Cross-cultural evidence that intergroup conflict heightens preferences for dominant leaders: A 25-country study

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ABSTRACT

Across societies and across history, seemingly dominant, authoritarian leaders have emerged frequently, often rising to power based on widespread popular support. One prominent theory holds that evolved psychological mechanisms of followership regulate citizens' leadership preferences such that dominant individuals are intuitively attributed leadership qualities when followers face intergroup conflicts like war. A key hypothesis based on this theory is that followers across the world should upregulate their preferences for dominant leaders the more

they perceive the present situation as conflict-ridden. From this conflict hypothesis, we generate and test four concrete predictions using a novel dataset including 5008 participants residing in 25 countries from different world regions (consisting of a mix of convenience and approximately representative country-specific samples). Specifically, we combine experimental techniques, validated psychological scales, and macro-level indicators of intergroup conflict to gauge people's preferences for dominant leadership. Across four independent tests, results broadly support the notion that the presence of intergroup conflict increases follower preferences for dominant leaders. Thus, our results provide robust cross-cultural support for the existence of an adaptive, tribal followership psychology, a finding that has various implications for understanding contemporary politics and international relations.

1. Introduction

Across the world and across history, political leaders with strong, authoritarian personalities have regularly risen to power. Prime historical and contemporary examples include personas with widely different legacies such as Julius Caesar, Fidel Castro, Recep Tayyip Erdogan, Vladimir Putin, and Donald Trump. Importantly, these dominant leaders have risen to power with broad public support, which has led political analysts to wonder if there is something inevitable about "strong man" politics (Bremmer, 2018). As troubling as this might seem from a democratic perspective, it raises the obvious question why it is that citizens come to prefer dominant personalities as ideal leaders. This is particularly puzzling given that (i) existing work only provides partial support that dominant leaders improve follower conditions through for instance facilitation of intra-group coordination or protection of the ingroup against enemy outgroups (Brown, 2014; but see Chen et al., 2021), and (ii) studies of electoral behavior find that voters generally prefer warm and competent candidates (e.g. Bittner, 2011; Laustsen & Bor, 2017). Consequently, observed preferences for dominant leaders seem to be at odds with established insights from political behavior.

One explanation of citizens' paradoxical preference for dominant leaders focuses on intergroup conflict. Specifically, this account suggests that the more citizens perceive the social world as marked by strife and intergroup rivalry the more they will endorse dominant leaders. Consistent with this conflict hypothesis, preferences for dominant leaders are shown to rise under both natural conditions of intergroup conflict and experimental primes based on terrorist attacks or interstate conflict (Laustsen & Petersen, 2017, 2020a; Little et al., 2007; Merolla & Zechmeister, 2009). This association has been established in experimental studies using visual cues (masculinized faces; Little et al., 2007, Spisak et al., 2012. See also Todorov et al., 2005; Todorov, 2017; Sell et al., 2009), vocal cues (low voice pitch; Tigue et al., 2012, Klofstad et al., 2012, see also Sell et al., 2010) and textual cues of dominance (male leader name or masculine personality; Van Vugt & Spisak, 2008; Laustsen & Petersen, 2020a; Hasty & Maner, 2023).[2] Finally, individuals who are predisposed to perceive the social world as more conflict-ridden and dangerous—those scoring high on rightwing authoritarianism (RWA) or social dominance orientation (SDO)—also exhibit higher preferences for dominant leaders (Laustsen & Petersen, 2017; Womick et al., 2019).

On this basis, scholars have argued that the conflict-sensitive nature of leader preferences reflects an adaptive psychological system regulating whom to follow in different evolutionarily relevant contexts (Laustsen, 2021; Van Vugt, 2006). Notwithstanding the significance of this theoretical claim, it is largely based on North American and Western European data. Here we follow recent calls for employing culturally diverse and heterogeneous datasets when testing broad claims about human nature (Barrett, 2020; Henrich et al., 2010). Specifically, we report the results from a study testing the link between follower

perceptions of intergroup conflict and preferences for dominant leadership across 5008 participants residing in 25 different countries spread across the globe. While study samples comprise a mix of convenience, student, and more representative samples, the full dataset encompass citizens from both western and non-western, rich and poor, democratic and less democratic countries. Still, because we rely on online samples among mostly educated participants, we cannot fully claim that our study covers WEIRD and non-WEIRD populations alike (Henrich et al., 2010). Nevertheless, our dataset constitutes a hugely diverse sample and significantly broadens the range of settings in which the conflict hypothesis has previously been tested. Consequently, our results not only address the pressing question of *when citizens prefer a dominant leader*; our results also address the fundamental question of whether *these conflict contingent leadership preferences are omnipresent* and, hence, are compatible with the theoretical notion of a dedicated, adaptive psychological system for leadership and followership.

Recent theoretical endeavors argue that the emergence of leadership—with one individual exerting disproportionate influence on group decision-making—constitutes an effective strategy to overcome various collective action problems in groups (Glowacki & von Rueden, 2015; McDermott et al., 2016). Intergroup conflict constitutes an important collective action problem which has significantly influenced human social psychology and behavior throughout human evolution (Gat, 2006; Bowles, 2009; McDonald et al., 2012; see also Fry, 2013). Anthropological studies find that leadership in small-scale societies is granted to different individuals in different contexts. Various Native American tribes (e.g., the Navajo) had different leaders during war and peace (Price & Van Vugt, 2014: p. 181; Shepardson, 1963), and analyses of contemporary small-scale societies show that different pathways to leadership equally associate with more surviving offspring, suggesting a link with reproductive success (Chagnon, 1988; von Rueden & Jaeggi, 2016). Furthermore, cross-species comparisons of non-human societies (e.g., meerkats and capuchin monkeys) support the notion of context-sensitivity in leadership roles with contexts characterized by intergroup conflict consistently being male-biased (Smith et al., 2022). Consequently, humans may have functionally specialized psychological mechanisms for following leaders with certain ideal traits (cf. Lord & Maher, 2002)—with variation in intergroup conflict exerting particularly strong effects on leadership preferences. Relatedly, over human evolutionary history, leadership and status have been attained through two distinct routes of dominance and prestige (Cheng et al., 2013; Hasty & Maner, 2023; Henrich & Gil-White, 2001). The gist of the dominance-prestige model is that dominant personalities achieve power through force, intimidation, and threat of punishment, whereas prestigious personalities achieve power through possessing expertise and generosity (Cheng et al., 2013). Recent theoretical and empirical work questions the distinctiveness of the dominance and prestige pathways suggesting larger conceptual overlap than the original model expresses (Durkee et al., 2020; Garfield & Hagen, 2020). Specifically, these studies suggest that dominant individuals only to a limited extent rise in status and decision-making authority without also generating benefits for their group (Durkee et al., 2020; Durkee & Lukaszewski, 2024). Likewise, Garfield and Hagen (2020) find that although dominance and prestige emerged as distinct constructs among a sample of contemporary

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[2] Hasty and Maner (2023) also show that followers regardless of context prefer prestigious over dominant leaders (see also Wiezel et al., 2024). The present study was not designed to test this, but we urge future research to address the relative preference for dominance cis-à-vis prestige cross-culturally.

