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Political ideology, cooperation and national parochialism across 42 nations

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Political ideology has been hypothesized to be associated with cooperation and national parochialism (i.e. greater cooperation with members of one’s nation), with liberals thought to have more cooperation with strangers and less national parochialism, compared to conservatives. However, previous findings are limited to few—and predominantly western—nations. Here, we present a large-scale cross-societal experiment that can test hypotheses on the relation between political ideology, cooperation and national parochialism around the globe. To do so, we recruited 18 411 participants from 42 nations. Participants made decisions in a prisoner’s dilemma game, and we manipulated the nationality of their interaction partner (national ingroup member, national outgroup member or unidentified stranger). We found that liberals, compared to conservatives, displayed slightly greater cooperation, trust in others and greater identification with the world as a whole. Conservatives, however, identified more strongly with their own nation and displayed slightly greater national parochialism in cooperation. Importantly, the association between political ideology and behaviour was significant in nations characterized by higher wealth, stronger rule of law and better government effectiveness. We discuss the implications of these findings for understanding the association between political ideology and cooperation.

This article is part of the theme issue ‘The political brain: neurocognitive and computational mechanisms’.

1. Introduction

In a globalized world, cooperation within and across nations is of great importance to promote and maintain public goods across nations [1–3]. These public goods can involve immense challenges that transcend national boundaries, such as the management of pandemics, climate change and resource conservation, all of which require nations to make costly contributions to the public good and which can prevent collective disaster. Although there is urgency for nations to cooperate to address these challenges, there seems to have been an increase in national parochialism around the globe, with the rise of political parties gaining popularity via nationalist and isolationist agendas [4]. These movements have the potential to hinder the ability to successfully solve these large-scale global challenges. In this paper, we investigate in a social dilemma game whether political ideology is associated with cooperation and national parochialism, and whether this association varies across nations around the world.

Political ideology has previously been associated with variation in values that can affect cooperation [5]. For example, liberals (in the USA and Italy) have been found to weight others’ outcomes more in social decisions, compared to conservatives [6]. Other research, however, did not find political ideology to be related to a willingness to cooperate with others, or any differences in parochial cooperation based on political party affiliation [7]. One major limitation of

previous work is that it concentrated on a limited set of nations (i.e. USA, the Netherlands and Italy) and that the countries under investigation were WEIRD, i.e. Western, Educated, Industrialized, Rich and Democratic [6–8].

In this paper, we take a much more comprehensive approach by running a study with representative populations from 42 nations around the world. These countries were chosen to reflect a broad range of institutional, cultural and ecological factors. Owing to the large variance in these factors, we are able to examine (i) whether political ideology is associated with cooperation and national parochialism around the globe, (ii) whether political ideology is associated with psychological mechanisms (i.e. national identification/identification with the world, or trust) that can account for why people cooperate more with ingroup versus outgroup members, and (iii) whether the relation between political ideology and cooperation is moderated by cross-societal factors such as quality of institutions and prevalence of infectious diseases.

(a) Political ideology and cooperation

Political ideology can be defined as a set of beliefs about the proper order of society and how it can be achieved [9]. Traditionally, two main political ideologies emerge from the research on differences between these sets of beliefs: conservatives and liberals [5]. These differences in political ideology could reflect differences in how people interact with others [6]. For example, individual differences in political ideology may underlie different strategies in social interactions, including the degree to which people cooperate with others, or aggress outgroups [10,11]. Liberals, compared to conservatives, are expected to extend their cooperation beyond their close network and, therefore, have cooperative interactions with unknown others. Past evidence has indeed found that liberals and conservatives display different preferences about how to distribute resources between themselves and others [6,12,13]. In particular, liberals have been hypothesized to be more concerned for others' outcomes, compared to conservatives (i.e. liberals are more inequality averse) [7]. This is because liberals are less likely to believe that social inequalities are best characterized as zero-sum interactions (i.e. one person's gain is equivalent to another's loss) [14]. This suggests that liberals may be more motivated to sacrifice their own self-interest to establish equal and mutually beneficial outcomes in social interactions [7,15,16].

