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Differentiating between belief-indicative and status-indicative groups improves predictions of intergroup attitudes

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Abstract

Ingroup bias is often treated as the default outcome of intergroup comparisons. We argue that the mechanisms of impression formation depend on what information people infer from groups. We differentiate between *belief-indicative* groups that are more informative of beliefs and affect attitudes through ingroup bias and *status-indicative* groups that are more informative of status and affect attitudes through a preference for higher status. In a cross-cultural factorial experiment (N_{total} = 1,281), we demonstrate that when information about targets' multiple group memberships is available, belief-indicative groups affect attitudes via ingroup bias, whereas status-indicative groups—via preference for higher status. These effects were moderated by social-structural context. In two follow-up studies (N_{total} = 451), we develop and validate a measure of belief- and status-indicativeness of groups (BISI). BISI showed expected correlations with related constructs of entitativity and essentialism. Belief-indicativeness of groups was a better predictor of ingroup bias than entitativity and essentialism.

Keywords: ingroup bias, status, morality, beliefs, intersectional stereotyping

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Since the development of social identity theory (SIT; Tajfel & Turner, 1979), research on intergroup relations strongly relies on the phenomenon of ingroup bias (or favoritism)—the preference for own membership groups over outgroups—as the cognitive foundation of prejudice and discrimination (Hewstone et al., 2002). Preference for the ingroup has essentially become the default assumption of intergroup relations literature (Jost et al., 2004). Although ingroup bias is found across a wide range of conditions (Hewstone et al., 2002), there is considerable evidence that outgroup favoritism can occur under certain circumstances as well.

Three major theories in social psychology of prejudice—social identity (Tajfel & Turner, 1979), social dominance (Sidanius, 1993), and system justification theories (SJT; Jost & Banaji, 1994)—predict outgroup favoritism or at least weaker ingroup bias among low-status groups when status hierarchies are stable and there is intergroup consensus about the status relations (Jost et al., 2004; Rubin & Hewstone, 2004; Tajfel & Turner, 1979). Importantly, Rubin and Hewstone (2004) note that "it is inappropriate to describe consensual discrimination in terms of 'ingroup' and 'outgroup' effects because self-categorization and ingroup identification play no part in determining this type of discrimination" (p. 826). Instead, consensual discrimination reflects a general preference for high-status groups.

This paper demonstrates that not only socio-structural characteristics, but also lay theories about the nature of social groups involved in intergroup comparison determine which of the two mechanisms—preference for the ingroup or preference for higher status—will be activated. This research goes beyond existing literature by establishing a link between a group typology based on the two-dimensional models of stereotypes (Abele et al., 2021) and modes of

information processing and attitude formation. We differentiate between belief-indicative groups, which are likely to induce ingroup bias, and status-indicative groups, which are likely to induce a preference for higher status. In three studies, we provide empirical support for this differentiation and its predictive validity.

Belief-Indicative and Status-Indicative Groups

Two fundamental dimensions of human perception largely determine how we perceive others: horizontal (warmth, communion, sociability, morality) and vertical (competence, agency, status) (Abele et al., 2021). Perceptions of warmth are linked to cooperative interdependence that promotes trust (Brewer, 1999), and perceptions of competence are linked to status (Fiske et al., 2002). Both dimensions provide evolutionarily significant information about individuals and groups (Fiske et al., 2007).

In a series of online and lab experiments, Koch and colleagues (2016) asked participants from USA and Germany to judge the similarity of a large sample of social groups. Two dimensions consistently emerged from this similarity judgments: A (agency or socio-economic success) and B (conservative vs. progressive beliefs). The dimension of warmth/sociability from the Big Two described above did not emerge as an independent dimension, but rather as the centrality function of A and B: groups that had average scores on A and B were seen as warmer than those that had extreme scores on A and B.

Building on this approach, we assume that inferences about groups' status and beliefs are fundamental to structuring perceptions of social groups. We further argue that not all dimensions of social categorization are equally informative of group members' status and beliefs and therefore certain dimensions of social categorization will produce more variation along the status axis (e.g., income), while other dimensions will produce more variation along the beliefs axis

(e.g., religion). In short, we argue that different types of groups are better suited to provide information about either one or the other dimension. The existing typologies of social groups (Lickel et al., 2000; Wilder & Simon, 1998), however, do not address this distinction.

We propose a typology that differentiates between *belief-indicative* and *status-indicative* groups, with belief-indicative groups being more informative for inferring their members' beliefs, and status-indicative groups being more informative for inferring their members' status. We further suggest that ingroup bias predominantly occurs when intergroup comparisons involve belief-indicative groups, whereas preference for higher status predominantly occurs when comparisons involve status-indicative groups. Finally, many social groups may be psychologically consequential, but provide little to no information as to their members' beliefs or status in a given context. We refer to this third category as *neutral* groups and expect that they will have no effect on attitudes if information regarding other, more informative group memberships is present. We further provide a theoretical rationale for this typology.

Belief-Indicative Groups

From an evolutionary standpoint, groups that have clear group boundaries and normative regulations facilitate intragroup cooperation and trust, making ingroup interactions less costly and giving rise to ingroup bias (Brewer & Caporael, 2006). Such groups are likely to be perceived as meaningful units, that is, to have high entitativity. Perceived group entitativity is associated with stronger prejudice (Agadullina & Lovakov, 2018). Group entitativity, however, is not sufficient to predict which groups will elicit prejudice: Intimacy groups (e.g., family) have high entitativity but do not usually give rise to intergroup phenomena, whereas social categories that have relatively low entitativity (e.g., nation) do (Hamilton et al., 2004).

If group entitativity is not a sufficient criterion for identifying groups that elicit ingroup bias, then what is? We argue that *the extent to which a group signals its members' beliefs, moral values, and worldviews* determines whether ingroup bias will occur. Morality is the primary dimension that positively differentiates the ingroup from outgroups (Leach et al., 2007) and moral traits dominate both individual (Goodwin et al., 2014) and group perception (Brambilla et al., 2012). Worldview conflict was identified as a consistent predictor of prejudice across target groups (Brandt & Crawford, 2019) and morality-based groups were shown to elicit more prejudice than non-morality-based groups (Haidt et al., 2003; Parker & Janoff-Bulman, 2013; Weisel & Böhm, 2015). Finally, similarity in beliefs was found to be a much stronger predictor of cooperation than similarity in agency (A. Koch et al., 2020). Groups based on religious beliefs, political ideology, and cultural background would be typical examples of this type of social group. We refer to such groups as *belief-indicative* and hypothesize that membership in such groups affects attitudes through preference for the ingroup (H1).

Status-Indicative Groups

Whereas belief-indicative groups can signal their members' trustworthiness through perceptions of belief similarity, those groups that provide information about members' standing in the societal hierarchy signal competence (Cuddy et al., 2008). *The extent to which a group signals its members' status and competence* determines whether preference for higher status will occur. From an evolutionary standpoint, competence is attractive, because, by associating and cooperating with the most competent partners, individuals can increase their own access to resources and acquire knowledge from the best available sources (Chapais, 2015; Henrich & Gil-Whiteb, 2001). Several studies found a consistent preference for higher-status others on dimensions of education, occupation, and income (Horwitz & Dovidio, 2017; Kuppens et al.,

2018), irrespective of participants' own standing in these hierarchies (Grigoryan, 2020a; Hainmueller & Hopkins, 2015). We refer to such groups as *status-indicative* and hypothesize that membership in such groups affects attitudes through preference for higher status (H2).

Contextualizing the Typology

Belief- and status-indicative qualities of groups are context-bound. Perceptions of groups as belief- or status-indicative emerge from the intergroup dynamics in a specific cultural and historical setting. These perceptions are linked to the utility of a categorization dimension for differentiating people into groups based on their differences in either status or beliefs. Consequently, any categorization dimension that serves these functions can be belief- or status-indicative, and when the function of a certain categorization dimension changes, perceptions of belief- and status-indicativeness would change as well. For example, religion would be perceived as belief-indicative in most societies, but the belief-indicativeness of religion would likely be higher in societies with an ongoing religious conflict.

In real life, belief- and status-indicative qualities of groups are often confounded. For example, ethnic groups can be considered belief-indicative, as they reflect their members' cultural background, which encompasses cultural worldviews and beliefs. However, stable ethnic hierarchies are found in many countries (Hagendoorn, 1995). Preference for higher-status outgroups is found among ethnic minorities in various contexts (Dunham et al., 2014), particularly in implicit attitudes (Jost, 2019). Largely because access to power (education, jobs, money) has been historically restricted for members of minority groups, minority status on belief-indicative dimensions (and sometimes neutral, such as gender) and lower position in a societal hierarchy often go hand in hand (e.g., Williams et al., 2016). Hence, we propose, outgroup favoritism towards belief-indicative groups results from the perceivers' assumptions

about the minority groups' membership in status-indicative groups. Supporting this claim, studies that independently manipulate both membership in belief-indicative (e.g., ethnicity, religion) and status-indicative (e.g., education, occupation) groups find ingroup preference exclusively on belief-indicative dimensions and preference for higher status exclusively on status-indicative dimensions (Grigoryan, 2020b; Hainmueller & Hopkins, 2015). However, this does not mean that membership in one group cannot affect how membership in another group is being perceived.

Perceptions of belief- and status-indicativeness and their consequences for impression formation can certainly be affected by the intersection of different social categories. Intersectionality (Crenshaw, 1989), as applied in psychological research, describes the consequences of belonging to multiple social categories (Cole, 2009), with a special focus on how these group memberships interact in non-additive ways in shaping stereotypes and attitudes (e.g., Kang & Chasteen, 2009; Remedios et al., 2011; Wilson et al., 2017). First, information about an individual's multiple group memberships can affect the perceived informativeness of specific categories. For example, gender can indicate both status (Eagly & Wood, 1982) and beliefs (J. W. Koch, 2000), but when more informative categories are available (e.g., job titles), participants do not rely on gender to make such inferences (Eagly & Wood, 1982). The well-established factors that affect category use, such as category accessibility (Bruner, 1957), perceiver goals (van Knippenberg & Dijksterhuis, 2000), and normative and comparative category fit (Oakes, 1987), are likely to also predict how informative a category is perceived to be for a given situation, person, and judgment (see also Petsko et al., 2022; Petsko & Bodenhausen, 2020 for a discussion of intersectional stereotyping). Second, information about one group membership can change the meaning and the interpretation of another: for example,

the importance of status in evaluations can change depending on whether a target belongs to the ingroup or an outgroup on a belief-indicative dimension. Different combinations of group memberships can give rise to new stereotypes that are not a simple combination of stereotypes about each group (Hampton, 1997).

Relations to Other Constructs and Typologies

Stereotypes. The APA dictionary defines stereotypes as "a set of cognitive generalizations (e.g., beliefs, expectations) about the qualities and characteristics of the members of a group or social category." (VandenBos, 2007). Belief- and status-indicativeness (BISI) of groups can be seen as a special case of descriptive stereotypes: as stereotypes, they are cognitive generalizations and can be used to draw inferences about a person from their membership in a group. However, unlike most stereotypes, BISI do not apply to a person or a group of people but to dimensions of social categorization. For example, people would have very different stereotypes about the "poor" and the "rich", but both groups would be seen as similarly indicative of status. While stereotypes typically describe characteristics associated with specific groups, BISI describe variance that exists in these stereotypes along a certain dimension of social stratification. To say that religion is informative of beliefs is to say that, in a given society, there exist at least two religious groups with different belief-stereotypes associated with them. Stereotypes can encompass a wide range of characteristics about groups, spanning from status and morality to appearance and food preference. BISI are narrower in that regard and are closely linked to the function of dividing society into groups based on a certain criterion. If the function of a categorization dimension is to describe differences in the groups' position in the societal hierarchy, the groups on this dimension will be seen as indicative of status; if the function is to

describe differences in the groups' norms and beliefs, the groups will be seen as indicative of beliefs.

Principal dimensions of prejudice. Taking a data-driven approach, Bergh & Brandt (2021) identified three principal dimensions of prejudice in the USA: prejudice against marginalized groups, prejudice against privileged/conservative groups, and prejudice against unconventional groups. These dimensions overlap with our proposed typology in differentiating groups along the status dimension (privileged vs. marginalized) and the beliefs dimension (unconventional). Prejudice in this study was operationalized as a negative attitude towards the group compared to all other groups, rather than as ingroup bias. Our approach complements this dimensional approach to prejudice by allowing to disentangle the qualitatively different mechanisms that lead to prejudice: ingroup bias versus preference for higher status.