Ethiopian hunter-gatherers, many male leaders were seen as both dominant and prestigious. Studies of Tsimane horticulturalists suggest covariance between dominance and prestige arises when they depend on the same traits, such as physical strength or knowledge (von Rueden et al., 2014). Despite this debate about the distinctiveness of dominance from prestige, the historical and contemporary notion of dominant leaders rising to power does resonate with prominent evolutionary models of leadership and status acquisition such as the dominance-prestige model.

Despite the insights reviewed above, one might still consider why people should want a dominant leader during episodes of intergroup aggression? Intergroup conflicts require an aggressive response, and a forceful and threatening individual had—at least ancestrally—a greater ability to inflict costs on outgroup members (Little et al., 2007). Dominant leaders may also effectively coordinate within-group responses to external threats (Chen et al., 2021; McDermott et al., 2016). Indeed, delegating power to a dominant leader can foster group defense by deterring or punishing free-riders (Laustsen & Petersen, 2015). Whether for reasons of aggression or defense against rival groups, the underlying theoretical notion remains the same: Humans might possess dedicated psychological mechanisms for regulating leader-follower relations—an *adaptive followership psychology*—with one important component being its conflict-sensitive nature. This leads to our key "conflict hypothesis": Humans upregulate their preferences for dominant leadership as a function of the presence and intensity of intergroup conflict.[3]

This article reports four tests of the conflict hypothesis. *Test 1* investigates the observable implication that followers intuitively prefer more dominant leaders when facing intergroup conflict (than in less conflict-ridden situations). We test this proposition by assigning participants to conditions varying in intensity of intergroup conflict and exposing them to fictitious leader faces manipulated to evoke subtle differences in dominance impressions. *Test 2* ties the conflict hypothesis to the dominance-prestige model exploring the observable implication that intergroup conflict relates distinctly to follower preferences for leader traits associated with dominance but not prestige. *Test 3* shifts the focus from contextual manipulations of intergroup conflict to individual perceptual differences. Specifically, Test 3 examines if individuals who perceive society as more dangerous and conflict-ridden also hold stronger preferences for dominant leaders and further tests if perceptions of society as dangerous or conflict-ridden constitute the strongest predictor. Finally, *Test 4* investigates the implication that macro-level indicators of alertness to intergroup conflict correlate positively with sample-level preferences for dominant leadership across the 25 countries covered in our study. All four tests utilize the same original dataset and support the conflict hypothesis.

2. Methods

The study was reviewed and approved by the Scientific and Ethical Review Board (VCWE) of the Faculty of Behavior & Movement Sciences, VU University Amsterdam (VCWE-2019-138R1). Further ethical approval was obtained when local data collection collaborators found it appropriate. All study materials needed for replication are displayed in the online Supplementary Information.

2.1. Participants and procedure

Participants from across 25 different countries (see Table 1) were recruited to participate in "a large cross-national research project" about "political attitudes" and choices "between different individuals as your

favored leader". Participants read instructions on the start screen, provided consent, and remained anonymous throughout the data collection. Surveys were collected from October 2019 to November 2020. Samples were mostly convenience-based (e.g., Germany, Nigeria), or student-based (e.g., Australia, South Korea) with a few more representative exceptions (Denmark and Kenya). Surveys were translated into local language in collaboration with local data collection collaborators or fielded in English if appropriate (see Supplementary Information A.1 for English survey). Due to the online mode of data collection and because many surveys were administered in English, our samples are most likely higher educated than general populations (see Discussion).

Countries were included in the project based on network opportunities in the project PIs' professional networks and ambitions to include all inhabited continents of the world. Data collection was also initiated in Ethiopia and Panama but suspended due to unforeseen recruitment obstacles. We aimed to recruit at least 150 participants per country and were mostly successful. All 25 samples were collected online except for Australia, where data was collected in a computer laboratory. Three criteria were applied for exclusion of inattentive participants: First, all participants who stopped answering the survey before assignment of the experimental treatment (2116 participants).[4] Second, participants who answered the entire survey in less than 5 min with the expected response time being 12–15 min (104 participants). This decision was based on a cursory look at response time for outliers to detect careless responses (Huang et al., 2012; Van Quaquebeke et al., 2022). Third, participants who failed to answer more than half of the questions capturing preferences for leader facial dominance (56 participants). Following this procedure, our analyses are based on 5008 participants ($M_{age} = 30.46$, $SD_{age} = 13.94$; 58.47 % female) described in Table 1 (reported results remain substantially unchanged when all available participants are included, see Supplementary Information A.13).

In the survey, participants first answered a series of demographic questions (gender, age, education, and income). Second, they answered validated measures of political ideology, Social Dominance Orientation (SDO), and Rightwing Authoritarianism (RWA). Next, they were randomly assigned to one of three experimental conditions after which they answered the two main dependent variables: i) Face-based questions tapping subtle preferences for dominant leadership, and ii) explicit trait preferences in leaders. Participants then answered questions for other projects before reporting the perceived local resemblance of the employed face stimuli. Finally, they were thanked and debriefed.

2.2. Experimental conditions

A central component of our research design is the random assignment of participants to one of three experimental conditions varying the contextual situation surrounding leader preferences: Control, war, and peace. We use the terms "war" and "peace" because they represent direct contemporary instantiations of opposite situations related to "intergroup conflict"—the evolutionarily relevant concept of interest in this project. Importantly, most previous studies compare conditions reflecting war and peace directly leaving out a true control condition. However, adding a control condition constitutes an important design feature as it allows tapping participants' default leader preferences in the absence of concrete contextual information. Furthermore, the control condition permits testing if war and peace contexts exert equal or differential effects on followers' leadership preferences (although in opposite directions), and it constitutes the basis for macro-level analyses (Test 4). Our experimental conditions were based on short instructions asking participants to imagine certain contextual situations (following Little et al., 2007; Spisak et al., 2012). The strength of using such

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[3] Contexts of economic hardship and increasing inequality also heighten preferences for dominant leaders (Kakkar & Sivanathan, 2017; Sprong et al., 2019). Thus, different kinds of existential threat may enhance preferences for dominant leadership.

[4] The rather large number of participants stopping their participation probably relates to the unpaid nature of the study. Thus, dropouts also include participants who only clicked the link to check out the survey.

Table 1
Descriptive statistics and details across all 25 countries included in the dataset.