Importantly, differences in inequality aversion are associated with differences in a willingness to cooperate with others [15]. In fact, cooperation involves actions that benefit others, often at a cost to oneself [17]. Prior models have emphasized different approaches to understanding cooperation (for reviews, see [17,18]), such as models that integrated political ideology and its association with concerns for others [6]. Moreover, conservative ideologies are characterized by higher individualism and self-reliance, values that should prioritize individual interests over collective ones [19]. As pro-social preferences, such as inequality aversion, are associated with higher cooperation towards others [13], we can expect political ideology to be associated with cooperation with others, such that liberals, compared to conservatives, will generally cooperate more with others (table 1, hypothesis 1 (H1))

Cooperation with unrelated strangers can be risky, and requires making oneself vulnerable to being exploited [20]. Therefore, cooperation among strangers requires trust and

tolerance of uncertainty [17,21]. As interactions with strangers can involve a risk of exploitation, positive beliefs about others' behaviours (i.e. trust) are important to understanding how people behave. As conservatives are characterized by beliefs that others are self-interested and view the world as more threatening [14], it can be hypothesized that conservatives do not expect others to cooperate. Therefore, we hypothesize that liberals, compared to conservatives, generally show higher trust towards strangers (H2a). Importantly, trust is strongly associated with cooperation, especially when the risk of exploitation is high [1,17,22]. As a consequence, we hypothesize that higher trust (i.e. positive expectations toward others) is associated with greater cooperation, therefore mediating the relation between political ideology and cooperation (H2b).

(b) Political ideology and national parochialism

Decades of research on human cooperation suggest that cooperation is parochial, i.e. people prefer to cooperate with ingroup members, compared to outgroup members and strangers [23–26]. Little research has been done on political ideology and national parochialism in cooperation. Research on political ideology proposes two potential competing perspectives on how differences in ideologies are potentially related to parochialism [5,27]. On the one hand, research proposes that conservatives are more loyal to their groups [28,29]. Empirical evidence supports the idea that conservatives, compared to liberals, show more prejudice towards others [30,31], while liberals have been found to be less discriminatory, even with people of opposing ideologies ([32], H3a). On the other hand, it has been argued that both liberals and conservatives can engage in prejudice if they perceive the outgroup holds different world views ([27], H3b). Supporting this idea, research on Democrats and Republicans in the USA found that both showed ingroup favouritism (parochialism) when interacting with people from the same versus different political party [7].

Importantly, it is possible that individual differences in political ideology affect two of the psychological mechanisms that have been hypothesized to explain national parochialism, that is expectations (trust) and identification with one's nation and the world as a whole. Supporting this idea, past research has found that people cooperate more with ingroup members because they hold positive expectations that other ingroup members, but not outgroup members, will cooperate [33]. As conservatives are more loyal to their groups and norm abiding [12,28], we hypothesize that conservatives, compared to liberals, will expect more cooperation from ingroup members, compared to outgroup members (H4). Previous cross-cultural research has also found that the degree to which people identify with their nation, compared to the world as a whole, affects investments to local and global public goods [23,34]. Assuming that liberals, compared to conservatives, perceive the world as less threatening [14] and have relatively lower loyalty to group affiliations [12], we hypothesize that liberals, compared to conservatives, will identify less with their nationality and more with the world as whole (H5).

(c) Cross-societal differences in political ideology and cooperation

Does the relation between political ideology and cooperation and national parochialism vary across nations? To date, research has not examined how individual differences in

Table 1. Summary of the hypotheses.

#	hypothesis	support
1	liberals, compared to conservatives, will cooperate more with others (independently of the others' group membership)	yes
2a	liberals, compared to conservatives, show higher trust towards strangers, independent of the others' nationality	yes
2b	higher trust (i.e. positive expectations towards others) is associated with greater cooperation towards others, therefore mediating the relationship between political ideology and cooperation	yes
3a	liberals will show less national parochialism, compared to conservatives	yes
3b	no difference in national parochialism between conservatives and liberals	no
4	conservatives, compared to liberals, will expect more cooperation from ingroup members, compared to outgroup members	yes
5	liberals, compared to conservatives, will identify less with their nationality and more with the world as a whole	yes
6	in nations characterized by higher quality of institutions, higher scores in liberal ideology will be associated with higher cooperation (independently of partner's nationality) and less national parochialism.	yes
7	in nations characterized by lower prevalence of infectious diseases, liberals will express less national parochialism and higher cooperation towards others (independently of their nationality), compared to conservatives	partly

