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Short Communication

Denial of anthropogenic climate change: Social dominance orientation helps explain the conservative male effect in Brazil and Sweden☆

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ABSTRACT

Political conservatives and males are more likely to deny human influence on climate change. In this paper we examine the role of social dominance orientation (SDO) in explaining this "conservative male" effect by testing whether SDO mediates the influence of both political conservatism and gender on anthropogenic climate change denial. We use cross-sectional online-based data from Brazil ($N = 367$) and Sweden ($N = 221$) to test our mediation hypothesis. Results from path analysis showed that SDO partially or fully mediated the influence of political orientation and gender on anthropogenic climate change denial. The results provide insights about the role of SDO in the "conservative male" effect, and suggest that SDO could be considered more comprehensively in studies focusing on climate change denial and environmental attitudes/behaviors.

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Climate change is a serious threat to humans and other species. Despite widespread scientific consensus regarding the causes and consequences of climate change (e.g., Anderegg, Prall, Harold, & Schneider, 2010), some individuals remain unconvinced that the climate is changing due to human activities (e.g., Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011). Importantly, individuals who deny anthropogenic climate change are not random social agents, but rather share similar characteristics. Indeed, research has shown a "conservative white male" effect in the tendency to deny human influence on the climate system, meaning that denial is more common among politically conservative white males compared to other adults (McCright & Dunlap, 2011; Milfont, Milojev, Greaves, & Sibley, 2015; Poortinga et al., 2011).

Based on these findings, scholars have argued that climate change denial stems from a motivation to protect the current societal structures where these individuals are likely to hold relatively high power positions (Jylhä & Akrami, 2015; McCright & Dunlap, 2011). In fact, climate scientists highlight that while the lifestyle of wealthy individuals is the primary cause of anthropogenic climate change, those in disadvantaged positions are at a higher risk of facing serious consequences (Intergovernmental Panel on Climate Change, 2014). Hence, it is likely that individuals who are generally more inclined to accept uneven distribution of risks and benefits across social groups are also less willing to acknowledge and address anthropogenic climate change. Recent research supports this argument. Specifically, an individual difference variable measuring preference for group-based social hierarchies—social dominance orientation (SDO; Pratto, Sidanius, Stallworth, & Malle, 1994)—has been linked to anti-environmentalism and climate change denial (e.g., Jackson, Bitacola, Janes, & Esses, 2013; Milfont, Richter, Sibley, Wilson, & Fischer, 2013).

Since political conservatives and males tend to score higher on SDO than political liberals and females (Pratto et al., 1994; Snellman, Ekehammar, & Akrami, 2009; Van Hiel & Mervielde, 2002), SDO may help explain the "conservative male" effect. Indeed, two previous studies found SDO to mediate the effect of gender on climate change beliefs (Milfont et al., 2013, Study 4), and environmental values (Milfont & Sibley, 2016). Moreover, studies testing the unique contributions of socio-political ideological variables on climate change denial show that the effects of other conservative ideologies substantially decrease, or become statistically non-significant, when adjusting for SDO (Häkkinen & Akrami, 2014; Jylhä & Akrami, 2015; Milfont et al., 2013, Study 3).

The aim of the present paper is to investigate the role of SDO in explaining the "conservative male" effect in anthropogenic climate change denial. Based on extant research, we test a mediating hypothesis whereby SDO mediates the associations between both political conservatism and gender and climate change denial. Studies examining the mediating role of SDO have so far focused on either political orientation or gender (e.g., Häkkinen & Akrami, 2014; Milfont et al., 2013, Study 4).

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To our knowledge, this is the first study testing whether SDO simultaneously mediates the effects of political orientation and gender on anthropogenic climate change denial. We also extend previous research by testing the mediating hypothesis in two cultural contexts. Most of the studies examining the "conservative male" effect have been conducted in English speaking countries, so we expand this line of research by testing the replicability of this effect in Brazil and Sweden. We expect to observe the mediating role of SDO in both Brazil and Sweden, as SDO is an individual difference variable that tends to predict comparable outcomes across cultural contexts (Pratto et al., 2013).

1. Method

1.1. Participants

We analyzed data collected as part of broader online questionnaire studies conducted during 2014 in Brazil ($N = 367$, 151 men, $M_{age} = 29.70$, $SD_{age} = 10.80$; see Cantal, Milfont, Wilson, & Gouveia, 2015, Study 2) and Sweden ($N = 221$, 75 men, $M_{age} = 28.45$, $SD_{age} = 10.78$; see Jylhä & Akrami, 2015). Researchers invited participants to complete the questionnaires via emails, online social networks, notice boards and face-to-face requests. Most of the participants were either students or had completed at least a secondary degree (Brazil: 70.2%, Sweden: 99.5%).