Country (language)	Number of participants (N)	Proportion female	Mean age	Sample type	Mean pref. For dominant leadership	
					Face-based Mean (SD)	Trait pref. Mean (SD)
Australia (English)	157	0.70	20.66	1	0.49 (0.50)	0.69 (0.16)
Canada (English)	276	0.68	26.74	1 & 2	0.48 (0.50)	0.71 (0.17)
Chile (Spanish)	198	0.57	32.13	1 & 2	0.41 (0.49)	0.47 (0.19)
China (Chinese)	154	0.86	21.20	1	0.44 (0.50)	0.70 (0.12)
Colombia (Spanish)	153	0.70	23.54	1 & 2	0.53 (0.50)	0.56 (0.18)
Croatia (Croatian)	93	0.51	28.60	1 & 2	0.48 (0.50)	0.75 (0.15)
Cyprus (Greek)	108	0.56	35.20	2	0.50 (0.50)	0.67 (0.19)
Denmark (Danish)	309	0.41	53.61	3	0.44 (0.50)	0.64 (0.15)
Germany (German)	244	0.67	39.57	2	0.41 (0.49)	0.66 (0.16)
Greece (Greek)	462	0.67	36.06	2	0.46 (0.50)	0.64 (0.18)
Hungary (Hungarian)	196	0.37	56.40	2	0.43 (0.50)	0.69 (0.19)
Israel (Hebrew)	361	0.47	27.39	1	0.53 (0.50)	0.85 (0.14)
Kenya (English)	306	0.50	31.85	3	0.51 (0.50)	0.72 (0.19)
Lebanon (English)	94	0.65	28.35	1 & 2	0.45 (0.50)	0.66 (0.18)
Netherlands (Dutch)	186	0.86	20.54	1 & 2	0.46 (0.50)	0.71 (0.13)
Nigeria (English)	125	0.46	28.19	2	0.47 (0.50)	0.67 (0.18)
Pakistan (English)	155	0.35	20.81	1	0.53 (0.50)	0.75 (0.18)
Poland (Polish)	148	0.33	29.91	1 & 2	0.48 (0.50)	0.70 (0.18)
Russia (Russian)	148	0.60	25.45	1 & 2	0.47 (0.50)	0.55 (0.20)
Singapore (English)	153	0.50	30.11	1 & 2	0.46 (0.50)	0.71 (0.16)
South Korea (Korean)	147	0.56	22.27	1	0.46 (0.50)	0.75 (0.14)
Switzerland (French)	130	0.38	30.65	1 & 2	0.46 (0.50)	0.69 (0.16)
UK, Scotland (English)	110	0.75	24.97	1 & 2	0.43 (0.50)	0.64 (0.16)
Ukraine (Ukrainian)	199	0.71	23.41	1 & 2	0.50 (0.50)	0.55 (0.19)
United States (English)	396	0.70	20.31	1	0.52 (0.50)	0.75 (0.16)
Total	5008	0.58	30.46		0.47 (0.50)	0.68 (0.19)

Note: Sample type: 1 = Student sample, 2 = Convenience sample, 3 = Representative (YouGov) sample.

scenarios is that it allows us to create and compare a context of war versus peace, where in real-life such straightforward comparisons are often not feasible (Evans et al., 2015). Participants in the control condition were only instructed to "Imagine that you are about to elect a new leader of your country". Participants in the war condition were asked to "Imagine that your country is at war and threatened by enemies". Finally, participants in the peace condition were told to "Imagine that everything is peace and quiet in your country and that relations with other countries are all friendly". Across all three conditions participants were then asked "who would you prefer to lead your country" adding "safely through the war" in the war condition or "and make sure that everybody is alright" in the peace condition. Regardless of the assigned condition, the question always referred to two faces shown on screen.

2.3. Dependent variables

Next, participants answered two sets of questions tapping their i) preferences for facial dominance in leaders, and ii) explicit trait preferences in leaders.

2.3.1. Leader facial dominance
Following recent trends in studies of person and leader perception, we used face-based stimuli materials to evoke subtle impressions of leadership style and characteristics (Laustsen & Petersen, 2020b; Spisak et al., 2012). Specifically, participants were exposed to pairs of faces for ten different target leaders. To improve realism and reduce confounds based on non-shared ethnicity between participants and assigned leader faces, materials were crafted to resemble local individuals residing in participants' countries (cf. Scott et al., 2014). Based on five different face categories (African, European/White, East Asian, Latino, and West

Asian) participants were exposed to faces common in their country and approved by local collaborators (European/White faces are from the Face Research Lab London Set (DeBruine & Jones, 2017); all other faces are from the Chicago Face Database (Ma et al., 2015)).[5] Measuring perceived local resemblance of employed faces reveal a satisfactory mean resemblance rating of 0.50 on a scale from 0 "*Not at all*" to 1 "*Very much*" ($M = 0.50$, $SD = 0.26$).

Each of the ten face pairs consisted of a dominant and a non-dominant version of the same target face, and participants were instructed to choose the face they "would prefer to lead the country". Fig. 1 displays three face pair examples from three different countries. Faces were initially cropped, and subsequently the shapes of all target faces were morphed using the online face morphing tool Webmorph dragging target faces 50 % in direction of either a dominant or a non-dominant face anchor.

Reassuringly, manipulation checks unequivocally show that manipulations, as intended, produce clear perceptual differences of dominance (Supplementary Information A.2 lists all materials). For each face choice, the dominant and non-dominant versions of a given target leader face were shown simultaneously on screen (positions randomized). Coding choices of dominant and non-dominant faces as "1" and "0" ($M = 0.47$, $SD = 0.50$), respectively, this binary variable constitutes the first measure of participants' preferences for dominant leadership.

2.3.2. Leader trait preferences
Following the face choices, participants were instructed to still think of the situation from the leader choice questions (i.e., the control, peace, and war conditions) and answer to which degree they "would like a leader who is [trait]" for each of the following traits: Competent, trustworthy, dominant, generous, strong, warm, and toughminded.

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[5] Given the non-random procedure underlying choice of face materials, generalizability of results to faces more generally is obviously limited.