political ideology relate to cooperation and national parochialism across societies. Evolutionary theory proposes that individual differences in how people cooperate and show parochialism can be the result of adaptive responses to the social environment, which in turn underlie political ideology in humans [10]. Hence, based on this, we can expect variation in political ideology around the world. Importantly, according to a post-materialist perspective, a critical societal and ecological precondition for self-expression and emergence of individual differences is the fulfilment of basic material needs, such as health [26]. Hence, based on this perspective, we could expect that the expression of these individual differences may vary around the world. In general, it may be that the associations between political ideology, cooperation and national parochialism occur in societies that promote the fulfilment of these needs. High-quality institutions and societies with lower historical prevalence of infectious diseases can mitigate material threats and guarantee safe interactions with unknown strangers [34]. Here, we consider the possibility that societies that fulfil basic material needs allow for a stronger association between individual differences in political ideology, cooperation and national parochialism. In particular, in societies characterized by higher quality of institutions, we hypothesize that liberal, compared to conservative, ideologies will be associated with higher cooperation and less national parochialism (H6). Moreover, in nations characterized by lower prevalence of infectious diseases, liberals will display higher cooperation and lower national parochialism than conservatives (H7) (see table 1 for summary of hypotheses).

2. Methods

(a) Participants

We recruited 18 411 participants from 42 nations (Argentina, Australia, Bolivia, Brazil, Canada, China, Colombia, Egypt, Finland, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Italy, Japan, Kenya, Mexico, Malaysia, Morocco, The Netherlands, New Zealand, Nigeria, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Russia, Serbia, Singapore, South Africa, South Korea, Spain, Sweden, Taiwan, Turkey, Venezuela, UK and USA) varying widely in quality of

institutions, state of democracy, prevalence of infectious diseases and religion. Participants were recruited by a panel agency with the goal to obtain a stratified sample by age, gender and income. Additional information on the sample strategy can be found in [35]. We determined the sample size by conducting a power analysis to detect a within-subjects effect of national parochialism in cooperation (difference between ingroup and outgroup members/strangers; preregistration of the design can be found here: <https://osf.io/gnxv2/>). An *a priori*-power analysis suggested that to detect the effect size of the within-subjects difference reported in a recent meta-analysis ($d = 0.27$, [26]) at statistical power $(1 - \beta) = 0.95$ and $\alpha = 0.05$ required a sample size of 150 people per country. A sensitivity-power analysis that considers a sample size of 400 and 800 participants and a 95% statistical power and 5% of probability error reveals that we can detect very small effect size of discrimination ($d = 0.16$ and $d = 0.12$).

(b) Procedure and experimental design

Participants made several choices in a prisoner's dilemma task in an online survey. The decision-making task involved three counterbalanced within-subject treatments about the nationality of their partner in the prisoner's dilemma (partner's nationality: national ingroup versus national outgroup versus unidentified stranger) and two counterbalanced within-subjects treatments that varied whether their choice was either private or public (see table 2 for design summary). The procedure of the experiment was the same across all nations. First, participants gave their informed consent, and then made 12 independent cooperation decisions in a prisoner's dilemma, each with a different partner (either from the same nation, a set of outgroup nations or an unidentified stranger). After that, participants were asked about their political ideology, national and global identification, and sociodemographic information. We wrote an English version of the survey. After that, we had experts translate the survey by using either the back-translation method or the committee method.