Entitativity and essentialism. Entitativity is the perceived "group-ness" of a social unit (Campbell, 1958). Conceptualizations of essentialism vary widely, but, put simply, essentialism reflects a perception of social categories as having some underlying "essence" (Haslam et al., 2000). The two concepts are closely related: Haslam et al. (2000) conceptualized entitativity and natural kind-ness as two dimensions of essentialist beliefs. Like BISI, entitativity and essentialism describe properties of social categories that have implications for impression formation, stereotyping, and prejudice. We would expect different relationships between entitativity/essentialism and belief- and status-indicativeness of groups across different components of entitativity/essentialism. General perceptions of groupness, as well as perceptions of similarity and common fate would be expected to positively correlate with belief-indicativeness, but not with status-indicativeness. Informativeness of groups, on the other hand, would be expected to correlate similarly with both belief- and status-indicativeness. Whereas

perceived entitativity and essentialism can be considered dmore distal predictors of prejudice, belief-indicativeness of groups is a more proximal one and should be more closely linked to ingroup bias.

Identity clusters. The proposed typology parallels findings in social identity research. In a factor analysis of ratings of the relative importance of various identities to the self-concept, Easterbrook et al. (2020) distinguish three clusters of groups: sociocultural (e.g., ethnicity, religion), which parallels belief-indicative groups; socioeconomic (e.g., education, income), which parallels status-indicative groups; and basic demographics (age, gender), which would correspond to the neutral groups in the current typology.

Overview of the studies

We conduct a cross-cultural factorial survey experiment (Study 1) where participants evaluate fictitious persons described through their membership groups. The factorial experiment allows us to disentangle the effects of the target person's various group memberships on perceivers' attitudes, and to test the predictions regarding the two distinct mechanisms underlying preference for belief-indicative and status-indicative groups. In a follow-up (Study 2), we develop a measure to directly assess belief and status inferences people make from different group memberships. Finally, we further validate the typology and the proposed measure by demonstrating the link between perceived belief-indicativeness of groups and ingroup bias, as well as the associations of belief- and status-indicativeness with the related constructs of essentialism and entitativity (Study 3). All materials, data, and syntax are available on the Open Science Framework platform: https://osf.io/2nrbm/. We report all manipulations, measures, and exclusions in the studies.

Study 1: Two Routes from Groups to Attitudes

We conducted a factorial survey experiment in four countries to identify the unique impact of different group memberships on attitudes depending on the group type and context. This study aimed to test the two core hypotheses presented in the introduction: We expected that belief-indicative groups will affect attitudes via preference for the ingroup (H1) and status-indicative groups will affect attitudes via preference for higher status (H2).

Method

Design

Factorial survey is an experimental technique implemented in a survey format. Participants are presented with vignettes representing situations or objects (here—descriptions of people). The characteristics of these stimuli systematically vary on several dimensions (here—group memberships), and participants evaluate the stimuli, necessarily making trade-offs between the dimensions (Auspurg & Hinz, 2015). Factorial surveys allow investigating causal mechanisms without compromising external validity (Jasso, 2006).

We selected four countries with extreme scores on acceptance of cultural diversity (ACD) and inequality: Australia for high ACD and low inequality, Armenia for low ACD and low inequality, Brazil for high ACD and high inequality, and India for low ACD and high inequality. We expected the effects of group memberships on attitudes to differ across countries with high. vs. low ACD and inequality. Due to page limits, we report the details of country selection and the results of country-level analyses in the SI.

We aimed for a balance between cultural sensitivity and theoretical and empirical comparability when selecting dimensions and categories for inclusion in the experiment. To select culturally relevant dimensions, we interviewed ten or eleven experts on intergroup

relations, mainly university professors, in each country (see Grigoryan et al., 2022 for details).

Based on the results of expert interviews, eight dimensions of social categorization were

included in the main study in all four countries, and one additional dimension per country that

experts found uniquely relevant in that country. The dimensions included in all countries are age,

gender, ethnicity, religion, place of residence (rural/urban), education, occupation, and income.

The country-specific dimensions are English language proficiency in Australia, sexual

orientation in Armenia, political views in Brazil, and caste in India. Table S1 presents the levels

of each variable for each country.

We used a D-efficient fractionalized design with orthogonal main effects for vignette

sampling. D-efficient designs are the best way to ensure a balanced representation of all vignette

levels in the sample and orthogonality of vignette dimensions (Dülmer, 2007). We sampled 30

vignettes from the vignette universe in each country, excluding the implausible combinations

(e.g., being a professional and poor in Brazil). We split the sampled vignettes into three sets of

10 vignettes to avoid participant fatigue. We used SAS Enterprise software (SAS Institute Inc.,

Cary, 2011) for vignette sampling. The D-efficiency coefficients for the designs varied between

92.55 and 98.02, providing sufficient power to identify the effects of vignette dimensions on

attitude in all four countries (Auspurg & Hinz, 2015). The vignette setup is presented in Table

S2.

Procedure and measures

The study was conducted online. All participants gave informed consent. The study did

not require approval by the ethical review board as per national regulations and university

guidelines. Participants were randomly assigned to one of the three versions of the questionnaire,

which differed only by vignette sets. The questionnaire started with the ten vignettes presented in

a randomized order. The group memberships within each vignette were always presented in the same order, since evidence suggests that order effects have little to no impact on judgments in factorial survey experiments with design parameters similar to ours (Auspurg & Jäckle, 2017; Düval & Hinz, 2020). Example of a vignette: "A young Tamil man. He lives in a capital city. He is a Muslim. He belongs to a Scheduled Caste. He studied up to high school and is currently unemployed. He is rich." (India). Attitude was measured with three items: "I like this person", "I respect this person", and "I want to engage with this person" (Cronbach's α varied from .81 to .92 in four countries).

We collected information on participants' sociodemographic background on all variables manipulated in the vignettes. Response categories were matched to the labels used in the vignettes, enabling us to code whether the participant and each evaluated target shared a group membership on each of the dimensions.

To measure belief dissimilarity, we asked: "How compatible or incompatible are moral values and beliefs of the groups listed below with the values and beliefs of the groups that you belong to?" Participants rated outgroups on each of the dimensions on a scale from 1 – *Absolutely incompatible* to 6 – *Absolutely compatible*. The scores were reverse coded to reflect belief dissimilarity. The questionnaire included additional measures that are reported on the project's OSF page and in Grigoryan et al. (2022).

Participants

We used non-probabilistic quota sampling to represent all the social groups mentioned in the vignettes. Following Maas and Hox (2005) recommendations, we aimed for 100 participants per questionnaire version to achieve sufficient power for multilevel regression analysis, i.e. 300 participants per country (100 x 3 questionnaire versions). Additionally, following Auspurg and

Hinz's (2015) recommendations, we aimed for at least 5 participants per questionnaire version from each subgroup, i.e., 15 participants per group.

Data collection was conducted by the survey company Lightspeed in Australia, Brazil, and India and by the Turpanjian Center for Policy Analysis in Armenia[1]. We reached the desired sample size for 100 out of 103 sampled groups. The total sample size was $N = 1,281$ ($N_{AU} = 359$, $N_{AR} = 311$, $N_{BR} = 282$, $N_{IN} = 329$). With ten vignette evaluations per participant, the effective sample size was $N = 12,810$ observations. We did not exclude any observations. The sample details are presented in Table S3.

Analytical strategy

The independent variables are target's gender, age, ethnicity, religion, place of residence (urban/rural), occupation, education, and income, plus language in Australia, sexual orientation in Armenia, political views in Brazil, and caste in India. Group memberships on these dimensions are the levels of IVs and attitude towards the vignette person is the DV. As vignettes are nested within respondents, we used multilevel regression models for all analyses. ICC indicated that substantial proportion of variance in attitudes was at the level of individuals: 33% in Armenia (AR), 63% in India (IN), and 64% both in Australia (AU) and Brazil (BR). We coded whether each participant-target pair belonged to the same group on each of the dimensions. We then tested regression models in each country, predicting attitude towards the vignette person from the vignette dimensions, in- vs. outgroup membership on each dimension, and respondent characteristics.

To test H1 and H2, we classified the groups as either belief-indicative, status-indicative, or neutral. We classified religion, ethnicity, and the country-specific dimensions of sexual

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[1] Lightspeed does not have a panel in Armenia.

orientation[2] and political views as belief-indicative; education, occupation, income, and the

India-specific dimension of caste as status-indicative; and age, gender, rural/urban, and the

Australia-specific dimension of English language proficiency as neutral. The groups classified as

neutral can potentially be informative of both status and beliefs if no other information is

available. However, when more informative group memberships are present (e.g., religion for

beliefs and income for status), we expect people to rely less on these categories. The effects of

ingroup membership along belief-indicative dimensions on attitude tested H1 and the effects of

status-indicative dimensions on attitude tested H2. To further test whether ingroup bias occurs

predominantly between belief-indicative groups (H1), we created an aggregated dataset with the

country-specific estimates of strength of ingroup bias (regression slope of ingroup membership

on attitude) on each dimension, aggregated mean belief dissimilarity on that dimension, and

group type (N=36).

Results

Belief-Indicative vs. Status-Indicative Groups

　　Ingroup bias in belief-indicative groups. The country-specific multilevel models

predicting attitudes towards the vignette person are reported in Tables S4.1–S4.4. The strongest

ingroup bias was observed on the dimensions classified as belief-indicative: sexual orientation

(AR: $b = 0.72$, $SE = .07$, $p < .001$), political views (BR: $b = 0.27$, $SE = .03$, $p < .001$), religion

(AU: $b = 0.14$, $SE = .03$, $p < .001$; AR: $b = 0.17$, $SE = .05$, $p < .001$; BR: $b = 0.20$, $SE = .03$,

$p < .001$; IN: $b = 0.20$, $SE = .04$, $p < .001$), and ethnicity (AR: $b = 0.17$, $SE = .07$, $p = .012$; IN:

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[2] We classified sexual orientation as a belief-indicative group, because public discourse in most countries

frames sexual orientation as a moral issue (Jayaratne et al., 2006), even more so in countries like Armenia, where

questions of gender identity and sexual orientation are still a taboo.

$b = 0.07$, $SE = .03$, $p = .006$). Figure 1 shows the distribution of the strength of ingroup bias and belief dissimilarity by group type in the aggregated sample of effect sizes. Participants showed a consistent preference for the ingroup only for belief-indicative groups ($M_b = 0.20$, $SD = 0.2$), supporting H1. The mean effect of ingroup membership on attitude was close to zero for both neutral ($M_b = 0.01$, $SD = 0.04$) and status-indicative ($M_b = -0.01$, $SD = 0.05$) groups. Group type significantly predicted strength of ingroup bias ($F(2, 33) = 11.7$, $p < .001$, $\eta^2 = 0.42$).

Figure 1

Ingroup Bias and Belief Dissimilarity by Group Type
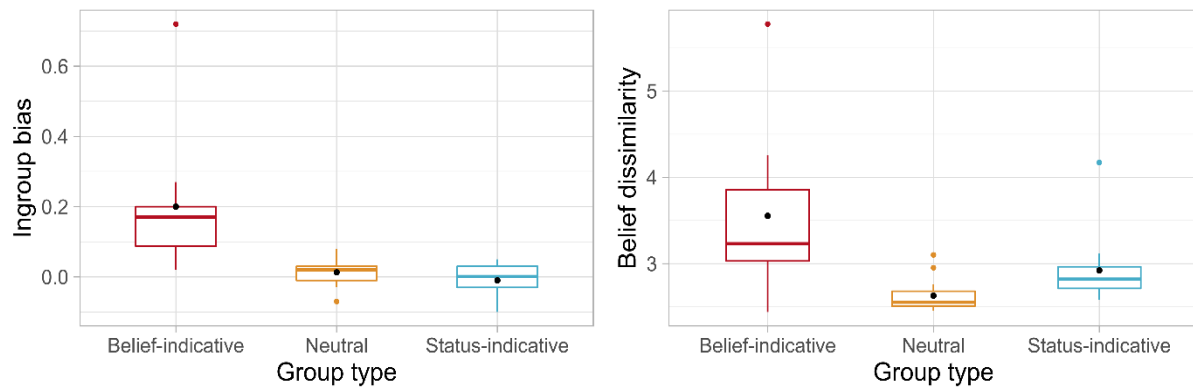
Note. In the "Ingroup bias" plot, the unit of analysis is the regression estimate (b) of the effect of ingroup membership on attitude on one dimension in one country. For the "Belief dissimilarity" plot, the unit is the mean aggregate belief dissimilarity score on one dimension in one country (6-point scale).

Supporting our theorizing, perceived belief dissimilarity was higher between belief-indicative groups ($M = 3.56$, $SD = 0.93$) compared to neutral ($M = 2.63$, $SD = 0.2$) and status-indicative groups ($M = 2.92$, $SD = 0.4$), a significant difference ($F(2, 33) = 7.9$, $p = .002$, $\eta^2 = 0.32$). Group type and belief dissimilarity together explained 74% of variance in strength of bias. Belief dissimilarity fully mediated the link between group type and bias ($b = 0.14$, 95% CI [0.07, 0.23], $p < .001$), accounting for 77% of the total effect.