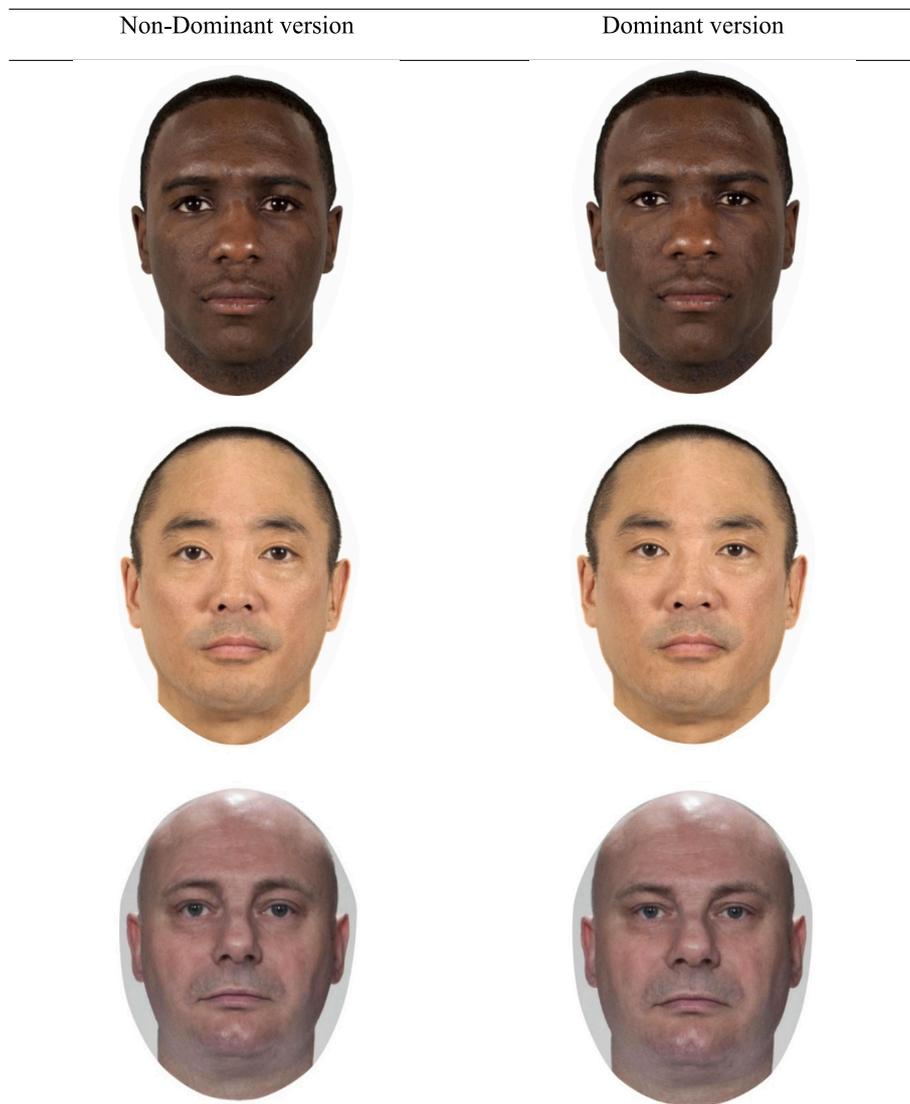| Non-Dominant version	Dominant version

Fig. 1. Example face pairs. Faces to the left and right illustrate non-dominant and dominant morphs of the same target face, respectively. Faces in upper, middle, and lower panels exemplify faces used in Kenya, South Korea and United Kingdom, respectively.
Note. Face examples for Kenya and South Korea are from the Chicago Face Database (Ma et al., 2015). The UK example is from "Face Research Lab London set" (DeBruine & Jones, 2017).

Responses were recorded from "1" (*strongly disagree*) to "7" (*strongly agree*) and subsequently recoded to 0–1 scales with "1" reflecting strongest possible trait preference. Based on Principal Component Analysis (PCA) we extracted three components (eigenvalues were 2.34, 1.38, and 0.99; for details on PCA see Supplementary Information A.3).[6] The three components were labelled Dominance (dominant, strong, toughminded; $\alpha = 0.57$, $M = 0.68$, $SD = 0.19$), Warmth (warm, generous; $\alpha = 0.65$, $M = 0.74$, $SD = 0.19$), and Competence (competent, trustworthy; $\alpha = 0.66$, $M = 0.93$, $SD = 0.16$).[7] Importantly, this three-dimensional trait structure captures the theoretically important

distinction between dominance and prestige rather well with competence and warmth reflecting prestige-based leadership traits (Cheng et al., 2013; Van Vugt & Smith, 2019).

2.4. Individual differences capturing perceptions of intergroup conflict

Studies consistently show how perceptions of the social world as dangerous, competitive, and conflict-ridden map onto individual differences in political orientations from liberal to conservative and/or from left to right (for larger reviews see Jost et al., 2003; Hibbing et al., 2014) as well as to individual differences in Social Dominance Orientation (SDO) and Rightwing Authoritarianism (RWA) (e.g., Duckitt & Sibley, 2010). Consequently, we included measures of political ideology, SDO and RWA to test if individual perceptual differences of the social world relate to preferences for dominant leadership. Regardless of original response options, all variables were recoded to 0–1 scales with larger values reflecting higher SDO, RWA, rightwing and conservative positions.

SDO. Participants answered the short eight items version of the SDO-7 scale (Ho et al., 2015). Sample items include "Some groups of people

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[6] Components were extracted based on three reasons: (1) As argued by Samuels (2017), Kaiser (1974)'s criterion (eigenvalue >1) sometimes is too high; (2) The eigenvalue of the third component was 0.99 being very close to meeting Kaiser's criterion; and (3) Besides relating to the Dominance-Prestige model, the three-component model also relates to Fiske et al.'s (2007) Stereotype Content Model of social cognition.

[7] The relatively low Cronbach's α values should be evaluated against the low number of items per scale. Supplementary Materials A.6 reports complementary analyses using single-item trait measures.

are simply inferior to other groups" and "We should work to give all groups an equal chance to succeed" (reverse coded) and were answered on seven-point response scales from 1 (*strongly disagree*) to 7 (*strongly agree*). Averaging across responses, a reliable SDO scale was obtained (α = 0.78, *M* = 0.30, *SD* = 0.17).

RWA. Participants answered a selection of eight items from Zakrisson's (2005) validated measure of Rightwing Authoritarianism. Sample items include "Facts show that we have to be harder against crime and sexual immorality, in order to uphold law and order" and "Our society would be better off if we showed tolerance and understanding for untraditional values and opinions" (reverse coded) and were answered on seven-point response scales from 1 (*strongly disagree*) to 7 (*strongly agree*). Averaging across responses, a reliable RWA-scale was obtained (α = 0.73, *M* = 0.38; *SD* = 0.17).

2.5. Analytical strategy and modelling procedures

Analyses for Test 1–3 were conducted using Stata version 18.5 (StataCorp, 2023), while Test 4 was analyzed in R (R Core Team, 2023). Given the nested structure of our dataset, Tests 1–3 employ multilevel regression. Specifically, for Test 1 we rely on three levels with face choices (level-1) nested in participants (level-2), who are further nested in countries (level-3). Notably, we conduct multilevel logistic regressions due to the binary nature of the face choices. For Test 2, we rely on a simpler two-level data structure with only participants (level-1) nested in countries (level-2). For Test 3, we use the three-level data structure when analyzing preferences for leader facial dominance, while the two-level data structure is used for analyses of explicit leader trait preferences. Models were specified using random intercepts and randomly varying slopes for experimental conditions across countries based on the results of model comparisons (Lorah, 2018; Sommet & Morselli, 2017). For Test 4, we estimate Pearson's correlations between measures of preferences for leader dominance and various indicators of intergroup conflict, which we subsequently adjust for risks of non-independence between country samples (Claessens et al., 2023).

2.6. Transparency and openness

As described above, we aimed to collect 150 participants per sampled country with final sample sizes being determined by data collection collaborators' access to participants. No formal power analysis was conducted, but country-specific samples match or exceed samples employed in existing work (e.g., Laustsen & Petersen, 2015; Little et al., 2007; Spisak et al., 2012). All data exclusions, manipulations, and employed measures are presented and explained above. Data and code are available under Appendix A Supplementary data (Supplementary Information A.1 contains English survey/codebook). The study design and the reported analyses were not preregistered.