(i) Cooperation and trust

Cooperation was assessed in a two-person prisoner's dilemma game (PD). In the PD, participants were informed

Table 2. Summary of the design. Outgroup 1 = Australia, Colombia, Germany, India, Nigeria, Serbia, Singapore, United States; outgroup 2 = Canada, Hong Kong, Hungary, Kenya, New Zealand, Panama, Sweden, Venezuela.

choices	membership	observability	block
1	ingroup	yes	1
2	ingroup	yes	1
3	outgroup 1	yes	1
4	outgroup 2	yes	1
5	stranger	yes	1
6	stranger	yes	1
7	ingroup	no	2
8	ingroup	no	2
9	outgroup 1	no	2
10	outgroup 2	no	2
11	stranger	no	2
12	stranger	no	2

that they would make several decisions and that they were endowed with 10 Monetary Units (MU) for each decision. Each decision was made with a different partner. Participants were informed that both they and their partner could decide to send none, part or the entire amount to the other. Each MU sent to the other would have then been doubled. Cooperation was measured by the amount of MU (0–10) sent to the partner. Participants were also asked how many MU (0–10) they expected their partner to send to them. This served as a measure of trust. There was no feedback after decisions.

(ii) Observability: public versus private choices

We also included an experimental manipulation of whether choice in the prisoner's dilemma was made public or not. Since this manipulation was introduced to test hypotheses not related to this project, we describe it in the electronic supplementary material.

(iii) Partner's nationality

In the ingroup treatment, participants made cooperation decisions by giving between 0 and 10 MU to a partner from the same nation. In the outgroup treatment, participants made cooperation decisions with a partner from one of a set of other 16 nations. Since participants made two outgroup decisions per each observability treatment, we split the outgroup treatment into two sets (outgroup 1: Canada, Hong Kong, Hungary, Kenya, New Zealand, Panama, Sweden, Venezuela; outgroup 2: Australia, Colombia, Germany, India, Nigeria, Serbia, Singapore, USA). If the participant was from one of these outgroup nations, we excluded that specific nation from the pools (outgroup 1 or outgroup 2). In the unidentified Stranger treatment, the nationality of the partner was not specified (i.e. unknown; see instructions in the electronic supplementary material).

(iv) Incentives

A recent meta-analysis found no difference between using incentivized and hypothetical scenarios to study national

parochialism [1,26]. Moreover, an experimental study has replicated this same finding across three countries [35]. Nonetheless, as a robustness check, we investigated whether cooperation and national parochialism were affected by the use of incentives (versus hypothetical scenarios) in three nations. Participants in Brazil, India and Poland ($N \sim 800$ per country) were randomly allocated to a between subjects treatment where cooperation decisions could result in real monetary outcomes or a treatment where cooperation decisions resulted in hypothetical outcomes. Participants were endowed with 10 MU. Then, they were informed that each MU corresponded to 2.5 min average wage in each country. Information regarding wages in each country was retrieved from <https://tradingeconomics.com/country-list/wages>. Participants were paid for one of the decisions in the incentive treatment. We found no interactions between national parochialism or observability with incentives, as well as no main effect of incentives on cooperation. These results provide additional empirical support for the conclusion that there is no substantial difference between studies that use incentivized or hypothetical scenarios to study cooperation with ingroup and outgroup members (results can be found in [35]).

(v) Political ideology

Political ideology was assessed by asking participants where they would place themselves on a scale from 0 to 10 on political issues (0, strong conservative–right leaning; 10, strong liberal–left leaning). Higher scores in political ideology indicate higher levels of liberalism. Translations were adapted to reflect differences between left and right in political ideology across nations.

(vi) National and global identity

National and global identity were assessed by means of two items. Participants were asked how much they agree on the statement 'I identify with my nationality' on a 7-point Likert scale for the national identity measure and how much they agree on the statement 'I identify with the world as a whole' for the global identity measure (1, disagree completely; 7, agree completely). Higher scores indicate greater national and global identification.

(vii) Analytic strategy

In the models presented below, we used mixed-effects models where participants (level 2) and nations (level 3) were two random intercepts. Additionally, we included partner's nationality as a random slope. Partner's nationality (ingroup versus outgroup and stranger), political ideology, national and global identification were fixed-effects predictor variables (level 2 variables). Similar to previous research, we combined outgroup and strangers to study the intrinsic motivation of participants to favour others from their own nation (i.e. ingroup favouritism [26]; see also electronic supplementary material). As we did not find evidence for outgroup derogation (people did not cooperate less with outgroups compared to strangers; see electronic supplementary material), we did not consider this motivation any further. To account for potential self-selection effects, other individual differences variables (e.g. age and gender) were included as level-2 control variables. Regarding the cross-societal analyses, we ran mixed-effects models where country-level indicators were level 2 predictor

variables. A complete report of the results is presented in the electronic supplementary material, tables S6–S24.