Preference for higher status in status-indicative groups. Although status-indicative groups did not produce ingroup bias, they affected attitudes via preference for higher status.

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Supporting H2, participants evaluated targets with lower levels of education (vs. holding a university degree) more negatively (AU: $b = -.13$, $SE = .03$, $t(3108) = -4.94$, $p < .001$; AR: $b = -.11$, $SE = .05$, $t(2745) = -2.07$, $p = .039$; BR: $b = -.01$, $SE = .04$, $t(2540) = -0.30$, $p = .764$; IN: $b = -.23$, $SE = .05$, $t(2853) = -4.14$, $p < .001$). Similarly, unemployed targets were evaluated more negatively than professionals (AU: $b = -.22$, $SE = .03$, $t(3107) = -7.49$, $p < .001$; AR: $b = -.77$, $SE = .05$, $t(2745) = -15.36$, $p < .001$; BR: $b = -.09$, $SE = .05$, $t(2539) = -1.71$, $p = .088$; IN: $b = -.22$, $SE = .05$, $t(2844) = -4.75$, $p < .001$). The effect of income showed strong cross-country variability. Participants preferred rich over poor targets in Australia and Armenia (AU: $b = -.12$, $SE = .03$, $t(3105) = -4.43$, $p < .001$; AR: $b = -.13$, $SE = .04$, $t(2745) = -3.08$, $p = .002$), but poor over rich in Brazil and India (BR: $b = .15$, $SE = .04$, $t(2539) = 3.91$, $p < .001$; IN: $b = .07$, $SE = .03$, $t(2844) = 2.08$, $p = .038$). Only caste in India had no significant effect on attitude (Scheduled caste vs. Forward caste: $b = -.04$, $SE = .03$, $t(2847) = -1.21$, $p = .228$).

The effects of status-indicative dimensions (education, occupation, and income) were stronger in more equal countries (Australia, Armenia), and ingroup bias on the dimension of ethnicity, but not religion, was stronger in countries with lower ACD (Armenia, India). We elaborate on these country-level differences in the SI.

Discussion

We demonstrated that targets' group memberships can affect attitudes via two distinct routes: preference for the ingroup occurred for those groups that were indicative of their members' beliefs and values (e.g., religion), and preference for higher status occurred for the groups that were indicative of their members' standing in the societal hierarchy (e.g., occupation). These effects were further moderated by social-structural characteristics. We found weaker ethnic bias in countries with higher acceptance of diversity, although this effect did not

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generalize to religious bias. Preference for higher status for status-indicative groups (education, occupation, income) was stronger in more equal countries.

One important limitation of our approach is that although we employ a design that allows an intersectional analysis of attitude formation, we do not make use of this design feature. As we argued in the introduction, dimensions of social categorization can interact with each other in shaping attitudes. We do not present such analysis here. The use of orthogonal main effects design in this study means that some higher-order interactions are confounded and cannot be tested. However, with careful theorizing and additional tests of data suitability to ensure that the specific interactions of interest can be tested, these data can be used in future studies to test such interactions. For example, information about the target's level of education could have a stronger positive effect on attitude when the candidate is an ethnic majority vs. minority group member (e.g., see Di Stasio & Heath, 2019).

The strength of factorial survey experiments is in their ability to disentangle the effects of different variables that might be confounded in real life. However, this design feature also presents a challenge when applied to social group memberships. Different combinations of groups memberships would be perceived as more or less realistic, which could affect participants' judgements. Following best practices in factorial survey research (Auspurg & Hinz, 2015), we discussed these implausible group combinations with local experts in each country prior to data collection and excluded combinations that seemed too unrealistic. Nevertheless, many atypical combinations remained, to not defeat the purpose of the experimental design. Future studies could ask participants directly how strange or unusual the described person is to account for this variation. Asking participants to list, in an open-ended question, their thoughts

about the described person would further help to capture stereotypes that emerge from different combinations of group memberships.

The main limitation of Study 1 is the absence of a direct measure of belief- and status-indicativeness of groups. We relied on the research team's knowledge of each cultural context to classify the groups as belief-indicative, status-indicative, or neutral. However, as mentioned in the introduction, the perceptions of groups' belief- and status-indicativeness are context-bound and, therefore, it is important to obtain estimates of the groups' belief- and status-indicativeness directly from participants in these countries. To address this limitation, we conducted a follow-up study. We selected two countries that are most distant from each other on the dimensions used for country selection in Study 1 and, for feasibility, where the study could be conducted in the same language: Australia (high ACD, low inequality) and India (low ACD, high inequality).

Study 2: Measuring Belief- and Status-Indicativeness of Groups

To validate the proposed typology, we developed a measure to assess belief and status inferences people make from different group memberships. To develop the items, we relied on existing measures of warmth/beliefs and competence/agency dimensions of social cognition (Abele et al., 2016; Fiske et al., 2002; A. Koch et al., 2016). We aimed to test (1) the reliability of the new measure in two countries, (2) whether the three hypothesized clusters of belief-indicative, status-indicative, and neutral groups emerge from the data and (3) whether these clusters agree with our classification of groups in Study 1.

Method

Participants

To ensure sufficient power for multilevel CFA, we aimed to recruit 150 participants in each country (Hox & Maas, 2001; T. Koch et al., 2015). Australian participants were recruited

on the online survey platform Prolific and compensated with £1.9 for their time. Prolific does not operate in India, therefore Indian participants were recruited via Amazon MTurk crowdsourcing platform and compensated with $2 for their time. As a quality control, we asked participants at the end of the questionnaire if their responses were careless and should be excluded from the analysis; participants were assured that their compensation would not depend on their response to this question. After excluding participants who did not reside in either Australia or India and those who indicated that their responses should be excluded, the effective sample size was *N*=148 in both countries. Sample characteristics are presented in Table S6 of the SI.

Procedure and Measures

To measure the type of information inferred from group memberships, we developed a scale based on the operational definitions of the belief- and status-indicative groups. Table 1 presents operational definitions of the constructs and the items designed to measure them. The instruction was adapted for each of the categories included in Study 1. In both countries, we asked about gender, age, ethnicity, religion, place ("the size of the town they are from"), education, occupation, and income. Additionally, we included the country-specific dimensions of English language proficiency in Australia and caste in India, and the two country-specific dimensions from Armenia and Brazil. We matched countries with similar levels of acceptance of cultures diversity, asking about sexual orientation in India and about political views in Australia. This resulted in a total of ten groups in each country.

Additionally, participants reported their socio-demographic background as in Study 1. The questionnaire included other exploratory measures that are reported on the project's OSF page. The study was not preregistered. It was conducted online and took on average 10 minutes

to complete. The study was approved by the ethical committee of the Psychology department at Ruhr University Bochum.

Results

We first tested the reliability of the BISI measure and then conducted a cluster analysis to see if the three types of groups emerge from the data.

Table 1

The measure of belief- and status-indicativeness of groups (BISI)

Construct	Operational definition	Instructions/Scale	Items
Belief-indicative groups (BI)	Belief-indicative groups are groups that signal their members' moral beliefs, values, and worldviews.	Imagine the only thing you know about someone is their [group: e.g., gender]. What can you tell about this person? All items are answered on a 5-point scale from 1 – *"You cannot tell at all"* to 5 – *"You can tell for sure"*, with a labeled middle category 3 – *"You can tell to some extent"*.	Can you tell what kind of values this person has? Can you tell what kind of moral beliefs this person has? Can you tell how trustworthy this person is? [replaced in the follow-up study with: "Can you tell whether this person's values and beliefs are similar to your own?"]
Status-indicative groups (SI)	Status-indicative groups are groups that signal their members' status in the societal hierarchy.		Can you tell how successful this person is? Can you tell if this person has high or low status in the society? Can you tell how competent this person is?

Note: See SI for the final version of the scale in English and German.

Scale Reliability

The measures were administered for ten different groups in each country, creating a multilevel data structure, where group evaluations are nested within respondents. We therefore tested two multilevel CFA models, one for each country, with group evaluations (Level 1,

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$N = 1480$) nested within respondents (Level 2, $N = 148$). Two correlated latent factors (BI and SI) were represented by three items each. The factor loadings and model fit indices are presented in Table S7 of the SI. All items significantly loaded on the respective latent factor in the expected direction (all βs > .40) on both levels. Model fit indices indicated that the model was a good fit to the data (AU: CFI = .966, TLI = .936, RMSEA = .085; IN: CFI = .996, TLI = .992, RMSEA = .019). Partial metric and scalar invariance of the scale was established across countries and target groups, with only the "trust" item showing significant variability in loadings (see SI, Table S8).

In Australia, the two constructs were orthogonal ($r = .04$, $p = .207$), whereas in India they correlated positively ($r = .65$, $p < .001$), suggesting that groups that were considered informative of their members' status in India were also seen as informative of their members' beliefs. Indian participants in general perceived various social groups to be more informative of their members' beliefs ($M_{IN} = 3.66$, $SD_{IN} = 1.02$, $M_{AU} = 1.83$, $SD_{AU} = 0.93$, $t(2931) = -51.3$, $p < .001$, $d = 1.88$) and status ($M_{IN} = 3.70$, $SD_{IN} = 0.96$, $M_{AU} = 1.98$, $SD_{AU} = 1.04$, $t(2938) = -46.5$, $p < .001$, $d = 1.71$) than did Australian participants.

Group Evaluations: Cluster Analysis

To test whether the three types of groups emerge from the data, we conducted a k-means cluster analysis with Euclidian distance as a similarity measure. We scaled the BI and SI measures before running the analysis (Milligan & Cooper, 1988). We determined the optimal number of clusters based on the within-cluster sums of squares using the *factoextra* (Kassambara & Mundt, 2020) package in R. As Fig. 2 indicates, three clusters emerged in both countries.

Figure 2

The optimal number of clusters in group evaluations
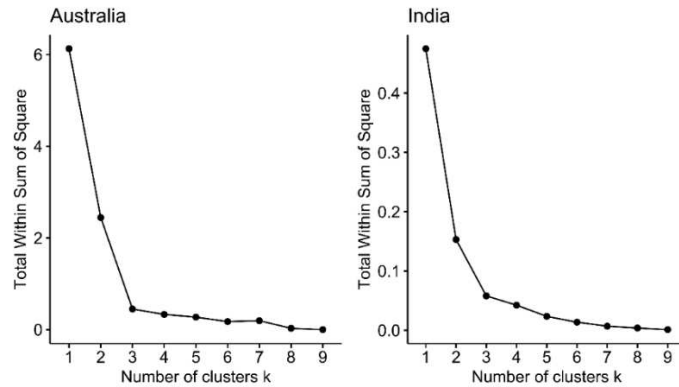
The three-cluster solution explained 92.7% of variance in the Australian sample and 87.8% of variance in the Indian sample. The cluster means showed a good fit of the data to the proposed typology: the groups in the first cluster with low scores on both dimensions can be described as neutral (cluster means: BI_{AU} = -.31, SI_{AU} = -.41, BI_{IN} = -.13, SI_{IN} = -.16), groups in the second cluster with high BI and low SI scores can be described as belief-indicative (cluster means: BI_{AU} = .87, SI_{AU} = -.35, BI_{IN} = .08, SI_{IN} = -.05), and groups in the third cluster with high SI and low BI can be described as status-indicative (cluster means: BI_{AU} = -.06, SI_{AU} = .93, BI_{IN} = .10, SI_{IN} = .25).

Figure 3

Clusters of groups by levels of belief- and status-indicative properties in Australia and India

Figure Australia | India

Cluster • Neutral ▲ Belief-indicative ■ Status-indicative
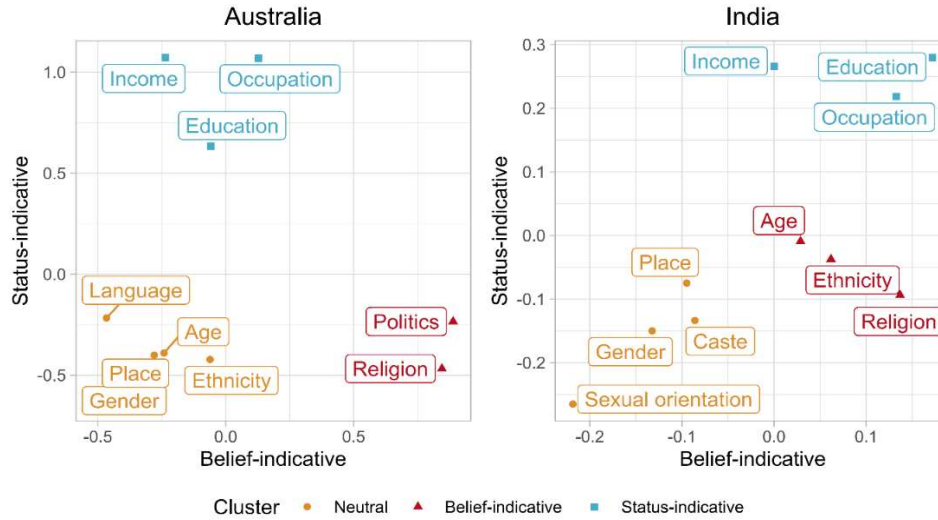
As Fig. 3 shows, the classification of groups into clusters was largely in line with our post-hoc classification in Study 1. In both countries, income, education, and occupation fell into the status-indicative cluster, religion into the belief-indicative cluster, and gender and place into the neutral cluster. As expected, political views were in the belief-indicative cluster, close to religion. We also observed a few deviations. Ethnicity was in the belief-indicative cluster in India, but not in Australia, which is consistent with Study 1, where we found significant ethnic ingroup bias in India, but not in Australia. Note, however, that both studies use self-reports, and the fact that we did not detect ethnic bias in Australia could simply reflect socially desirable responding or other limitations associated with self-report measures. Although age was among the neutral groups in Australia, it was seen as moderately informative of people's beliefs in India. Finally, sexual orientation and caste were seen as neutral in India, contrary to expectations.