3. Results

3.1. Test 1: do experimental contexts of intergroup conflict increase preferences for leader facial dominance?

The first observable implication of the conflict hypothesis states that contextual cues of intergroup conflict upregulate preferences for dominant leadership evoked through subtle manipulations of inferred dominance from target leaders' facial appearances. Consequently, we test whether experimental primes of intergroup conflict enhance followers' preferences for facially dominant leaders. Averaging across all 25 sampled countries, we find strong support for this expectation. The predicted probability of choosing a dominant leader face is 54 % among participants in the war condition, whereas it is significantly lower among participants in the control (46 %; *b* = 0.40, 95 % CI [0.29, 0.50], *p* < .001; Odds Ratio = 1.49) and peace conditions (42 %; *b* = 0.59, 95 % CI [0.48, 0.70], *p* < .001; Odds Ratio = 1.80). That is, in the war

condition participants were, on average, 8 and 12 percentage points more likely to choose leaders with dominant faces compared to the control and peace conditions, respectively.[8] Moreover, participants in the peace condition also displayed 4 percentage points lower preferences for leaders with dominant faces compared to participants in the control condition (*b* = −0.20, 95 % CI [−0.31, −0.10], *p* < .001; Odds Ratio = 0.82). Thus, while the war and peace conditions move preferences for leader facial dominance in opposite directions compared to the control condition, the war effect is significantly stronger than the peace effect (χ^2 (1) = 5.65, *p* = .018) and twice its size. This suggests that followers' preferences for dominant leadership are more sensitive to situations characterized by high (rather than low) intergroup conflict.

In addition, it is worth noting that participants in the war condition display preferences for leader facial dominance significantly above a predicted probability of 50 % (i.e., chance level), while participants in the control and peace conditions display preferences for *non*-dominant leader faces indicated by predicted probabilities significantly below 50 % (*ps* < 0.001). This default preference for non-dominant leaders in the control group resonates well with recent findings about voters' general trait preferences in politicians (Laustsen & Bor, 2017; Wiezel et al., 2024) and anthropological records of general leader characteristics (Garfield et al., 2019). Finally, because previous work finds that followers favor more *non*-dominant looking leaders when a leader's facial features resemble those of an ethnic outgroup (Bøggild & Laustsen, 2016) we tested if perceived local resemblance of the displayed leader faces moderate the reported experimental effects. This was not the case (*p* > .05; see Supplementary Information A.9).

Next, we test if these aggregate results differ across the 25 sampled countries. Because prior work generally contrasts war and peace situations (leaving out a control condition), we focus on this comparison. We use a model comparison approach—comparing the model with and without random slopes—to assess whether the slope (i.e., the difference between war and peace) should be allowed to vary (Lorah, 2018; Sommet & Morselli, 2017). A likelihood-ratio test reveals a better fit for the varying slope model (χ^2 (1) = 8.85, *p* = .003), which in substantial terms means that the difference between the war and the peace condition varies significantly across the 25 countries. To illuminate these differences, we estimate country-specific changes in predicted probabilities for choosing a dominant leader face between the war and the peace conditions. Panel a) of Fig. 2 displays these differences per country, while panel b) displays predicted probabilities for choosing a dominant leader face for the peace (black dots) and war (grey squares) conditions. Results show that in 19 out of 25 countries, we replicate the aggregate finding (*ps* < 0.05) (for country-specific models see Supplementary Information A.4). Results from Chile, Denmark, Germany, and Singapore also point in the predicted direction although non-significantly so, while no trends emerge for just two countries, Nigeria and Russia. Consequently, Fig. 2 illustrates that intergroup conflict heightens preferences for dominant leadership evoked through subtle manipulations of target leaders' facial appearances. Importantly, this pattern obtains in a large majority of the sampled countries and with no countries countering the conflict hypothesis.

3.2. Test 2: do experimental contexts of intergroup conflict increase explicit preferences for dominance, but not prestige, in leaders?

To test the second prediction of the conflict hypothesis, we employ participants' explicitly stated trait preferences in leaders along three separate dimensions of dominance, warmth, and competence. Importantly, including trait preferences for competence and warmth alongside dominance permits pitting preferences for leader dominance against

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[8] Such differences between experimental conditions in predicted probabilities for a binary outcome taking the value "1" are sometimes labelled "Risk Differences" (Uanhoro et al., 2021).
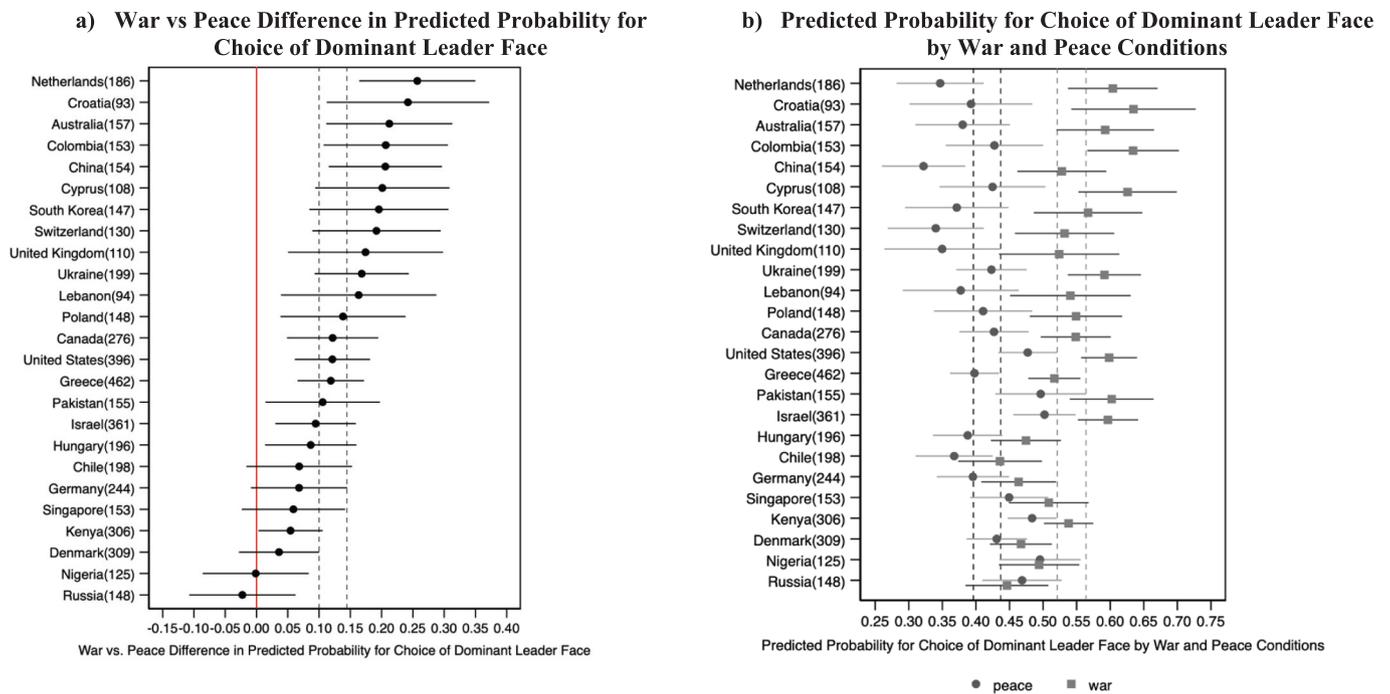
Fig. 2. (a) The figure shows differences in predicted probabilities for choosing a dominant leader face as a function of the experimental condition (war vs. peace). (b) The figure shows levels of predicted probabilities for choosing a dominant leader face for peace (black dots) and war (grey squares) conditions. Horizontal lines indicate 95 % confidence intervals (CIs). Numbers in parentheses after country names reflect sample sizes. Dashed vertical lines indicate the 95 % CI across all countries in the multilevel analysis.