To help the interpretability of the cross-cultural analyses, we used a principal component analysis to calculate participant scores for cooperation and national parochialism. A cooperation score was computed based on a model that assumes the data across the 12 decisions load on one factor. The cooperation score can be interpreted as the cooperation one person displays across all 12 decisions, independent of the treatments, with higher scores indicating higher cooperation. Parochialism scores were based on a model that assumes that the data across the 12 decisions load on two factors (ingroup versus outgroup + stranger treatments). A national parochialism score can be interpreted as the influence of the partner's nationality on cooperation, with higher scores meaning higher national parochialism (see electronic supplementary material, §3 for further details on the principal component analysis). The national parochialism score is based on the outcome of the principal component analysis, and should not be confused with the term for national parochialism, which represents the use of partner nationality to predict cooperation (ingroup versus and outgroup and stranger).

3. Results

(a) Cooperation, trust and political ideology

First, we tested whether political ideology was associated with cooperation (H1). Across all 42 nations, we found that people who scored high in liberalism (left leaning) cooperated more with others (independently from whether their partners were from the same nation, other nations, or unidentified strangers) compared to people who were more conservative (mixed-effects regression controlling for age, gender and main treatments: $b = 0.075$, $p < 0.001$, see electronic supplementary material, table S6). However, this relation was characterized by a small effect size ($r = 0.03$) and was statistically significant in only 4 out of 42 nations (see random-effects meta-analysis in electronic supplementary material, figure S8). We also found that liberals held different expectations about others' cooperation (trust), compared to conservatives (see table 1, H2a). In fact, in a mixed-effects regression model, we found that liberals expected more cooperation from others, compared to conservatives ($b = 0.044$, $p < 0.001$). This relation was also characterized by a small effect size ($r = 0.02$) and was statistically significant in only five nations (see electronic supplementary material, figure S9). Finally, we ran a multi-level mediation model [36] to test whether political ideology had an effect on cooperation via the indirect effect of trust. We found that trust partially mediated the relation between political ideology and cooperation (indirect effect: $b = 0.027$, $p < 0.001$; 95% CI [0.022, 0.030], prop. mediated = 0.365) (H2b).

(b) National parochialism, expectations and political ideology

Across all 42 nations, participants cooperated more when they knew that their partner was from the same nation, compared to when they knew that their partner was from another nation or a stranger ($b = 0.28$, $p < 0.001$; see also [35]). To test hypothesis 3, we ran a mixed-effects regression and found that the national parochialism in cooperation was weaker among liberals compared to conservatives (interaction effect controlling for age

and gender: $b = -0.030$, $p < 0.001$, see electronic supplementary material, table S7). This result was also robust when computing a national parochialism score (see details on the calculation of the score in the electronic supplementary material, §3) to test the main effect of political ideology on national parochialism: supporting H3a, and disconfirming H3b, we found that liberals showed less national parochialism than conservatives ($b = -0.053$, $p < 0.001$). The relation was characterized by a small effect size ($r = -0.02$) and the effect was significant in six nations (see electronic supplementary material, figure S10). Similarly, liberals, compared to conservatives, exhibited smaller differences in terms of expectations (trust) between ingroup members, compared to outgroup members and strangers (interaction effect: $b = -0.098$, $p < 0.001$). Supporting H4, the relation between expectation and national parochialism was stronger for conservatives, compared to liberals.

(c) National identity, global identity and political ideology

We then tested whether political ideology was associated with differences in how people identify with their nations or with the world as a whole (H5). In line with the hypotheses, liberals identified less with their nationality, compared to conservatives ($b = -0.110$, $p < 0.001$). The effect size was small ($r = -0.07$) and this negative relation was statistically significant in 19 out of 42 nations (see electronic supplementary material, figure S11). By contrast, we found that liberals identified more with the world as a whole, compared to conservatives ($b = 0.163$, $p < 0.001$). The effect size was small ($r = 0.11$), the relation was statistically significant in 21 out of 42 nations, but the positive association was consistent across all nations except Taiwan (see electronic supplementary material, figure S12).