Discussion

We developed a measure to assess belief and status inferences people make from group memberships. The measure showed good reliability in two markedly different cultural contexts. Three clusters of groups emerged from the data, corresponding to the proposed typology: groups primarily informative of their members' beliefs, groups primarily informative of their members'

status, and neutral groups that were not very informative of either beliefs or status. The evaluations of specific social groups largely confirmed our post-hoc classification in Study 1. Out of 20 groups studied across the two samples, classification of 16 groups matched our classification in Study 1 and only four deviated from our expectations. This suggests that with some knowledge of a given cultural context, researchers can anticipate which groups will be perceived as belief- or status-indicative, or neutral. However, this classification is malleable, and groups can shift from one cluster to another depending on context and time. This finding further highlights the importance of having a direct measure to assess inferences that people make from social groups at a given time and place.

In Study 1, relying on a post-hoc classification of groups to belief- and status-indicative, we showed that ingroup bias predominantly emerges for belief-indicative, but not status-indicative groups. In Study 2, we demonstrated that belief- and status-indicativeness of groups can be reliability assessed and that our post-hoc classification largely overlaps with participants' perceptions of groups. In Study 3, we test whether this newly developed measure is predictive of the strength of ingroup bias.

Study 3: Linking Belief- and Status-Indicativeness of Groups to Ingroup Bias

We tested the link between perceptions of belief- and status-indicativeness of groups and ingroup bias. The preregistered hypothesis (https://osf.io/rtv48) was that the more indicative of its members' beliefs a group is perceived to be, the stronger perceivers' ingroup bias will be (H1)[3]. We additionally tested how the BISI dimensions are related to essentialist beliefs and entitativity, and whether belief-indicativeness of groups is predictive of bias over and above entitativity and essentialism.

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[3] Deviations from the preregistered protocol, as well as additional analyses in line with the preregistration protocol are reported in the SI.

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Method

The study was conducted in Germany. As in Study 1, we first identified salient social groups in Germany, using the strategy suggested by Koch et al. (2016). We asked participants to name 40 social groups that spontaneously come to their minds. Sixty-eight people completed the questionnaire, 72% women and 26% men, 19 to 67 years old (M=27.5, SD=9). Participants mentioned 2,369 groups in total. The groups were then assigned to the relevant categorization dimensions and type of group based on classification by Lickel et al. (2000): intimacy groups, social categories, task groups, and loose associations. As the focus of the current study is on social categories, only those are included in the main study. Ten most frequently mentioned categories were included[4]: occupation, political affiliation, religion, income, age, ethnicity, gender, place of residence (East vs. West Germany), sexual orientation, and education.

Participants

As in Study 2, given the nested data structure, we recruited 150 participants to have sufficient power for multilevel CFA and regression analysis. The study was hosted on Qualtrics and the link to the survey was distributed via social media platforms and among the students of Ruhr University Bochum. Students received one credit point for participation. A total of 176 participants completed the questionnaire. Twenty-one of them were excluded as they failed more than two of the five attention checks. The final sample size was $N = 155$.

Majority of the participants (79%) were women. Age varied between 19 and 62 years old, $M_{age} = 27$, $SD = 10$. Most participants (75%) were students. Majority (72%) had a high school qualification, 21% had a tertiary degree (BA, MA, or PhD), 4.5% completed vocational training, and only 2.6% did not complete high school. In terms of subjective income, 46% believed their

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[4] Migration status was the 6th most frequently mentioned category, but we decided to exclude it to have a relatively balanced representation of different group types, while limiting the number of categories to 10.

monthly income was below the average in Germany, 38% – about average, and 16% – above average. The participants came predominantly from West German states (96%) and were politically left leaning (74% were "very" or "slightly" liberal). Most participants (86%) identified as German, 4% identified as Turkish, 1% as Russian, and 9% mentioned other ethnic groups. Majority (63%) identified as Christian, 28% as atheist/agnostic, 7% as Muslim.

Procedure and measures

Participants gave informed consent and confirmed that they live in Germany and speak German.

BISI. Ten groups were evaluated using the BISI scale as in Study 2. The groups were presented in a randomized order. We made one modification to the scale: in Study 2, the *trust* item had a weaker loading on the latent construct compared to the other two items in Australia and was not invariant across countries. Since trust can be based both on belief inferences (trust-benevolence) and competence inferences (trust-credibility, Gansen, 1994), we reasoned that trust might be the outcome of belief and status inferences rather than part of them. In Study 3, we added one additional item to the scale to test whether it performs better: "Can you tell whether this person's values and beliefs are similar to your own?" The scale performed better with the new item ($CFI = .996$, $TLI = .993$, $RMSEA = .032$, $SRMR_{within} = .045$, $\beta_{within} = .86$) compared to the trust item used earlier ($CFI = .944$, $TLI = .896$, $RMSEA = .109$, $SRMR_{within} = .134$, $\beta_{within} = .37$). Therefore, we use the revised version of the scale in all calculations. The final version of the scale in English and German is presented in the SI.

Entitativity. Participants rated the same ten groups on three entitativity items from Blanchard et al. (2020). Example item: "The members of this group are a unit", $\alpha = .88$.

Essentialism. We used the Essentialist Beliefs scale (Bastian & Haslam, 2006) which consists of three subdimensions: biological basis (e.g., "The kind of person someone is can be largely attributed to their genetic inheritance", $\alpha = .83$), discreteness (e.g., "A person either has a certain attribute or they do not", $\alpha = .66$), and informativeness (e.g., "When getting to know a person it is possible to get a picture of the kind of person they are very quickly", $\alpha = .70$). The scale also performed well as a unidimensional measure of essentialist beliefs ($\alpha = .81$).

Feeling thermometer scales were completed for several groups on each dimension. For example, for the dimension of political orientation, participants rated "liberals" and "conservatives" and for gender, "men", "women", and "non-binary persons". Participants also reported their socio-demographic background on each of the dimensions[5]. To get a measure of ingroup bias, we calculated a difference score, subtracting the average of all outgroup evaluations on the feeling thermometer from the ingroup evaluation.

Results

We first performed a cluster analysis to test whether the three types of groups emerge from the data. As in Study 2, three clusters emerged, explaining 90% of variance in group evaluations. Fig. 4 illustrates the distribution of groups by clusters.

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[5] Due to a technical error, the questionnaire did not include a question about participants' sexual orientation, so the score for ingroup bias was calculated for 9 out of 10 groups.

Figure 4

Clusters of groups by levels of belief- and status-indicativeness in Germany
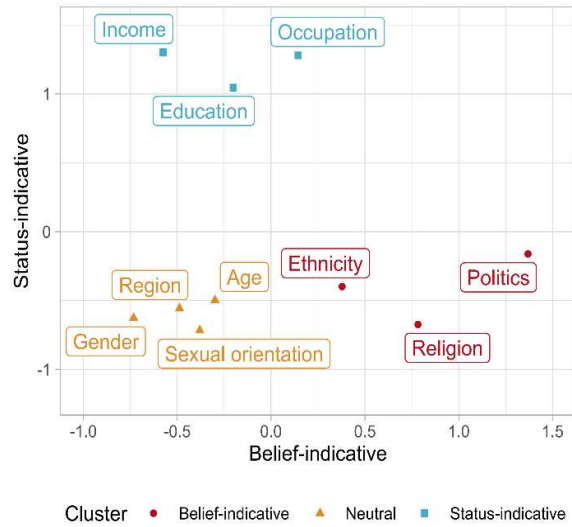
Next, we tested whether the strength of ingroup bias differed by group type. As Fig. 5 demonstrates, belief-indicative groups elicited stronger ingroup bias (*M*=19.5, *SD*=25) than neutral (*M*=10.4, *SD*=20) or status-indicative (*M*=10, *SD*=18.5) groups, a significant difference (*F* (2, 1343) = 28, *p* < .001, η^2 = .04, *95% CI* [.02, .06]). This was the case even though we had a highly educated sample, which conflated preference for the ingroup with preference for higher status in the estimates of ingroup bias for status-indicative groups.

Figure 5

Strength of ingroup bias by group type
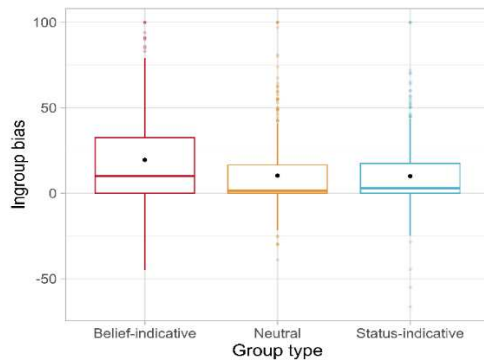
We predicted that the more indicative of beliefs a group is perceived to be, the stronger is the ingroup bias (H1). To test this prediction, we ran a multilevel regression model with group evaluations nested within respondents, predicting ingroup bias from standardized BI and SI scores. As predicted, the more participants perceived a group to be indicative of its members' beliefs, the stronger preference for the ingroup they showed ($b = 6.2$, $SE = 0.5$, $t(1321) = 11.6$, $p < .001$). An increase of one standard deviation in the BI score was related to a 6-point increase in the difference between the ingroup and the outgroup evaluations on a 100-point feelings thermometer. As expected, SI did not predict ingroup bias ($b = -0.9$, $SE = 0.5$, $t(1259) = -1.8$, $p = .077$).

Finally, we tested how BISI relates to essentialism and entitativity. Essentialist beliefs are an individual-level variable, we therefore aggregated the BISI scores at the level of individuals to test this association. Essentialism correlated positively with both BI ($r = .25$, $p < .001$) and SI ($r = .25$, $p < .001$). The strongest correlations were with informativeness subscale ($r_{BI} = .30$ and $r_{SI} = .26$, see Table S9), which supports the construct validity of the BISI scale. Unlike essentialism, entitativity was measured for each of the ten groups. Entitativity correlated with BI ($r = .36$, $p < .001$), but not with SI ($r = -.01$, $p = .535$), further supporting our theorizing. Table 2

reports the estimates of a multilevel model predicting ingroup bias from BI, SI, entitativity, and individual-level essentialism. Only entitativity and BI predicted stronger ingroup bias. The effect of BI was twice as strong as that of entitativity: 1 SD increase in BI was associated with a 5.3 increase on a 100-point feeling thermometer versus a 2.6 increase for a 1 SD increase in entitativity. Controlling for socio-demographic variables did not change the size or the significance of these effects (see Table S10).

Table 2

Estimates of a multilevel model predicting ingroup bias from BISI and entitativity

	b	SE	95% CI	t (df)	p
Intercept	13.14	0.98	[11.2, 15.1]	13.3 (151)	< .001
Belief-indicativeness (BI)	5.26	0.58	[4.1, 6.4]	9.1 (1324)	< .001
Status-indicativeness (SI)	-0.66	0.49	[-1.6, 0.3]	-1.3 (1261)	.179
Entitativity	2.56	0.64	[1.3, 3.8]	4.0 (1315)	< .001
Essentialist Beliefs	0.75	0.99	[-1.2, 2.7]	0.8 (153)	.448

General discussion

We propose and validate a typology of social groups that integrates two distinct and equally fundamental mechanisms through which information about others' group memberships affects attitudes towards them: preference for the ingroup and preference for higher status. The differentiation between belief-indicative and status-indicative groups goes beyond the existing typologies (e.g., Lickel et al., 2000; Wilder & Simon, 1998) in that it focuses on differences in the type of information a social category provides to a perceiver, helping to clarify the mechanisms of impression formation and predict under which circumstances one or the other mechanism will be activated.

Our findings demonstrate that when information about others' multiple group memberships is present, the influence of group membership on the attitude is conditioned by the type of the group. Groups that were indicative of the person's beliefs affected attitudes primarily via ingroup bias, whereas groups indicative of the person's status affected attitudes primarily via preference for higher status. We further showed that these inferences about beliefs and status can be reliably measured and that group evaluations form the three theorized clusters of belief-indicative, status-indicative, and neutral groups. Finally, we tested the predictive validity of this typology and the newly developed measure and demonstrated that the more indicative a group is perceived to be of its members' beliefs, the stronger the ingroup bias. The link between belief-indicativeness and bias was twice as strong as that of entitativity.