more prestige-based traits and, thus, test if intergroup conflict distinctly upregulates preferences for dominant leadership or if, rather, it enhances preferences for other kinds of leadership. A series of analyses based on the explicit trait preferences in leaders address this question. First, we find that preferences for facial dominance in leaders (the dependent variable used in Test 1) correlate positively with explicitly stated preferences for dominant leadership ($r = 0.20$, $p < .001$), while negatively and non-significantly with the prestige-related traits of warmth ($r = 0.08$, $p < .001$) and competence ($r = -0.00$, $p = .745$). Thus, participants' preferences for dominant faces (in Test 1) seem indeed driven by a wish for dominant leadership. Second, experimental results from Test 1 replicate using participants' explicit trait ratings of dominance in leaders: Participants assigned to the war condition exhibit increased trait preference for leader dominance ($b_{war-peace} = 0.04$, 95 % CI [0.03, 0.05], $p < .001$; $b_{war-control} = 0.04$, 95 % CI [0.03, 0.05], $p < .001$). In contrast, the war condition reduces preferences for warmth ($b_{war-peace} = -0.03$, 95 % CI [−0.04, −0.02], $p < .001$; $b_{war-control} = -0.02$, 95 % CI [−0.04, −0.01], $p < .001$) and leaves preferences for competence unaffected ($ps > 0.05$). Likelihood ratio tests show that these experimental effects on participants' explicit trait ratings in leaders do not differ across sampled countries (see Supplementary Information A.5). Furthermore, analyses splitting the dominance, warmth and competence variables into single-item trait measures produce identical results (see Supplementary Information A.6 for full models and robustness analyses).

3.3. Test 3: do individual differences in perceptions of society as dangerous and conflict-ridden predict preferences for dominant leadership?

The third observable implication of the conflict hypothesis holds that individuals' fundamental worldviews—along the fundamental dimensions of seeing the world as dangerous and competitive, respectively—may regulate preferences for dominant leadership across countries and experimental conditions in our study. On the one hand,

dominant leaders may be preferred for protective reasons among followers who see the world as dangerous and threatening (Laustsen & Petersen, 2017). On the other hand, dominant leaders could also be preferred to improve group prosperity and relative status among followers seeing the world as conflict-ridden and hierarchical (Laustsen & Petersen, 2017; for related work on different motivations related to inter-group conflict see Lopez, 2017; Doğan et al., 2018). Following conceptual work on the dual process motivational model of ideology (Duckitt & Sibley, 2010; Osborne et al., 2023), we measure tendencies to see the world as dangerous and threatening with RWA, whereas tendencies to see the world as competitive and hierarchical is measured by SDO. Using multilevel regression, we predict each of the dependent measures from Tests 1 (leader facial dominance) and 2 (explicit leader trait preferences) from RWA and SDO controlling for gender, age, education, income (education and income standardized within country samples), and experimental conditions. Starting with preferences for leader facial dominance, we find that both RWA ($b = 0.68$, 95 % CI [0.46, 0.90], $p < .001$; Odds Ratio = 1.97) and SDO ($b = 0.43$, 95 % CI [0.22, 0.63], $p < .001$; Odds Ratio = 1.54) constitute simultaneous and significant predictors (see Model 1 in Table 2). In terms of changes in predicted probabilities for choosing a dominant leader face, this corresponds to a difference of 14 percentage points between the least (0) and most (1) authoritarian (RWA) participants. For the least and most socially dominant (SDO) participants, a difference of 9 percentage points obtains. Parallel results are found for explicit preferences for leader dominance ($b_{RWA} = 0.31$, $p < .001$; $b_{SDO} = 0.08$, $p < .001$; see Model 2 in Table 2) with RWA in this case being a significantly stronger driver compared to SDO (χ^2 (1) = 79.88, $p < .001$).

Analyses including RWA and SDO separately lead to almost identical conclusions (see Supplementary Information A.7). Likelihood ratio tests further reveal that relationships between SDO and RWA and preferences for leader facial dominance do not vary across countries, although some cross-sample variations occur for explicit dominance preferences (see Supplementary Information A.8). Furthermore, we investigate if perceived local resemblance of the displayed leader faces moderates the

Table 2

Effects of Rightwing Authoritarianism (RWA), and Social Dominance Orientation (SDO) on preferences for dominant leader faces (Model 1), explicit preferences for leader dominance (Model 2), warmth (Model 3) and Competence (Model 4). Multilevel regression coefficients and 95 % Confidence Intervals.

	Model 1 (Logistic regression) Pref. for leader facial dominance $N_{individual} = 4945$		Model 2 (OLS regression) Explicit pref. for leader dominance $N_{individual} = 4864$		Model 3 (OLS regression) Explicit pref. for leader warmth $N_{individual} = 4864$		Model 4 (OLS regression) Explicit pref. for leader competence $N_{individual} = 4865$	
	b	95 % CI	b	95 % CI	b	95 % CI	b	95 % CI
Fixed effect								
Constant	−0.46***	[−0.60, −0.31]	0.56***	[0.53, 0.60]	0.83***	[0.79, 0.86]	0.97***	[0.95, 0.99]
War (Mdiff$_{war\ vs\ peace}$)	0.58***	[0.48, 0.69]	0.04***	[0.03, 0.05]	−0.03***	[−0.04, −0.02]	−0.01	[−0.01, 0.00]
Control (Mdiff$_{control\ vs\ peace}$)	0.19***	[0.11, 0.27]	0.00	[−0.01,0.01]	−0.01	[−0.02, 0.01]	−0.00	[−0.01, 0.01]
SDO	0.43***	[0.22, 0.63]	0.08***	[0.05, 0.11]	−0.29***	[−0.32, −0.26]	−0.12***	[−0.15, −0.10]
RWA	0.68***	[0.46, 0.90]	0.31***	[0.28, 0.34]	0.04*	[0.00, 0.07]	−0.02*	[−0.04, −0.00]
Gender (0 = male, 1 = female)	−0.12**	[−0.19, −0.05]	0.01	[−0.00, 0.02]	0.03***	[0.02, 0.04]	0.01	[−0.00, 0.01]
Age	−0.01***	[−0.01, −0.00]	−0.00***	[−0.00, −0.00]	−0.00***	[−0.00, −0.00]	0.00	[−0.00, 0.00]
Education	−0.03	[−0.06, 0.01]	−0.00	[−0.01, 0.00]	−0.00	[−0.01, 0.00]	0.00**	[0.00, 0.01]
Income	0.04*	[0.01, 0.07]	0.00	[−0.00, 0.01]	−0.01*	[−0.01, −0.00]	0.00**	[0.00, 0.01]

Note. $N_{country} = 25$. * $p < .05$, ** $p < .01$, *** $p < .001$.

effects of RWA and SDO on preferences for leader facial dominance. While the moderations are non-significant for SDO ($ps > 0.05$), results reveal that the effect of RWA increases significantly with higher perceived local resemblance ($b = 0.78$, $p = .037$; see Supplementary Information A.9).