(d) Cross-societal differences

Finally, we tested whether cross-societal differences in quality of institutions (H6), or historical prevalence of infectious diseases (H7), could moderate the relation between political ideology, cooperation and national parochialism scores around the globe. As we had multiple indices of cooperation (national ingroup, national outgroup and unidentified strangers), we used a principal component analysis to extract values according to each construct. We found a significant positive interaction between quality of institutions and political ideology predicting cooperation scores. These findings were consistent across three indicators of quality of institutions (government effectiveness: $b = 0.151$, $p = 0.009$; rule of law: $b = 0.134$, $p = 0.02$; GDP per capita: $b = 0.180$, $p = 0.002$). As displayed in electronic supplementary material, figure S3, the relation between political ideology and cooperation was stronger in societies characterized by higher government effectiveness, rule of law and gross domestic product.

Similarly, we found a significant negative interaction between quality of institutions and political ideology predicting national parochialism scores (government effectiveness: $b = -0.067$, $p < 0.001$; rule of law: $b = -0.054$, $p = 0.001$; GDP per capita: $b = -0.072$, $p < 0.001$). The interactions are plotted in electronic supplementary material, figure S4, and display that the relation between political ideology and national parochialism scores in the observed data becomes stronger in nations characterized by higher quality of institutions.

We found no significant interaction between the historical prevalence of infectious diseases and political ideology

predicting cooperation ($p=0.204$). However, we found a significant interaction between historical prevalence of infectious diseases and political ideology predicting national parochialism scores ($b=0.065, p<0.001$). As displayed in electronic supplementary material, figure S5, the relation between political ideology and national parochialism scores was stronger in societies characterized by lower historical prevalence of infectious diseases. We also explored other potential cross-societal moderators (i.e. state of democracy, importance of religion and church attendance) of the relationship between political ideology, cooperation and national parochialism, which we report in the electronic supplementary material.

4. Discussion

Research proposes that political ideology is associated with people's willingness to cooperate with strangers, ingroup members and outgroup members [6,7]. In particular, people with conservative ideologies have been hypothesized to cooperate less with strangers [6,7], and be more willing to express ingroup bias towards people who share their values or identities [7,30]. Other research has questioned these differences and stressed the similarities among people with different political ideologies [27].

In this paper, we tested prominent hypotheses on the relation between political ideology, cooperation and national parochialism in an international experiment involving 42 nations around the globe. Overall, we found that liberals, compared to conservatives, cooperated more with unrelated strangers independently of group membership. Moreover, liberals showed less national parochialism compared to conservatives. These differences seemed particularly driven by extreme liberal views, instead of extreme conservative views (see results on political extremism in the electronic supplementary material, §2.7). Contrary to previous research [7], our results support theories that posit the existence of core differences in beliefs, values and behaviours among people of different ideologies [5]. However, we found these effects in a limited number of nations and, similar to previous research [7], the magnitude of the effect of the relation between political ideology and cooperation was small (see electronic supplementary material). This suggests that although there are differences in how people cooperate in social dilemmas based on their political ideology, research should be cautious in not overestimating the role of ideology in social dilemmas. In fact, it is possible that other individual differences (e.g. personality [13]), or contextual factors (e.g. punishment, communication [37,38]), explain more variance on how people behave in social dilemmas.

Differences in cooperation and national parochialism among people with different ideologies were also present in the extent to which people trusted strangers, and to which they identified with their nations or the world as a whole. In fact, we found that conservatives, compared to liberals, expected less cooperation from strangers in general, and expected relatively more cooperation from a partner with shared nationality. Moreover, people with conservative rather than liberal ideologies identified more with their nation and identified less with the world as a whole. The effects of the relation between political ideology and identifications were larger than the ones observed in the prisoner's dilemma game, suggesting that individual differences may be less relevant when passing from thinking about subjective self-

identification compared to strategic behaviour in social dilemmas involving resource allocations. These results further validate the behavioural findings observed in the prisoner's dilemma, suggesting that political ideology can affect interactions with strangers and ingroup members. Moreover, these results inform previous research on international cooperation, by suggesting that individual differences in political ideology can explain why some people engage in universal versus parochial cooperation [1,23].