Importantly, although groups can be classified as belief-indicative or status-indicative, this classification is malleable. For example, evidence from South Africa shows that race functions as a status-indicative group in contexts with extreme racial disparities (Dunham et al., 2014). Racial categorization itself can be affected by status cues (Freeman et al., 2011). Similarly, social class can function as a belief-indicative group in contexts with high economic inequality, as our findings from India indicate. Social context is what saturates social groups with meaning.

Limitations and Future Directions

We find consistent evidence in support of our hypotheses in seven samples from five countries. These countries, however, are not representative of the world's population. Moreover, the three studies varied in how well they represented the sampled subpopulations from each country. Study 1 had the most balanced sample due to quota sampling approach, whereas Studies 2 and 3 used convenience samples that over-represented some subgroups, while under-

representing others. The sample of Study 3 was particularly skewed towards young, educated, and liberal participants. Although the results in any of the studies did not change when controlling for demographic variables, the predominance of majority and higher-status groups in the sample can still be problematic. For example, ingroup bias on belief-indicative dimensions could be either weaker (Bettencourt et al., 2001) or stronger (Scheepers et al., 2006) if more members of minority groups were included. An over-representation of higher-status groups on status-indicative dimensions could inflate the estimates of preference for higher status. Future studies would benefit from sampling an equal number of participants from majority and minority, as well as higher- and lower-status groups to test the universality, robustness, and the size of the effects found here. Studies that exclusively sample minority or lower-status groups would also be valuable, to balance out the over-reliance of social psychology on majority and higher-status samples (Henrich et al., 2010; Roberts et al., 2020).

This paper serves as an initial "proof of concept", leaving several unanswered questions that future studies can tackle. How do belief- and status-indicative groups interact in impression formation? Most likely, these effects are non-additive and the perception of one group can change depending on membership in another (e.g., see discussion on intersectionality in the introduction). Under which circumstances do groups become indicators of either beliefs or status? How do these perceptions shift over time and across situations? Under which conditions are the two dimensions orthogonal and when are they not? What are the implications of this non-orthogonality? Does perceived informativeness of groups go hand in hand with higher cultural tightness and higher prejudice? And how do our findings generalize to face-to-face interactions where the visibility and salience of different group memberships vary? Field studies,

experimental data with artificial groups, and cross-cultural data with greater contextual variation can help address these questions.

Our findings also suggest some avenues for advancing prejudice reduction interventions. The majority of prejudice reduction models—e.g., intergroup contact (Pettigrew, 1998), group norm theory (Crandall et al., 2002), common ingroup identity (Gaertner et al., 1993)—target prejudice towards a specific group (Paluck & Green, 2009). The secondary transfer effect of intergroup contact usually extends to similar, but not dissimilar outgroups (Harwood et al., 2011). Based on our findings, an intervention designed to increase general tolerance to belief dissimilarity might be more efficient in reducing bias in relation to a wider range of social groups.

Conclusion

We proposed and validated a typology of social groups, differentiating between belief-indicative groups that signal their members' values, beliefs, and worldviews, and status-indicative groups that signal their members position in the societal hierarchy. We showed that intergroup comparisons involving belief-indicative groups result in ingroup bias, whereas those involving status-indicative groups result in preference for higher status. We further demonstrated that socio-structural context shapes the way these group memberships affect attitudes.

This information-based approach brings together various lines of research, offering an integrative framework for the study of intergroup attitudes. It links the evolutionary-driven fundamental dimensions of social perception (Abele et al., 2021; A. Koch et al., 2016) to mechanisms of attitude formation from social identity (Tajfel & Turner, 1979), social dominance (Sidanius & Pratto, 1999), and system justification theories (Jost, 2019). By incorporating the type of information people infer from different group memberships into the studies of intergroup

relations, we can make better, more contextualized predictions about intergroup attitudes and

behavior.

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Supplementary Information for

Grigoryan, L., Jones, H.B., Cohrs J.C., Boehnke, K., Easterbrook M.J. Differentiating between belief-indicative and status-indicative groups improves predictions of intergroup attitudes

This file includes:

Table S1. Levels of independent variables (Study 1)

Variable	Levels			
	Australia	*Armenia*	*Brazil*	*India*
Age	Young Middle-aged Elderly			
Ethnicity	European Australian Asian Australian Aboriginal Australian	Armenian Russian Yazidi	White Mixed race Black	Bihari Bengali Tamil
Gender	Woman Man			
Place	Capital city Regional town Country Australia	Yerevan Regional town Village	Capital city Regional town Village	
Religion	Christian Muslim Not religious	Christian Yazidi Not religious	Catholic Evangelical Not religious	Hindu Muslim Not religious
Education	Has a university degree Completed vocational training Completed high school to year 10	Has a university degree Attended college Completed high school	Has a university degree Completed high school Completed primary school	Has a university degree Studied up to high school Studied up to primary school
Occupation	Professional Tradesperson Unemployed	Skilled professional Low-skilled worker Unemployed		Professional Laborer Unemployed
Income	Better off than the average Australian On a par with the average Australian Worse off than the average Australian	Rich Has an average income Poor		
Country-specific	*Language:*	*Sexual orientation:*	*Political views:* Apolitical	*Caste:* Forward Caste

Native Australian English speaker	Heterosexual	Supports the right	Other Backward Class (OBC)
Fluent in English, but does not sound Australian	Homosexual	Supports the left	Scheduled caste/tribe
Has difficulty speaking English			

Table S2. Distribution of factor levels by vignette sets (Study 1).

Vignette factors	Australia Factor levels	Frequency by set Set 1	Set 2	Set 3	Armenia Factor levels	Frequency by set Set 1	Set 2	Set 3	Brazil Factor levels	Frequency by set Set 1	Set 2	Set 3	India Factor levels	Frequency by set Set 1	Set 2	Set 3
Age	Young	4	3	3	Young	4	4	3	Young	3	3	4	Young	3	3	4
	Middle-aged	3	3	3	Middle-aged	3	3	4	Middle-aged	4	4	2	Middle-aged	3	4	3
	Elderly	3	4	4	Elderly	3	3	3	Elderly	3	3	4	Elderly	4	3	3
Ethnicity	European Australian	3	3	3	Armenian	3	3	3	White	3	3	3	Bihari	3	4	3
	Asian Australian	3	3	4	Yazidi	4	5	4	Black	4	3	4	Bengali	3	4	3
	Aboriginal Australian	4	4	3	Russian	3	2	3	Mixed race	3	4	3	Tamil	4	2	4
Gender	Female	5	5	6	Female	5	5	6	Female	6	5	5	Female	5	5	5
	Male	5	5	4	Male	5	5	4	Male	4	5	5	Male	5	5	5
Place	Capital city	3	3	3	Yerevan	3	3	3	Capital city	3	3	4	Capital city	3	3	4
	Regional town	4	3	3	Regional town	3	4	4	Regional town	4	3	3	Regional town	4	4	2
	Country Australia	3	4	4	Village	4	3	3	Village	3	4	3	Village	3	3	4
Religion	Christian	3	3	3	Christian	4	4	3	Catholic	4	3	4	Hindu	3	3	4
	Muslim	3	3	4	Yazidi	2	2	2	Evangelical	3	4	3	Muslim	4	3	3
	Not religious	4	4	3	Not religious	4	4	5	Not religious	3	3	3	Not religious	3	4	3
Country-specific	Native Australian English speaker	3	3	3	Heterosexual	7	7	7	Apolitical	4	3	3	Forward Caste	3	3	4
	Fluent in English, but doesn't sound Australian	4	3	4	Homosexual	3	3	3	Supports the right	3	4	3	Scheduled caste	3	4	3
	Has difficulty speaking English	3	4	3					Supports the left	3	3	4	OBC	4	3	3
Education	Has a university degree	3	3	4	Has a university degree	3	3	3	Has a university degree	4	4	5	Has a university degree	3	2	4

	Completed vocational training	3	3	3	Attended college	4	4	3	Completed high school	3	3	2	Studied up to high school	4	5	3
	Left school before completing Year 12	4	4	3	Completed high school	3	3	4	Completed primary school	3	3	3	Studied up to primary school	3	3	3
Occupation	Has a professional job	3	4	3	Skilled professional	3	3	3	Skilled professional	2	2	2	Professional	3	3	3
	Works as a tradesperson	3	3	3	Low-skilled worker	4	4	3	Low-skilled worker	3	3	3	Laborer	3	3	3
	Unemployed	4	3	4	Unemployed	3	3	4	Unemployed	5	5	5	Unemployed	4	4	4
Income	Better off than the average Australian	3	3	3	Wealthy	3	4	4	Rich	3	3	3	Rich	4	4	4
	On a par with the average Australian	3	4	3	Has an average income	4	3	3	Has an average income	4	3	4	Has an average income	3	3	3
	Worse off than the average Australian	4	3	4	Poor	3	3	3	Poor	3	4	3	Poor	3	3	3
D-efficiency coefficient (SE)	98.02 (0.77)				94.7 (0.77)				92.55 (0.77)				95.6 (0.77)			

Note. Reproduced from (Grigoryan et al., 2022, Supplemental Materials, p. 12)

Table S3. Sample characteristics (Study 1)

Dimension		*N*		*N*		*N*
Australia, N$_{total}$ = 359						
Age	Young	59	Middle-aged	216	Elderly	84
Ethnicity	European Australian	267	Asian Australian	35	Aboriginal Australian	46
Gender	Female	189	Male	168		
Place of upbringing	Capital city	212	Regional town	109	Country Australia	38
Religion	Christian	171	Muslim	19	Not religious	166
English language proficiency	Native Australian English speaker	292	Fluent in English, but not a Native AU English speaker	59	Difficulty speaking English	8
Education	University degree	119	Completed vocational training	171	Completed high school to year 10	69
Occupation	Has a professional job	187	Tradesperson	163	Unemployed	9
Income	Better off than the average Australian	54	On a par with the average Australian	188	Worse off than the average Australian	117
Armenia, N$_{total}$ = 311						
Age	Young	225	Middle-aged	59	Elderly	27
Ethnicity	Armenian	273	Yazidi	17	Russian	21
Gender	Female	200	Male	109		
Place of upbringing	Yerevan	167	Regional town	96	Village	48
Religion	Christian	236	Yazidi	17	Not religious	54
Sexual orientation		Heterosexual		289	Homosexual	22
Education	University degree	234	Attended college	36	Completed high school	41
Occupation	Professional	215	Manual worker	42	Unemployed	54
Income	Above average	67	Average	142	Below average	102
Brazil, N$_{total}$ = 282						
Age	Young	122	Middle-aged	133	Elderly	27
Ethnicity	White	166	Black	25	Mixed race	91
Gender	Female	142	Male	140		
Place of upbringing	Capital city	135	Regional town	130	Village	17
Religion	Catholic	122	Evangelical	101	Not religious	59
Political views	Apolitical	151	Supports the right	84	Supports the left	47
Education	University degree	168	Completed high school	76	Completed primary school	38
Occupation	Professional	214	Manual worker	61	Unemployed	7
Income	Above average	60	Average	170	Below average	52
India, N$_{total}$ = 329						
Age	Young	161	Middle-aged	146	Elderly	22
Ethnicity	Bihari	69	Bengali	108	Tamil	140
Gender	Female	127	Male	201		

Place of upbringing	Capital city	181	Regional town	109	Village	39
Religion	Hindu	283	Muslim	27	Not religious	19
Caste	Forward Caste	175	OBC	107	Scheduled caste	47
Education	University degree	281	Studied up to high school	33	Studied up to primary school	15
Occupation	Professional	258	Laborer	49	Unemployed	22
Income	Upper class	46	Middle class	256	Lower class	27

Note. Adapted from (Grigoryan et al., 2022, p. 39).

Table S4.1. Fixed and random effect estimates for models predicting attitudes towards a vignette person from vignette and participant characteristics in Australia.