1.2. Measures

1.2.1. Denial of anthropogenic climate change

Two items measured denial in the Brazilian sample ($r = .69$, $\alpha = .82$): 'Global warming and climate change are completely natural phenomena, unrelated to human actions', and 'Global warming and climate change are caused by human actions' (reversed). These items were rated on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Two comparable items from a published scale (Häkkinen & Akrami, 2014) measured denial in the Swedish sample ($r = .71$, $\alpha = .83$): 'Warming of the Earth's climate is natural and does not depend on human influence', and 'Temperature on Earth varies due to natural reasons and human activity has nothing to do with this variation'. These items were rated on a 5-point Likert-type scale ranging from 1 (*do not agree at all*) to 5 (*agree fully*). To make scores similar across samples, we converted the 1-to-7 and 1-to-5 denial metrics into percentage of maximum possible (POMP) scores (Cohen, Cohen, Aiken, & West, 1999) ranging from 0 (minimum possible score) to 100 (maximum possible score).[1]

1.2.2. Social dominance orientation

Recent versions of the SDO scale were used in Brazil (Ho et al., 2012) and Sweden (Ho et al., 2015). Example items include: 'Some groups of people are simply inferior to other groups' and 'Group equality should be our ideal' (reversed) (Ho et al., 2012, 2015). These 16-item scales are identical, except for the first item. To keep consistency across studies, the first item was excluded in both samples so that the same 15-item SDO scale was used in the analyses. Brazilian participants rated the SDO items ($\alpha = .85$) on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), and the Swedish participants rated the SDO items ($\alpha = .84$) on a 5-point Likert-type scale ranging from 1 (*do not agree at all*) to 5 (*agree fully*). We converted the 1-to-7 and 1-to-5 SDO metrics into POMP scores (Cohen et al., 1999).

[1] Although the climate denial items are not identical, results support their validity in both cultural contexts. A multiple-group analysis testing for scalar invariance showed good fit to the data: $\chi^2(1) = 1.45$, $p = .23$, CFI = 0.99, RMSEA = .04, 90% CI [.00, .17]; and the denial mean scores and their correlations with SDO are comparable across samples (see Tables 1 and 2).

1.2.3. Conservative political orientation

Political orientation was measured by a 7-point scale ranging from 1 (*very liberal*) to 7 (*very conservative*) in both samples.

2. Results

2.1. Preliminary results

Tables 1 and 2 present descriptive statistics and correlations among the measures. Climate change denial correlates positively with political orientation (being conservative), gender (being male), and SDO in both samples (see Table 2). The direction and size of all correlations are also comparable across samples. The results suggest a trend that denial and political conservatism only correlate among males ($r_{Brazil} = .19$, $p = .02$, $r_{Sweden} = .22$, $p = .06$) but not among females ($r_{Brazil} = .04$, $p = .61$, $r_{Sweden} = .09$, $p = .31$). However, regression analyses did not support the possibility that gender moderates the relation between denial and conservatism, as the conservatism × gender interaction term was non-significant in both samples ($ps > .10$).

2.2. Mediation hypothesis

We conducted a mediation path analysis in Mplus (Mplus 7.3; Muthén & Muthén, 2012) with 5000 bootstrap resamples to test whether SDO mediates the effects of both political orientation and gender on anthropogenic climate change denial. The results provide support for the mediation hypothesis in both countries (see Fig. 1). In the Brazilian sample, the effect of conservatism was fully mediated (standardized indirect effect: .065, $p = .003$, 95% CI: 0.023, 0.108) and the effect of gender was partially mediated (.036, $p = .02$, 95% CI: 0.006, 0.066) by SDO. In the Swedish sample, SDO fully mediated the effects of both conservatism (.061, $p = .007$, 95% CI: 0.017, 0.106) and gender (.062, $p = .008$, 95% CI: 0.016, 0.108) on denial.

3. Discussion

A number of studies have tried to identify the socio-structural characteristics of climate change deniers, and findings consistently show that conservative individuals and males are more likely to deny climate change compared to other adults (McCright & Dunlap, 2011; Milfont et al., 2015; Poortinga et al., 2011). Recent research suggests that this "conservative male" effect can be explained by endorsement of group-based social hierarchies as indexed by social dominance orientation (SDO; e.g., Häkkinen & Akrami, 2014; Milfont et al., 2013).

The aim of the present paper was to investigate further the extent to which SDO helps explain the "conservative male" effect. We contribute to the extant literature by examining the male/conservatism–denial link, and testing the mediation hypothesis of SDO, in a single model in two countries. The cross-cultural results provide strong support for this mediation hypothesis: the effects of both political conservatism and gender on climate change denial were mediated by SDO.

Table 1
Mean values (standard deviations) of anthropogenic climate change denial, social dominance orientation, and political conservatism.