We further investigated the cross-societal underpinnings of the relation between political ideology and cooperation around the globe. A cross-societal approach can be used to assess the generalizability and variability of the relation between political ideology and cooperation. We found that the relation between political ideology and cooperation was present in a limited set of nations, suggesting that differences in political ideology emerge in specific contexts. We tested two hypotheses based on the idea that a critical societal precondition for self-expression and the individual differences is the fulfilment of basic material needs [39]. We found that in nations characterized by higher quality of institutions (high GDP, government effectiveness and rule of law) and by lower historical prevalence of infectious diseases, the relation between political ideology and cooperation was stronger, such that people holding liberal (left-wing), compared to conservative (right-wing), ideologies were more cooperative with strangers. These results contribute to our understanding of how the expression of individual differences in social behaviours can be favoured by certain institutional conditions (e.g. countries characterized by high quality of institutions). Similar to findings on gender differences around the globe [39], we found that individual differences in political ideology were more predictive of behaviour in nations with higher quality of institutions and more favourable ecological conditions (i.e. lower historical prevalence of infectious diseases).

These results contribute to our understanding of the role of cultural institutions and ecologies in shaping the political brain and psychology around the globe [40,41]. In fact, political orientations have been hypothesized to be related to relevant physiological, psychological and behavioural differences [5,42–44]. However, other research questioned some of these findings and highlighted similarities (rather than differences) in the behaviour and physiological responses among people with different worldviews [27,45]. These different results may be owing to the restricted number of nations (e.g. nations with higher GDP like the USA) and samples used in research on the neuroscience and psychology of political ideology. In fact, we found that individual differences in political ideology are more remarkable in societies with specific institutions, while playing a minor role in others. Therefore, previous research may have underestimated the role of culture and ecologies, which may be crucial to understand the interplay between the environment, the formation of individual differences and how individual differences are expressed in behaviour [46]. As culture has had a prominent role in shaping human brains and behaviours [47,48], future research needs to embrace a cross-cultural approach to understand how differences in ecology, culture and institutions can affect the biology and psychology of political ideology across nations.

There are a few limitations of this research worth noting. First, we only used one item to assess political ideology across 42 nations. Although this may limit the complexity and variation of political ideology around the globe (e.g. the

possibility to distinguish between the social versus economic dimension), previous cross-cultural research finds evidence for the recurrence of a continuum from left to right across culture [49]. Second, some aspect of the design (e.g. online interactions) may contribute to the relatively small variation in the relation between political ideology and cooperation across nations. Third, it is possible that the null effects of political ideology in some nations might become significant when considering larger samples. In fact, the power analysis for this study was conducted to detect an effect size for national parochialism, and not for any (potentially smaller) effects of ideology. That said, in this study, we presented empirical evidence from a large set of nations, with standardized instructions across nations, and large samples stratified by age, gender and income. Moreover, our results were consistent across overlapping constructs (cooperation and identification with the world as a whole, national parochialism and identification with one's nation).

5. Conclusion

In a large cross-national experiment, we found that differences in cooperation and national parochialism can partially be accounted for by differences in political ideologies. Conservatives, compared to liberals, cooperated less with others

and showed higher national parochialism around the globe. These differences were particularly pronounced in nations characterized by higher wealth, rule of law and government effectiveness. Altogether, these results contribute to our understanding of the generalizability and variability of ideological behaviour around the globe.

Ethics. The research was approved by the Massey University Human Ethics Committee, application number: 4000019960 and by the board for Ethical Questions in Science of the University of Innsbruck, application number 37/2018.

Data accessibility. This article has no additional data.

Authors' contributions. A.R., M.S., J.H.L. and D.B. conceived of and designed the study, A.R. carried out the statistical analyses. A.R. and D.B. wrote the paper, M.S. and J.H.L. provided feedback on the draft. All authors gave final approval for publication and agree to be held accountable for the work performed therein.

Competing interests. We declare we have no competing interests.

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