Parameter	Model 1			Model 2			Model 3		
	b	*S.E.*	*p*	*b*	*S.E.*	*p*	*b*	*S.E.*	*p*
				Fixed effects					
Intercept	4.43	0.06	<.001	4.26	0.08	<.001	4.44	0.21	< .001
Level 1 (Within-Persons)									
Vignette dimensions									
Age: Young	Ref.								
Age: Middle–aged	0.03	0.03	.264	0.01	0.03	.845	0.01	0.03	.765
Age: Elderly	0.05	0.03	.076	0.04	0.03	.098	0.04	0.03	.093
Gender: Female	Ref.								
Gender: Male	-0.08	0.02	<.001	-0.07	0.02	<.001	-0.07	0.02	.001
Ethnicity: European Australian	Ref.								
Ethnicity: Asian Australian	-0.05	0.03	.085	-0.02	0.03	.448	-0.03	0.03	.395
Ethnicity: Aboriginal Australian	0.02	0.03	.495	0.03	0.03	.367	0.02	0.03	.394
Place: Capital city	Ref.								
Place: Regional town	0.06	0.03	.024	0.07	0.03	.015	0.06	0.03	.030
Place: Village	0.04	0.03	.123	0.05	0.03	.063	0.05	0.03	.105
Religion: Christian	Ref.								
Religion: Muslim	-0.34	0.03	<.001	-0.27	0.03	<.001	-0.29	0.03	< .001
Religion: Not religious	-0.05	0.03	.047	-0.05	0.03	.058	-0.05	0.03	0.078
Language: Native Australian	Ref.								
Language: Fluent non–native	0.02	0.03	.378	0.02	0.03	.497	0.02	0.04	.535
Language: Not fluent	-0.13	0.03	<.001	-0.12	0.04	<.001	-0.12	0.04	.002
Education: University	Ref.								
Education: Vocational	-0.04	0.03	.128	-0.05	0.03	.083	-0.04	0.03	.157
Education: High school	-0.14	0.03	<.001	-0.13	0.03	<.001	-0.13	0.03	< .001
Occupation: Professional	Ref.								
Occupation: Tradesperson	-0.04	0.03	.106	-0.04	0.03	.112	-0.04	0.03	.156
Occupation: Unemployed	-0.25	0.03	<.001	-0.21	0.03	< .001	-0.22	0.03	< .001
Income: Above average	Ref.								
Income: Average	0.005	0.03	.842	0.003	0.03	.911	0.001	0.03	.981
Income: Below average	-0.11	0.03	<.001	-0.12	0.03	< .001	-0.12	0.03	< .001
Shared group membership									
Age (ingroup)				0.05	0.02	.025	0.05	0.03	.034
Gender (ingroup)				0.03	0.02	.218	0.03	0.02	.184
Ethnicity (ingroup)				0.04	0.03	.198	0.04	0.03	.211
Place (ingroup)				0.02	0.02	.343	0.01	0.02	.623
Religion (ingroup)				0.15	0.02	< .001	0.14	0.03	< .001
Language (ingroup)				0.002	0.03	.950	-0.001	0.04	.983
Education (ingroup)				0.04	0.02	.111	0.03	0.02	.209
Occupation (ingroup)				0.05	0.03	.056	0.05	0.03	.044
Income (ingroup)				0.003	0.02	.910	0.001	0.02	.964
Level 2 (Between-Persons)									
Age: Young	Ref.								
Age: Middle–aged							-0.01	0.15	.929
Age: Elderly							0.06	0.17	.727
Gender: Female	Ref.								
Gender: Male							-0.20	0.10	.043
Ethnicity: European Australian	Ref.								
Ethnicity: Asian Australian							-0.31	0.22	.151
Ethnicity: Aboriginal Australian							-0.27	0.14	.059
Place: Capital city	Ref.								

Parameter	Model 1			Model 2			Model 3		
	b	*S.E.*	*p*	*b*	*S.E.*	*p*	*b*	*S.E.*	*p*
Place: Regional town							-0.02	0.10	.856
Place: Village							0.08	0.16	.619
Religion: Christian	Ref.								
Religion: Muslim							0.69	0.28	.012
Religion: Not religious							-0.08	0.10	.388
Language: Native Australian	Ref.								
Language: Fluent non–native							0.16	0.16	.299
Language: Not fluent							0.22	0.39	.570
Education: University	Ref.								
Education: Vocational							0.10	0.12	.395
Education: High school							0.19	0.16	.222
Occupation: High-skilled	Ref.								
Occupation: Low-skilled							-0.07	0.10	.483
Occupation: Unemployed							0.26	0.31	.403
Income: Above average	Ref.								
Income: Average							-0.05	0.14	.706
Income: Below average							-0.23	0.15	.122
				Random parameters					
Intercept (Between-Persons)	.745	.86		.747	.87		.684	.83	
Residual (Within-Persons)	.389	.62		.383	.62		.383	.62	
AIC	7916			7883			7586		
BIC	8040			8063			7869		
Log-likelihood	-3938			-3913			-3747		
Marginal R^2	.039			.043			.097		
Conditional R^2	.670			.676			.676		

Note. Empty model: AIC = 8278, BIC = 8296, log-likelihood = -4136. Intercept variance = 0.743 (*SD* = 0.86), residual variance = 0.439 (*SD* = 0.66), ICC = .628. Marginal R^2 = proportion of variance explained by fixed effects; Conditional R^2 = proportion of variance explained by fixed and random effects. Reproduced from (Grigoryan et al., 2022, Supplemental Materials, p. 14).

Table S4.2. Fixed and random effect estimates for models predicting attitudes towards a vignette person from vignette and participant characteristics in Armenia.

Parameter	Model 1			Model 2			Model 3		
	b	S.E.	p	b	S.E.	p	b	S.E.	p
					Fixed effects				
Intercept	4.54	0.09	< .001	3.70	0.15	< .001	3.44	0.19	< .001
Level 1 (Within-Persons)									
Vignette dimensions									
Age: Young	Ref.								
Age: Middle–aged	-0.18	0.04	< .001	-0.22	0.05	< .001	-0.22	0.05	< .001
Age: Elderly	-0.18	0.04	< .001	-0.23	0.05	< .001	-0.23	0.05	< .001
Gender: Female	Ref.								
Gender: Male	-0.13	0.04	< .001	-0.09	0.04	.013	-0.08	0.04	0.033
Ethnicity: Armenian	Ref.								
Ethnicity: Russian	-0.16	0.05	< .001	-0.03	0.07	.628	-0.04	0.07	0.592
Ethnicity: Yazidi	-0.10	0.05	.045	0.04	0.07	.589	0.03	0.07	0.637
Place: Capital city	Ref.								
Place: Regional town	0.04	0.04	.315	0.06	0.04	.201	0.06	0.04	0.174
Place: Village	-0.06	0.04	.193	-0.06	0.05	.213	-0.06	0.05	0.215
Religion: Christian	Ref.								
Religion: Yazidi	-0.19	0.06	.002	-0.05	0.07	.420	-0.06	0.07	0.398
Religion: Not religious	-0.30	0.04	< .001	-0.19	0.05	< .001	-0.20	0.05	< .001
Sexual orientation: Heterosexual	Ref.								
Sexual orientation: Homosexual	-1.37	0.04	< .001	-0.80	0.07	< .001	-0.75	0.07	< .001
Education: University	Ref.								
Education: Vocational	-0.19	0.04	< .001	-0.19	0.05	< .001	-0.20	0.05	< .001
Education: High school	-0.10	0.04	.026	-0.10	0.05	.048	-0.11	0.05	.039
Occupation: Professional	Ref.								
Occupation: Low–skilled	-0.30	0.04	< .001	-0.32	0.05	< .001	-0.33	0.05	< .001
Occupation: Unemployed	-0.75	0.05	< .001	-0.76	0.05	< .001	-0.77	0.05	< .001
Income: Wealthy	Ref.								
Income: Average	0.14	0.04	.001	0.16	0.04	< .001	0.16	0.04	< .001
Income: Poor	-0.14	0.04	.002	-0.13	0.04	.002	-0.13	0.04	.002
Shared group membership									
Age (ingroup)				-0.07	0.04	.144	-0.07	0.04	.141
Gender (ingroup)				0.08	0.04	.034	0.08	0.04	.025
Ethnicity (ingroup)				0.17	0.07	.011	0.17	0.07	.012
Place (ingroup)				-0.03	0.04	.487	-0.03	0.04	.465
Religion (ingroup)				0.18	0.05	<.001	0.17	0.05	<.001
Sexual orientation (ingroup)				0.65	0.07	<.001	0.72	0.07	<.001
Education (ingroup)				-0.02	0.05	.691	-0.03	0.05	.590
Occupation (ingroup)				-0.01	0.04	.740	-0.02	0.04	.610
Income (ingroup)				-0.10	0.04	.010	-0.10	0.04	.007
Level 2 (Between-Persons)									
Age: Young	Ref.								
Age: Middle–aged							-0.24	0.14	.082
Age: Elderly							0.42	0.19	.029
Gender: Female	Ref.								
Gender: Male							0.22	0.11	.053
Ethnicity: Armenian	Ref.								
Ethnicity: Russian							0.07	0.21	.754
Ethnicity: Yazidi							0.12	0.91	.899
Place: Capital city	Ref.								
Place: Regional town							0.20	0.12	.084

Parameter	Model 1			Model 2			Model 3		
	b	S.E.	p	b	S.E.	p	b	S.E.	p
Place: Village							0.05	0.15	.726
Religion: Christian	Ref.								
Religion: Yazidi							0.32	0.89	.720
Religion: Not religious							0.06	0.15	.685
Sexual orientation: Heterosexual	Ref.								
Sexual orientation: Homosexual							1.30	0.21	< .001
Education: University	Ref.								
Education: Vocational							-0.13	0.18	.467
Education: High school							0.03	0.17	.841
Occupation: Professional	Ref.								
Occupation: Low–skilled							-0.07	0.17	.693
Occupation: Unemployed							0.08	0.15	.594
Income: Above average	Ref.								
Income: Average							-0.09	0.13	.489
Income: Below average							-0.01	0.15	.926
	Random parameters								
Intercept (Between-Persons)	.792	.89		.839	.92		.651	.81	
Residual (Within-Persons)	.949	.97		.910	.95		.904	.95	
AIC	9390			9186			9071		
BIC	9505			9354			9336		
Log-likelihood	-4676			-4565			-4491		
Marginal R^2	.229			.242			.314		
Conditional R^2	.580			.606			.602		

Note. Empty model: AIC = 10678, BIC = 10697, log-likelihood = -5336. Intercept variance = 0.739 (*SD* = 0.86), residual variance = 1.52 (*SD* = 1.23), ICC = .327. Marginal R^2 = proportion of variance explained by fixed effects; Conditional R^2 = proportion of variance explained by fixed and random effects. Reproduced from (Grigoryan et al., 2022, Supplemental Materials, p. 16)

Table S4.3. Fixed and random effect estimates for models predicting attitudes towards a vignette person from vignette and participant characteristics in Brazil.

Parameter	Model 1			Model 2			Model 3		
	b	S.E.	p	b	S.E.	p	b	S.E.	p
				Fixed effects					
Intercept	4.65	0.08	< .001	4.43	0.09	< .001	4.50	0.20	< .001
Level 1 (Within-Persons)									
Vignette dimensions									
Age: Young	Ref.								
Age: Middle–aged	-0.06	0.03	.100	-0.06	0.03	.057	-0.06	0.03	.054
Age: Elderly	-0.02	0.03	.457	-0.03	0.03	.316	-0.03	0.03	.315
Gender: Female	Ref.								
Gender: Male	-0.08	0.03	.003	-0.09	0.03	.001	-0.09	0.03	.001
Ethnicity: White	Ref.								
Ethnicity: Mixed race	0.02	0.03	.614	0.02	0.03	.635	0.02	0.03	.637
Ethnicity: Black	0.04	0.03	.280	0.05	0.04	.171	0.05	0.04	.174
Place: Capital city	Ref.								
Place: Regional town	<.001	0.03	.999	-0.001	0.03	.986	-0.001	1.03	.977
Place: Village	0.02	0.03	.581	0.04	0.03	.203	0.04	0.03	.204
Religion: Catholic	Ref.								
Religion: Evangelical	-0.04	0.03	.226	-0.03	0.03	.358	-0.03	0.03	.359
Religion: Not religious	-0.02	0.03	.493	0.02	0.03	.488	0.02	0.03	.491
Political views: Apolitical	Ref.								
Political views: Right	-0.13	0.03	<.001	-0.07	0.03	.035	-0.07	0.03	.035
Political views: Left	-0.15	0.03	<.001	-0.05	0.03	.170	-0.05	0.03	.172
Education: University	Ref.								
Education: High school	-0.04	0.04	.329	-0.04	0.04	.334	-0.04	0.04	.329
Education: Primary school	-0.02	0.04	.587	-0.01	0.04	.765	-0.01	0.04	.764
Occupation: Professional	Ref.								
Occupation: Low–skilled	0.02	0.05	.691	-0.03	0.05	.598	-0.03	0.05	.608
Occupation: Unemployed	-0.03	0.04	.563	-0.09	0.05	.084	-0.09	0.05	.088
Income: Rich	Ref.								
Income: Average	0.07	0.04	.035	0.06	0.04	.080	0.06	0.04	.079
Income: Poor	0.15	0.04	< .001	0.15	0.04	< .001	0.15	0.04	< .001
Shared group membership									
Age (ingroup)				-0.01	0.03	.668	-0.01	0.03	.664
Gender (ingroup)				0.03	0.03	.222	0.03	0.03	.233
Ethnicity (ingroup)				0.02	0.03	.559	0.02	0.03	.570
Place (ingroup)				0.06	0.03	.039	0.06	0.03	.038
Religion (ingroup)				0.20	0.03	< .001	0.20	0.03	< .001
Political views (ingroup)				0.27	0.03	< .001	0.27	0.03	< .001
Education (ingroup)				0.03	0.03	.388	0.03	0.03	.376
Occupation (ingroup)				-0.09	0.04	.031	-0.09	0.04	.033
Income (ingroup)				0.02	0.03	.420	0.02	0.03	.427
Level 2 (Between-Persons)									
Age: Young	Ref.								
Age: Middle–aged							-0.04	0.12	.775
Age: Elderly							0.31	0.21	.150
Gender: Female	Ref.								
Gender: Male							-0.09	0.12	.426
Ethnicity: White	Ref.								
Ethnicity: Mixed race							0.20	0.13	.120
Ethnicity: Black							0.29	0.22	.177
Place: Capital city	Ref.								

