting on values: Effects via motivational relations in a circular model. *Journal of Personality and Social Psychology, 97*, 699–715. https://doi.org/10.1037/a0016420.

McCright, A. M. (2010). The effects of gender on climate change knowledge and concern in the American public. *Population and Environment, 32*, 66–87. https://doi.org/10.1007/s11111-010-0113-1.

Milfont, T. L., & Sibley, C. G. (2016). Empathic and social dominance orientations help explain gender differences in environmentalism: A one-year Bayesian mediation analysis. *Personality and Individual Differences, 90*, 85–88. https://doi.org/10.1016/j.paid.2015.10.044.

Nagpaul, T., & Pang, J. S. (2017). Materialism lowers well-being: The mediating role of the need for autonomy–correlational and experimental evidence. *Asian Journal of Social Psychology, 20*, 11–21. https://doi.org/10.1111/ajsp.12159.

Pleck, J. H., Sonenstein, F. L., & Ku, L. C. (1994). Attitudes toward male roles among adolescent males: A discriminant validity analysis. *Sex Roles, 30*, 481–501. https://doi.org/10.1007/BF01420798.

Poortinga, W., Spence, A., Whitmarsh, L., Capstick, S., & Pidgeon, N. F. (2011). Uncertain climate: An investigation into public scepticism about anthropogenic climate change. *Global Environmental Change, 21*, 1015–1024. https://doi.org/10.1016/j.gloenvcha.2011.03.001.

Poortinga, W., Whitmarsh, L., Steg, L., Böhm, G., & Fisher, S. (2019). Climate change perceptions and their individual-level determinants: A cross-European analysis. *Global Environmental Change, 55*, 25–35. https://doi.org/10.1016/j.gloenvcha.2019.01.007.

Räty, R., & Carlsson-Kanyama, A. (2010). Energy consumption by gender in some European countries. *Energy Policy, 38*, 646–649. https://doi.org/10.1016/j.enpol.2009.08.010.

Richins, M. L. (2004). The material values scale: Measurement properties and development of a short form. *Journal of Consumer Research, 31*, 209–219. https://doi.org/10.1086/383436.

Richins, M. L. (2017). Materialism pathways: The processes that create and perpetuate materialism. *Journal of Consumer Psychology, 27*, 480–499. https://doi.org/10.1016/j.jcps.2017.07.006.

Richins, M. L., & Dawson, S. (1992). A consumer values orientation for materialism and its measurement: Scale development and validation. *Journal of Consumer Research, 19*, 303–316. https://doi.org/10.1016/10.1086/209304.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna (Ed.), *Vol. 25. Advances in experimental social psychology* (pp. 1–65). Academic Press.

Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture, 2*. https://doi.org/10.9707/2307-0919.1116, 2307–0919.

Sheldon, K. M., Nichols, C. P., & Kasser, T. (2011). Americans recommend smaller ecological footprints when reminded of intrinsic American values of self-expression, family, and generosity. *Ecopsychology, 3*, 97–104. https://doi.org/10.1089/eco.2010.0078.

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. https://doi.org/10.1016/j.jenvp.2014.01.002.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review, 6*, 81–97.

Swim, J. K., & Geiger, N. (2018). The gendered nature of stereotypes about climate change opinion groups. *Group Processes & Intergroup Relations, 21*, 438–456. https://doi.org/10.1177/1368430217747406.

Swim, J. K., Geiger, N., Sweetland, J., & Fraser, J. (2018). Social construction of scientifically grounded climate change discussions. In S. Clayton, & C. Manning (Eds.), *Psychology and climate change* (pp. 65–93). Elsevier.

Swim, J. K., Gillis, A. J., & Hamaty, K. J. (2020). Gender bending and gender conformity: The social consequences of engaging in feminine and masculine pro-environmental behaviours. *Sex Roles, 82*, 363–385. https://doi.org/10.1007/s11199-019-01061-9.

Teng, F., Poon, K. T., Zhang, H., Chen, Z., Yang, Y., & Wang, X. (2016). Situational cuing of materialism triggers self-objectification among women (but not men): The moderating role of self-concept clarity. *Personality and Individual Differences, 97*, 220–228. https://doi.org/10.1016/j.paid.2016.03.066.

Tranter, B. (2011). Political divisions over climate change and environmental issues in Australia. *Environmental Politics, 20*, 78–96. https://doi.org/10.1080/09644016.2011.538167.

Tranter, B., & Booth, K. (2015). Scepticism in a changing climate: A cross-national study. *Global Environmental Change, 33*, 154–164. https://doi.org/10.1016/j.gloenvcha.2015.05.003.

de Vries, G. (2020). Public communication as a tool to implement environmental policies. *Social Issues and Policy Review, 14*, 244–272. https://doi.org/10.1111/sipr.12061.

Whitmarsh, L. (2011). Scepticism and uncertainty about climate change: Dimensions, determinants and change over time. *Global Environmental Change, 21*, 690–700. https://doi.org/10.1016/j.gloenvcha.2011.01.016.

Xiao, C., & McCright, A. M. (2012). Explaining gender differences in concern about environmental problems in the United States. *Society & Natural Resources, 25*, 1067–1084. https://doi.org/10.1080/08941920.2011.651191.

Zawadzka, A. M., Kasser, T., Borchet, J., Iwanowska, M., & Lewandowska-Walter, A. (2019). The effect of materialistic social models on teenagers' materialistic aspirations: Results from priming experiments. *Current Psychology*, 1–14. https://doi.org/10.1007/s12144-019-00531-3.

Zelezny, L. C., Chua, P. P., & Aldrich, C. (2000). New ways of thinking about environmentalism: Elaborating on gender differences in environmentalism. *Journal of Social Issues, 56*, 443–457. https://doi.org/10.1111/0022-4537.00177.

Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. Profile books.