	Denial	SDO	Conservatism
Brazil	19.9 (24.3)	24.8 (16.9)	3.5 (1.3)
Men	24.8 (27.6)	27.7 (17.4)	3.4 (1.4)
Women	16.5 (21.2)	22.8 (16.3)	3.6 (1.2)
Sweden	20.2 (23.7)	24.5 (15.6)	2.7 (1.4)
Men	23.5 (26.3)	29.8 (16.0)	2.8 (1.5)
Women	18.6 (22.1)	21.7 (14.7)	2.6 (1.3)

Note: Denial and SDO means are based on POMP scores ranging from 0 to 100, and conservatism means range from 1 to 7.

Table 2
Bivariate correlations.

	1	2	3	4
1. Denial of anthropogenic climate change		.25*	.10†	.17*
2. Social dominance orientation	.29*		.29*	.14*
3. Political orientation	.15*	.24*		−.08
4. Gender (female = 1, male = 2)	.10	.25*	.06	

Brazilian sample above diagonal, and Swedish sample below diagonal.
* $p < .05$.
† $p < .10$.

Besides the overall consistent pattern observed across both samples, it is worth noting some specific results. First, while SDO fully mediated the gender effect on denial among Swedish participants, SDO only partially mediated the gender effect among Brazilian participants. The direct gender effect observed in Brazil is consistent with findings showing that gender is a consistent predictor of environmentally-related issues (e.g., Zelezny, Chua, & Aldrich, 2000), as well as with results showing that SDO only partially mediates the gender effect on environmentalism and climate change beliefs (Milfont et al., 2013, Study 4; Milfont & Sibley, 2016). Social-cultural context is likely to moderate the gender–denial link, and larger cross-cultural research could examine this more fully. However, it is possible that the gender effect was non-significant in the Swedish sample due to the small proportion of male participants. We also found that the relation between conservatism and denial was non-significant in the Brazilian sample. Brazil has been going through a period of extreme economic and political instability (Brum, 2015), which has led political parties to focus less on environmental issues and more on economic and social issues. Thus, climate change may be less salient and polarized across political parties in Brazil than in more politically and economically stable countries. Importantly, these more specific results also suggest that, when compared to political conservatism and gender, SDO is a more consistent cross-cultural predictor of climate change denial.

It is important to bear in mind key limitations of our study. Although confirming the predictions in two cultural contexts, the findings are based on convenience sampling and cross-sectional data that restrict the generalizability of the findings. Future research incorporating representative and larger samples and testing the mediation hypothesis with longitudinal data would strengthen confidence in our findings. Notwithstanding these research limitations, we provide further empirical support for the important role of SDO in the environmental domain. This individual difference variable indexing preference for group-based social hierarchies has been primarily used to explain intergroup processes and political conservatism (Pratto, Sidanius, & Levin, 2006). The present study joins other recent studies suggesting that SDO is useful when examining environmentalism (e.g., Jylhä & Akrami, 2015; Milfont et al., 2013; Milfont & Sibley, 2014).

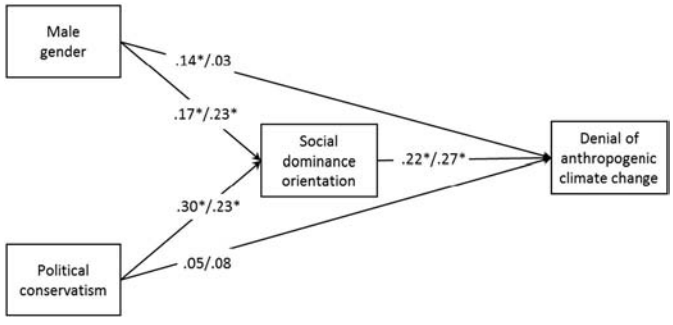

Fig. 1. Standardized path coefficients explaining anthropogenic climate change denial (Brazil/Sweden). Note: *$p < .05$.

Previous research results suggest that the SDO–environmentalism link reflects both environmental and social aspects. For instance, SDO extends to supportive views regarding human dominance over nature (Milfont et al., 2013), and predicts acceptance of anti-environmental actions that benefit high-status people (Jackson et al., 2013; Milfont & Sibley, 2014). Further, a recent study showed that climate change denial is uniquely predicted by views on both social and human–nature hierarchies (Jylhä & Akrami, 2015). It is thus possible that denial of environmental problems reflects, at least partly, an effort to protect the existing social and human–nature hierarchies. Future research could examine further whether the SDO–environmentalism link indeed reflects both environmental and social aspects.

To conclude, the present study extends previous research by showing that higher levels of SDO help explain why denial of anthropogenic climate change is more common among politically conservative individuals and males when compared to other adults. The take home message is that support for unequal social relations needs to be considered in attempts to understand the psychological underpinnings of anthropogenic climate change denial.

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