Parameter	Model 1			Model 2			Model 3		
	b	*S.E.*	*p*	*b*	*S.E.*	*p*	*b*	*S.E.*	*p*
Place: Regional town							0.15	0.12	.204
Place: Village							0.05	0.26	.854
Religion: Catholic	Ref.								
Religion: Evangelical							0.13	0.13	.322
Religion: Not religious							-0.34	0.16	.029
Political views: Apolitical	Ref.								
Political views: Right							-0.20	0.15	.172
Political views: Left							-0.06	0.17	.720
Education: University	Ref.								
Education: High school							-0.09	0.14	.514
Education: Primary school							0.06	0.19	.760
Occupation: Professional	Ref.								
Occupation: Low–skilled							-0.19	0.15	.214
Occupation: Unemployed							-0.13	0.37	.722
Income: Above average	Ref.								
Income: Average							-0.02	0.15	.913
Income: Below average							-0.20	0.19	.292
	Random parameters								
Intercept (Between-Persons)	.903	.95		.903	.95		.823	.91	
Residual (Within-Persons)	.496	.70		.467	.68		.467	.68	
AIC	6900			6760			6770		
BIC	7019			6933			7043		
Log-likelihood	-3430			-3351			-3339		
Marginal R^2	.008			.028			.086		
Conditional R^2	.648			.669			.669		

Note. Empty model: AIC = 6931, BIC = 6949, log-likelihood = -3463. Intercept variance = 0.901 (*SD* = 0.95), residual variance = 0.509 (*SD* = 0.71), ICC = .639. Marginal R^2 = proportion of variance explained by fixed effects; Conditional R^2 = proportion of variance explained by fixed and random effects. Reproduced from (Grigoryan et al., 2022, Supplemental Materials, p. 18).

Table S4.4. Fixed and random effect estimates for models predicting attitudes towards a vignette person from vignette and participant characteristics in India.

Parameter	Model 1			Model 2			Model 3		
	b	S.E.	p	b	S.E.	p	b	S.E.	p
				Fixed effects					
Intercept	4.49	0.08	< .001	4.29	0.10	< .001	4.18	0.21	< .001
Level 1 (Within-Persons)									
Vignette dimensions									
Age: Young	Ref.								
Age: Middle–aged	0.02	0.03	.500	0.02	0.03	.444	0.02	0.03	.560
Age: Elderly	0.02	0.03	.542	0.03	0.03	.435	0.00	0.03	.889
Gender: Female	Ref.								
Gender: Male	-0.10	0.03	< .001	-0.11	0.03	< .001	-0.10	0.03	< .001
Ethnicity: Bihari	Ref.								
Ethnicity: Bengali	0.04	0.03	.156	0.04	0.03	.237	0.04	0.03	.243
Ethnicity: Tamil	0.06	0.03	.050	0.05	0.03	.159	0.06	0.03	.066
Place: Capital city	Ref.								
Place: Regional town	-0.02	0.03	.620	-0.02	0.03	.643	-0.04	0.03	.222
Place: Village	0.005	0.03	.876	0.004	0.03	.917	-0.02	0.03	.538
Religion: Hindu	Ref.								
Religion: Muslim	-0.11	0.03	< .001	0.04	0.05	.346	0.06	0.05	.157
Religion: Not religious	-0.06	0.03	.080	0.11	0.05	.024	0.10	0.05	.036
Caste: Forward castes	Ref.								
Caste: Scheduled castes	-0.06	0.03	.054	-0.04	0.03	.204	-0.04	0.03	.228
Caste: OBC	-0.03	0.03	.314	-0.02	0.03	.463	-0.03	0.03	.352
Education: University	Ref.								
Education: High school	-0.07	0.03	.041	-0.11	0.05	.022	-0.13	0.05	.009
Education: Primary school	-0.17	0.04	< .001	-0.21	0.05	< .001	-0.23	0.05	< .001
Occupation: Professional	Ref.								
Occupation: Low–skilled	-0.10	0.04	.009	-0.11	0.05	.021	-0.12	0.05	.009
Occupation: Unemployed	-0.21	0.04	< .001	-0.21	0.04	< .001	-0.22	0.05	< .001
Income: Rich	Ref.								
Income: Average	0.10	0.03	< .001	0.07	0.04	.067	0.08	0.04	.050
Income: Poor	0.10	0.03	.003	0.10	0.03	.002	0.07	0.03	.038
Shared group membership									
Age (ingroup)				0.02	0.03	.602	0.02	0.03	.460
Gender (ingroup)				0.03	0.03	.277	0.02	0.03	.474
Ethnicity (ingroup)				0.08	0.03	.003	0.07	0.03	.006
Place (ingroup)				<0.001	0.03	.996	-0.02	0.03	.491
Religion (ingroup)				0.21	0.04	< .001	0.20	0.04	<.001
Caste (ingroup)				0.04	0.03	.147	0.04	0.03	.172
Education (ingroup)				-0.05	0.04	.221	-0.08	0.05	.112
Occupation (ingroup)				-0.001	0.04	.975	-0.001	0.04	.977
Income (ingroup)				0.05	0.04	.134	0.02	0.04	.563
Level 2 (Between-Persons)									
Age: Young	Ref.								
Age: Middle–aged							0.29	0.11	.007
Age: Elderly							-0.39	0.21	.067
Gender: Female	Ref.								
Gender: Male							0.07	0.11	.503
Ethnicity: Bihari	Ref.								
Ethnicity: Bengali							0.27	0.15	.065
Ethnicity: Tamil							0.30	0.14	.033
Place: Capital city	Ref.								

Parameter	b	S.E.	p	b	S.E.	p	b	S.E.	p
		Model 1			Model 2			Model 3	
Place: Regional town							0.02	0.12	.868
Place: Village							0.25	0.21	.219
Religion: Hindu	Ref.								
Religion: Muslim							0.57	0.19	.003
Religion: Not religious							0.07	0.22	.768
Caste: Forward castes	Ref.								
Caste: Scheduled castes							0.43	0.17	.015
Caste: OBC							0.10	0.12	.401
Education: University	Ref.								
Education: High school							-0.04	0.19	.818
Education: Primary school							-0.89	0.56	.112
Occupation: Professional	Ref.								
Occupation: Low–skilled							-0.36	0.18	.042
Occupation: Unemployed							-0.54	0.23	.021
Income: Upper class	Ref.								
Income: Middle class							-0.27	0.15	.074
Income: Lower class							-0.54	0.33	.106
				Random parameters					
Intercept (Between-Persons)	.961	.98		.960	.98		.759	.87	
Residual (Within-Persons)	.530	.73		.523	.72		.494	.70	
AIC	8256			8237			7717		
BIC	8378			8414			7995		
Log-likelihood	-4108			-4089			-3812		
Marginal R^2	.017			.021			.121		
Conditional R^2	.651			.655			.653		

Note. Empty model: AIC = 8376, BIC = 8394, log-likelihood = -4185. Intercept variance = 0.960 (*SD* = 0.98), residual variance = 0.558 (*SD* = 0.75), ICC = .633. Marginal R^2 = proportion of variance explained by fixed effects; Conditional R^2 = proportion of variance explained by fixed and random effects. Reproduced from (Grigoryan et al., 2022, Supplemental Materials, p. 20)

Country-Level Moderators

Context can moderate the effects of group memberships on attitudes through normative regulations and by shaping perceptions of permeability of group boundaries and of stability and legitimacy of status relations (Ellemers, 1993; Paluck & Green, 2009). When theorizing about the role of context, we focus on sociocultural categories (ethnicity, religion) to represent belief-indicative groups and socioeconomic categories (education, occupation, income) to represent status-indicative groups. We propose that societal-level acceptance of cultural diversity, which reflects inclusive social norms, moderates the effects of sociocultural group memberships on attitudes; and the level of inequality, which reflects permeability of group boundaries, moderates the effects of socioeconomic group memberships on attitudes.

Acceptance of Cultural Diversity and Ingroup Bias

Group norm theory (GNT) postulates that prejudice is a product of socialization (Sherif & Sherif, 1953). Prejudice is acquired by internalizing the normatively prescribed and proscribed forms of prejudice (Crandall et al., 2002). Changes in perceived group norms lead to changes in expressions of prejudice and discriminatory behavior (Crandall et al., 2002; Paluck, 2009). When prejudice is normalized, people express higher levels of prejudice (Crandall et al., 2018; Jackson et al., 2019), and when exposed to more inclusive social norms, they express more inclusive attitudes (Paluck & Green, 2009). At the societal level, the average acceptance of cultural diversity reflects the inclusivity of social norms. We expect that ingroup bias on sociocultural dimensions is weaker in contexts with higher acceptance of cultural diversity (H-S1).

Inequality and Preference for Higher Status

A generic preference for higher status results from members of high-status group showing preference for the ingroup and members of low-status groups showing preference

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for high-status outgroups. Available evidence suggests that outgroup favoritism is more likely to occur when the group boundaries are permeable: The easier it is to move from a low-status to a higher-status group, the less low-status group members identify with the ingroup and the more they favor the outgroup (Ellemers et al., 1988; Tausch et al., 2015). At the societal level, permeability of group boundaries for socioeconomic groups is reflected in social mobility: the higher social mobility, the easier it is to move from a lower-status group to a higher-status one. Since at the time of study planning a global index of social mobility did not exist and social mobility is closely associated with inequality (Corak, 2013), we used country-level inequality as a proxy. We theorize that in more economically equal countries meritocratic beliefs are widespread. People living in such countries are more likely to believe that higher status in a societal hierarchy is an indicator of personal talent and work ethic rather than luck. In contrast, people living in more unequal countries are less likely to believe that higher status is a personal achievement (Grigoryan et al., 2020). We therefore expect to find a stronger preference for higher-status others in contexts with lower levels of inequality (H-S2).

Country selection

To assess the moderating role of social context, we employ a quasi-experimental design: we follow Boehnke et al.'s (2011) advice and use purposive sampling at the country level, selecting four countries that represent contrast cases for country-level acceptance of cultural diversity (ACD) and inequality.

To select countries with extreme levels of acceptance of cultural diversity (hereafter – ACD), we used the World Value Survey data, wave 6 (WVS, 2015). The index is calculated based on the item "On this list are various groups of people. Could you please mention any that you would not like to have as neighbors?" (Examples of groups listed: "drug addicts", "homosexuals", "people of a different race", etc.). Four social groups were selected as related

to cultural diversity: "people of a different race", "immigrants/foreign workers", "people of a different religion", and "people who speak a different language". If the respondent mentioned a group, then a score of 1 was given on the index, so the resulting index varied from 0 (none of the groups were mentioned) to 4 (all four groups were mentioned). The country scores varied from 0.09 (high acceptance) to 2.08 (low acceptance), with the mean of 0.79 across 60 countries represented in WVS, wave 6. The mean Cronbach's alpha for this index was 0.67 across WVS countries. The index was recoded so that higher scores indicate higher acceptance. This measure highly correlates with the Migrant Integration Policy Index (Huddleston et al., 2015), which speaks for its reliability ($r = .71^{**}$). Fig. S1 shows the list of countries with highest and lowest ACD scores.

To select countries with extreme levels of (in)equality, we used the Human Development Report 2015 (UNDP, 2015). Two indicators were taken into account: inequality in income (distribution in household income, the Atkinson inequality index) and inequality in education (distribution in years of schooling, the Atkinson inequality index). The two indicators correlate at $r = .30^{***}$. The index of inequality was calculated as the sum of the two indicators. Fig. S2 shows the list of countries with highest and lowest levels of inequality based on this combined index.