Next, we investigate how RWA and SDO relate to preferences for prestige-related leadership traits. For warmth, we find that SDO constitutes a strong and negative predictor ($b = −0.29$, $p < .001$), while RWA is a weak and positive predictor ($b = 0.04$, $p = .031$; see Model 3 in Table 2). For competence, both RWA ($b = −0.02$, $p = .047$) and SDO ($b = −0.12$, $p < .001$) constitute significant negative predictors (see Model 4 in Table 2). We also explore possible interaction effects between experimental conditions and RWA and SDO, respectively. Results show that the war condition evoked slightly, yet significantly, stronger effects among participants low in RWA on preferences for leader facial dominance. For explicit dominance preferences, the effect of the war condition was also slightly and significantly stronger among participants low on RWA or SDO (full models for interactive models across all trait variables are reported in Supplementary Information A.10). Finally, supplementary analyses show that reported results replicate when substituting SDO and RWA with various measures of self-reported political ideology, such that more conservative participants hold stronger preferences for dominant leadership (see Supplementary Information A.11).

In total, results related to Test 3 give rise to three important takeaways. First, the more individuals chronically perceive the social world as dangerous and conflict-ridden, the more they prefer dominant leadership. This finding is important as it shows that experimental conditions of intergroup conflict (Tests 1 and 2) *and* individual differences in RWA and SDO relate to preferences for dominant leadership in parallel ways. Second, the positive relationships between RWA and SDO, respectively, and preferences for dominant leadership do *not* generalize to qualitatively different types of leadership (such as prestige-related traits like warmth and competence). This shows the distinctive nature of the conflict—dominance association. Third, individual differences in the extent to which the world is seen as dangerous and threatening (as measured by RWA) more strongly predicted preferences for dominant leadership than individual differences in perceptions of the world as competitive and hierarchical (as measured by SDO). We return to this interesting finding in the Discussion.

3.4. Test 4: do macro-level indicators of intergroup conflict correlate with average preferences for dominant leadership across country samples?

The fourth and final observable implication of the conflict hypothesis concerns the influence of societal context. It states that country-level

indicators of intergroup conflict should relate positively to average country-level preferences for dominant leadership. To tap country-level preferences for dominant leadership we rely exclusively on participants assigned to the control condition and calculate predicted probabilities for preferences for leader facial dominance (from Test 1) and mean scores for explicit preferences for leader dominance (from Test 2). Intergroup conflict is measured by the degree to which a country has historically been part of intergroup conflicts operationalized via the Directed Dyadic Interstate War Dataset (Maoz et al., 2019), and UCDP/PRIO's Dyadic Armed Conflict Dataset (Harbom et al., 2008; Pettersson et al., 2021). We also employ three indicators based on countries' current military expenditure (a) as percentage of GDP, (b) per capita, and (c) as percentage of government spending (SIPRI, 2021; capturing a sense of countries' "war-readiness"). Finally, we average across two items from the World Values Survey (wave 7, 2017–2020; Haerpfer et al., 2020) measuring respondents' worry about war (Q146) or terrorist attacks (Q147) to capture perceived intergroup conflict worry. Due to risks of spatial non-independence between sampled countries, we follow Claessens et al.'s (2023) procedure and adjust estimated relationships based on countries' latitudes and longitudes. Results reveal three sizably interesting relationships of relevance to the conflict hypothesis. First, preferences for leader facial dominance relate positively to military expenditure as percentage of GDP ($b = 0.38$, 95 % CI [−0.01, 0.77]). In addition, explicit preferences for leader dominance relate positively to the number of Dyadic Armed Conflicts (UCDP/PRIO Dataset; $b = 0.52$, 95 % CI [0.13, 0.99]) and to military expenditure per capita ($b = 0.52$, 95 % CI [0.12, 0.84]) (see Supplementary Information A.12). Importantly, while these macro-level results to some extent support the conflict hypothesis, we see them as an exploratory add-on to the results reported across Tests 1–3, which build more directly on previous studies.

4. Discussion

At different times and places, seemingly dominant, forceful, authoritarian leaders have emerged among widespread public support. This necessarily leads to the question why it is that citizens, despite the costs, come to prefer such dominant leaders. One prominent explanation holds that an acute intergroup conflict (like a war or terror attack) constitutes one important trigger of dominant leadership preferences. Using experimental techniques, well-validated psychological constructs, and macro-level indicators of intergroup conflict, we tested this theory based on an original dataset covering 25 culturally and institutionally diverse countries representing most major geographic regions of the world. Specifically, we generated and found support for four different predictions derived from the theory (with macro-level results in Test 4

providing the relatively weakest support). In sum, our results provide strong support for the key hypothesis that human followers across the globe upregulate their preference for dominant leaders under intergroup conflict.

Our key theoretical aim with this project was to map and test cross-cultural regularities in followership psychology with respect to preferences for dominant leadership. Consequently, our studies should not be seen as realistic depictions of democratic elections—obviously political leaders are not elected from two alternative versions of a given individual that only vary subtly in facial dominance. However, we do believe that our multifaceted research design provides ecologically valid tests of the psychological processes underlying and regulating followers' preferences for dominant leaders. Moreover, these processes may very well be activated and compete with a range of other processes in guiding electoral behavior in real-world democratic elections.

Theoretically, our results add important insights on human reasoning about leadership and on the origin of leadership preferences. Contingency models of leadership theorize that followers prefer different types of leaders in different contextual circumstances (Antonakis & Day, 2018), but the origin of these preferences may not be completely culturally acquired. Evolutionary psychological models theorize that humans possess an adaptive, context-sensitive followership psychology, which regulates whom to follow depending on external cues, signifying evolutionarily relevant threats and opportunities (Laustsen, 2021; Van Vugt, 2006). While definitive evidence for psychological adaptations is notoriously hard to establish, a key empirically verifiable implication is that they should be present across human societies, regardless of modern features such as a country's wealth, education, and political institutions—in other words, a human universal (Brown, 2004). In this regard, our various empirical tests add the important insight that humans—at least across most of the countries covered in our study drawn from across the globe—show enhanced preferences for dominant leaders as a function of intergroup conflict. We urge future studies to expand on the employed contextual variation to capture different kinds of peaceful relationships ranging from the mere absence of conflict to deep intergroup cooperation (Glowacki, 2024), different types of conflicts ranging from surprise attacks to protracted disputes (Glowacki et al., 2020), and other contexts of evolutionary relevance such as resource shortages and demographic transitions.

Further exploration of the role of individual differences across countries is also needed. Our geographically heterogeneous sample shows that both SDO and RWA are positive predictors of preferences for dominant leaders. That is, both individuals seeing the world as dangerous/threatening (high in RWA) and competitive/hierarchical (high in SDO) are attracted to dominant leaders with the former constituting the stronger predictor. This contrasts with existing work from the United States, Ukraine, and Poland, which primarily finds followers high in SDO to be attracted to dominant leaders (e.g., Laustsen & Petersen, 2017; Womick et al., 2019). Further research on the role played by individual differences—perhaps in interplay with different kinds of intergroup conflicts and geographic settings—in explaining support for dominant leaders is therefore warranted.

Regardless of the universal tendency to prioritize dominance traits in leaders during intergroup conflict, there is only sparse evidence that such leaders are effective, at least in modern times (although see Chen et al., 2021). This raises the possibility that such a heuristic is the result of an evolutionary mismatch (Li et al., 2018). Following an aggressive, domineering leader may have been ancestrally functional during intense and rapid physical combats between small-scale societies, but the same preference may backfire in the case of modern often protracted warfare between nation states. Further work in this regard constitutes yet another important direction to pursue.

Although the relationship between intergroup conflict and follower preferences for leader dominance was tested based on a geographically heterogenous dataset and using a diversity of methods, measurement techniques, and indicators, some limitations and caveats are still important to note. First, data-collection, with a few exceptions, was based on convenience and student samples. Moreover, due to the online mode of data collection (and because the survey was administered in English in many countries), our participants are probably more highly educated than their corresponding populations. We see this as less problematic for the generalizability of the experimental results, yet such differences between samples unavoidably introduce some noise, especially in the macro-level analyses. With respect to the employed face stimuli, faces were chosen (and validated) to resemble people in each of the 25 countries. However, the non-random character of these choices limits the generalizability of our results to faces from these populations. Relatedly, the geographic variation in sampling comes with the benefit of wide institutional and cultural variation between sampled nations, making the similarity and convergence of the experimental findings even more striking. Nevertheless, we are currently unable to explain why preferences for dominant leadership in some samples (Nigeria, Russia) were insensitive to experimental variation of the context. Also, the selection of countries was the product of our professional academic networks, and future cross-national projects may benefit from following different recruitment strategies, including sampling leadership preferences in traditional, small-scale societies that still exist around the globe. Testing the conflict hypothesis in contemporary small-scale societies constitutes an obvious next step for illuminating the potential evolved nature of followers' conflict-sensitive preferences for dominant leadership.

Second, one could wonder if choices between a dominant and a non-dominant morph of the same target leader (as used in Test 1) could possibly cause participants to guess the study's purpose. While concerns about such demand effects are legitimate, we doubt that they constitute a major challenge to our results. Most importantly, our experiment relies on between-subjects assignment of experimental condition for which reason participants are unaware that other participants are assigned to different contextual conditions. Moreover, the conflict hypothesis is not only supported from experimental results but also from measures tapping participants' tendencies to see the world as conflict-ridden and dangerous (Test 3) and country-level indicators of intergroup conflict (Test 4). Demand effects seem a less likely confounder of these tests. Finally, previous work that employs other research designs that are arguably less sensitive to demand effects also support conclusions matching ours (e.g. Bøggild & Laustsen, 2016; Laustsen & Petersen, 2020a; Tigue et al., 2012). Consequently, although we cannot entirely rule out risks of demand effects, we do not think they constitute a major threat to the validity of our results. However, as always, caution should still be in order when interpreting these results.

Third, correlations between preferences for leader facial dominance and explicitly stated preferences for dominant leadership might seem somewhat low ($r = 0.20$). Nevertheless, it is important to keep in mind that participants were asked to recall the assigned experimental condition when answering the explicit trait questions. Hence, weak recollections of the assigned instructions could easily have affected the strength of the correlation between face-based and explicit dominance preferences.

Despite these caveats and limitations, the project and the reported results provide novel and important insights with implications for trait-based leader preferences, electoral behavior, and leader evaluations across countries with different political systems, degrees of democratization, wealth, and average educational attainment. Importantly, the consistent support for the conflict hypothesis in this diverse setting provides unprecedented support for the notion of a universal, context-sensitive, and possibly evolved followership psychology. As a final thought, one wonders if dominant leaders could benefit from knowing about the conflict-dominance association themselves? For instance, leaders with a dominant personality could consider stirring up citizens' senses of intergroup hostility with the underlying strategic rationale of cashing in electorally when the same citizens come to realize that the dominant leader constitutes the solution to all pressing problems.

Putin's recurrent rhetorical attacks on the West and references to Ukrainians as "nazis" (e.g., Troianovski, 2022) and some of Trump's campaign ads during the 2015 Republican Primaries (e.g., "the world is a dangerous place; we need a tough strong leader"; Gass, 2015) constitute cases in point. The long-run effectiveness of these conflict-mongering strategies—whether based on deliberate calculations or intuitive instincts—remains unclear, but at least momentarily, they seem to increase the support for leaders with distinctively dominant traits.

5. Conclusion

Recent political events across the globe show the emergence of seemingly dominant, assertive, aggressive, and authoritarian leaders, who often rise to power with widespread popular support. Here, we provide consistent support for the theory that followers' perceptions of intergroup conflict drive up preferences for dominant leadership. Across four independent tests based on a large, original dataset containing participants from 25 different countries spread across the globe, we find broad support for this conflict hypothesis. Importantly, due to the consistency of our results, the considerable diversity of the sampled countries, and the variety of applied analytical techniques, our results are compatible with recent theoretical notions about humans possibly possessing evolved psychological mechanisms for navigating leader-follower relations.

CRediT authorship contribution statement

Lasse Laustsen: Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Xiaotian Sheng:** Writing – review & editing, Writing – original draft, Visualization, Formal analysis, Data curation. **M. Ghufran Ahmad:** Writing – review & editing, Investigation. **Laith Al-Shawaf:** Writing – review & editing, Investigation. **Benjamin Banai:** Writing – review & editing, Investigation. **Irena Pavela Banai:** Writing – review & editing, Investigation. **Michael Barlev:** Writing – review & editing, Investigation. **Nicolas Bastardoz:** Writing – review & editing, Investigation. **Alexander Bor:** Writing – review & editing, Investigation. **Joey T. Cheng:** Writing – review & editing, Investigation. **Anna Chmielińska:** Writing – review & editing, Investigation. **Alexandra Cook:** Writing – review & editing, Investigation. **Kyriaki Fousiani:** Writing – review & editing, Investigation. **Zachary H. Garfield:** Writing – review & editing, Methodology, Conceptualization. **Maliki Ghossainy:** Writing – review & editing, Investigation. **Shang E. Ha:** Writing – review & editing, Investigation. **Tingting Ji:** Writing – review & editing, Investigation. **Benedict C. Jones:** Writing – review & editing, Investigation. **Michal Kandrik:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Catherine Chiugo Kanu:** Writing – review & editing, Investigation. **Douglas T. Kenrick:** Writing – review & editing, Investigation. **Tobias L. Kordsmeyer:** Writing – review & editing, Investigation. **Cristhian A. Martínez:** Writing – review & editing, Investigation. **Honorata Mazepus:** Writing – review & editing, Investigation. **O. Jiaqing:** Writing – review & editing, Investigation. **Ike Ernest Onyishi:** Writing – review & editing, Investigation. **Boguslaw Pawlowski:** Writing – review & editing, Investigation. **Lars Penke:** Writing – review & editing, Investigation. **Michael Bang Petersen:** Writing – review & editing, Investigation. **Richard Ronay:** Writing – review & editing, Investigation. **Daniel Sznycer:** Writing – review & editing, Investigation. **Gonzalo Palomo-Vélez:** Writing – review & editing, Investigation. **Christopher R. von Rueden:** Writing – review & editing, Methodology, Conceptualization. **Israel Waismel-Manor:** Writing – review & editing, Investigation. **Adi Wiezel:** Writing – review & editing, Investigation. **Mark van Vugt:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Conceptualization.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.evolhumbehav.2025.106674.

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