The indices of ACD and inequality are orthogonal ($r = -.05^{n.s.}$) and can be used to select four contrasting cases. To identify countries that will represent contrast cases, we selected those countries that scored half a standard deviation below or above the mean on both indices and grouped them accordingly: low inequality, high acceptance (group 1), low inequality, low acceptance (group 2), high inequality, high acceptance (group 3), and high inequality, low acceptance (group 4). Using stricter criteria (one standard deviation or above) resulted in one of the four quadrants being empty. Group 1 included Australia, Netherlands, Poland, Slovenia, Spain, Sweden, Trinidad and Tobago, Uruguay, and Uzbekistan; group 2:

Armenia, Azerbaijan, Cyprus, Georgia, Japan, Kyrgyzstan, and Palestine; group 3: Brazil,

Colombia, Egypt, Peru, and Rwanda; group 4: India and Yemen. All these countries satisfy

the selection criteria, so we chose one country per group based on feasibility considerations

(language of data collection and access to collaborators). The final set of countries included

Australia (group 1), Armenia (group 2), Brazil (group 3), and India (group 4).

Figure S1

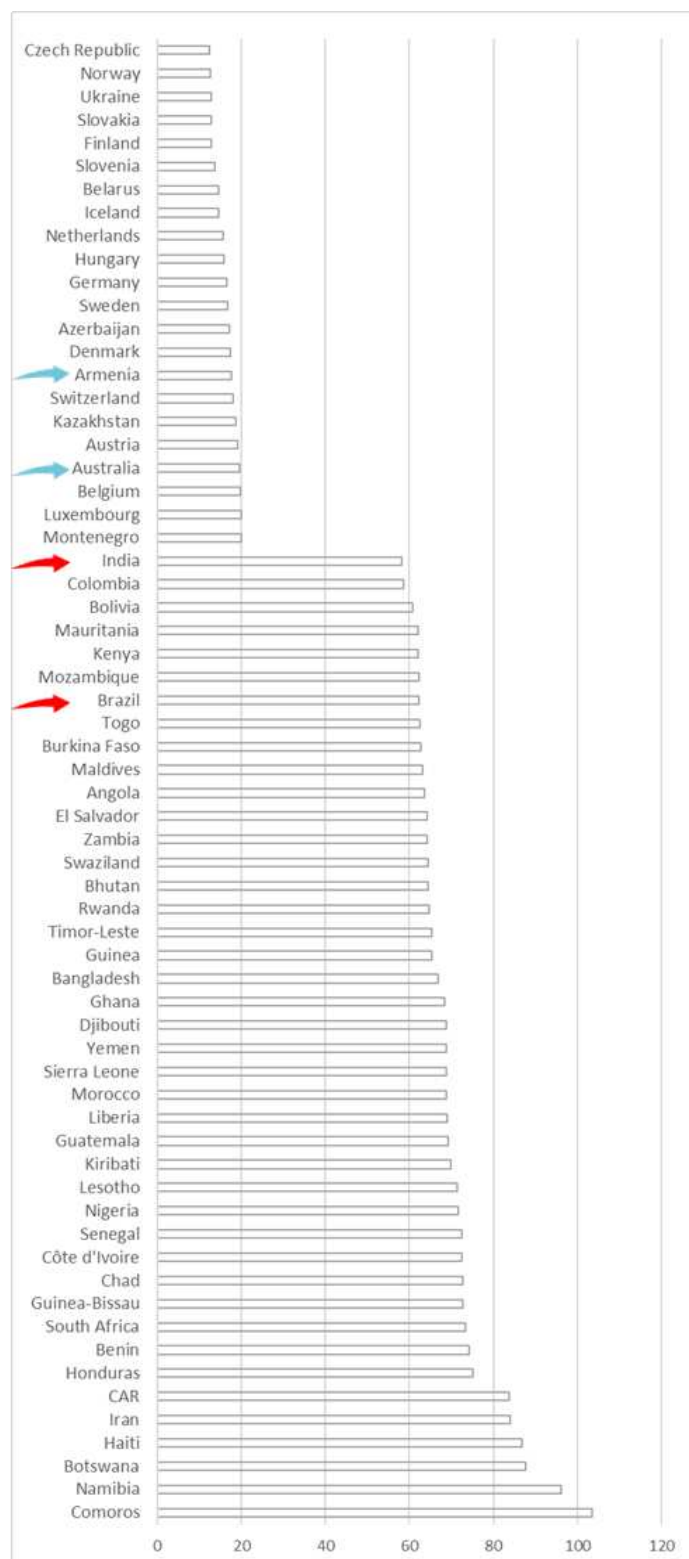*List of countries with highest and lowest scores on acceptance of cultural diversity*

Note. Higher scores indicate more acceptance (4-pt scale). Countries in the sample are marked with arrows.

Figure S2

List of countries with highest and lowest levels of income and educational inequality

Note. Higher scores indicate more inequality. Countries in the sample are marked with arrows.

Results

To test our predictions regarding contextual moderators, we pooled the data from all countries into a single dataset, including country as a fixed effect. Two dummy variables reflected the participant's country of residence in high vs. low ACD country and high vs. low inequality country. The interactions between ACD and ethnic and religious ingroup membership tested H-S1 and the interactions between inequality and education, occupation, and income tested H-S2.

The multilevel models with cross-level interaction effects are presented in Tables S5.1 and S5.2. We predicted that ingroup bias on sociocultural dimensions will be weaker in countries with higher ACD (H-S1). The slopes of ethnic and religious ingroup membership on attitude varied significantly across individuals ($\sigma^2_{u1} = .003$, $p = .002$ for ethnicity and $\sigma^2_{u1} = .025$, $p < .001$ for religion). The test of cross-level interactions (Figure 2) indicated that preference for ethnic ingroup members was stronger in low ACD countries ($b = .06$, $SE = .03$, $t(9944) = 2.04$, $p = .041$, 95% CI [.002, .13]). No such effect was observed for religion ($b = -.06$, $SE = .03$, $t(1377) = -1.76$, $p = .079$, 95% CI [−.12, .01]).

Figure S3. Ethnic and Religious Ingroup Bias as a Function of Country-Level Acceptance of Cultural Diversity.
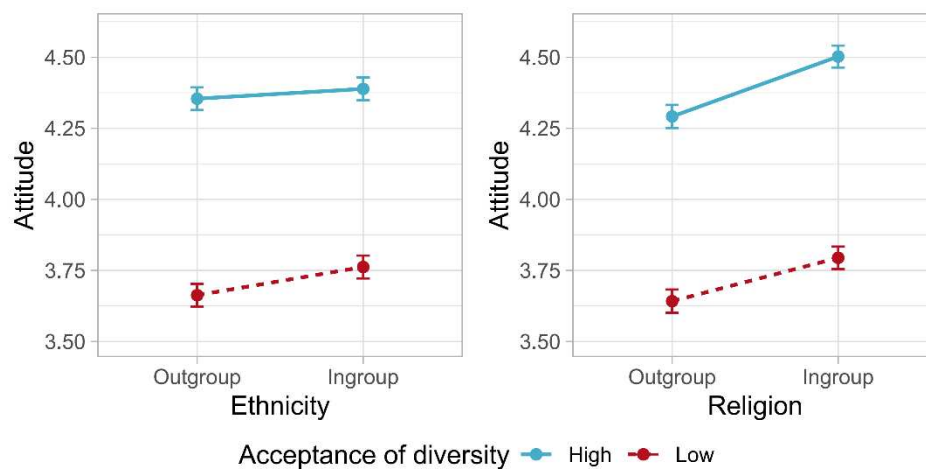
For socioeconomic dimensions, we expected to find a stronger preference for higher-status others in countries with lower levels of inequality (H-S2). We found significant variation in slopes across individuals for occupation (σ^2_{u1} = .12, p < .001) and income (σ^2_{u1} = .05, p = .008), but not for education (σ^2_{u1} = .001, p = .528). The cross-level interactions (Figure 3) supported our expectations: countries with a lower level of inequality showed a stronger preference for higher-status others. For occupation, the largest difference was observed in evaluations of the unemployed targets, who were perceived more negatively in more equal countries (b = .30, SE = .04, t(1437) = 7.47, p < .001, 95% CI [.22, .38]). For income, the level of inequality strongly affected the evaluations of the poor (b = .26, SE = .04, t(1445) = 7.07, p < .001, 95% CI [.19, .33]). Although the random slope of the level of education on attitude did not vary significantly between individuals, the interaction effect of education with country-level inequality was consistent with the hypothesis: participants in countries with lower inequality showed a stronger preference for better-educated targets (b = .11, SE = .04, t(10996) = 2.96, p = .003, 95% CI [.04, .17]).

Figure S4. Effects of Target's Socioeconomic Status on Attitudes as a Function of Country-Level Inequality.
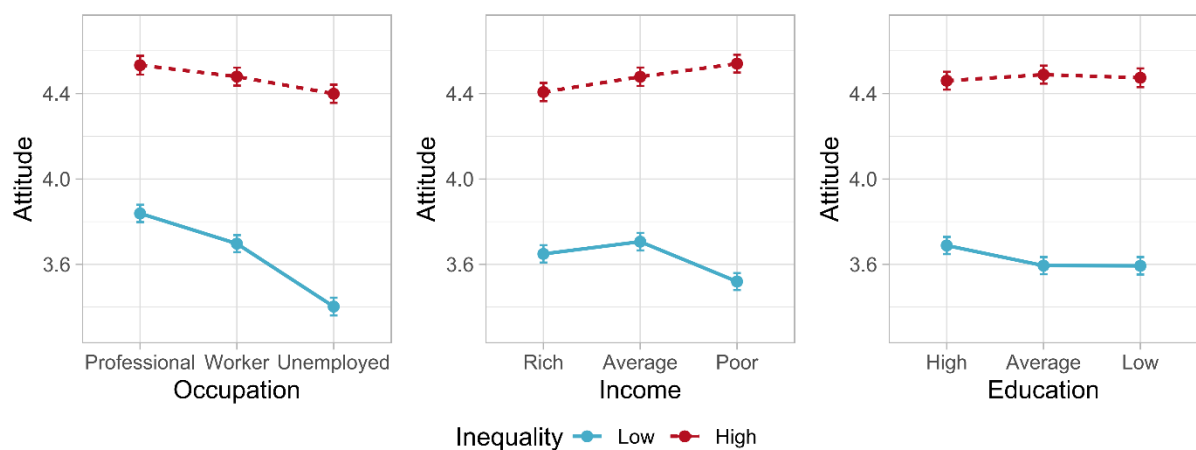
Alternative moderators

We tested some other related moderators to rule out alternative explanations. As alternatives to ACD, we tested the moderating role of country-level tightness-looseness

(Gelfand et al., 2021) and individualism-collectivism (Hofstede et al., 2010) on the effect of ethnic and religious ingroup membership on attitude. Neither tightness ($b = 0.06$, $SE = .06$, $p = .259$) nor individualism ($b = -0.001$, $SE = .001$, $p = .159$) explained country-level variation in the strength of ethnic ingroup bias. For religion, individualism had no moderating effect ($b = <0.001$, $SE = .001$, $p = .958$), but religious ingroup bias was weaker in tighter countries ($b = -0.19$, $SE = .06$, $p = .001$). Interestingly, when testing ACD as a continuous moderator, we found a similar effect: religious ingroup bias was stronger in more accepting countries ($b = -0.07$, $SE = .03$, $p = .013$). This contradictory finding might be explained by the peculiarity of religion as a social category. Religion itself is a "tight" category, in that it entails a clear set of normative beliefs and expectations prescribed to the members of the group. Individuals in countries that are more normatively loose and accepting of diversity are more likely be non-religious and can have negative sentiments about people who adhere to strict religious norms and practices. However, with only four countries included in the study, this can only be considered as weak evidence and further research with more countries is necessary to test the association between country-level tightness-looseness or acceptance of diversity and strength of religious ingroup bias.

As alternatives to objective inequality, we tested the moderating effects of subjective income inequality and GDP per capita. To measure subjective inequality, we asked participants "In your opinion, how equally is income distributed in [Country] society?". The scores were aggregated at country level. The effects of subjective inequality were consistent with that of objective inequality for education and occupation: the more equal participants perceived their country to be, the stronger preference for higher-status targets they showed (education low vs. high: $b = -0.16$, $SE = .03$, $p = < .001$, occupation unemployed vs. professional: $b = -0.10$, $SE = .04$, $p = .017$). However, we found no moderation effect for income ($b = -0.002$, $SE = .04$, $p = .958$). GDP per capita moderated the effects of education

and income in the same direction: higher-status others were liked more in richer countries (education low vs. high: b = -0.04, SE = .02, p = .038; income low vs. high: b = -0.06, SE = .02, p = .001). However, the effect of occupation was reversed, such that individuals in richer countries had more positive evaluations of manual workers and the unemployed (manual worker vs. professional: b = 0.05, SE = .02, p = .006; unemployed vs. professional: b = 0.06, SE = .02, p = .001). To sum up, objective inequality was the only consistent moderator of the effects of all three status dimensions on attitude.

Discussion

The contextual influences go beyond the type of information inferred from group memberships. We found weaker ingroup bias on the dimension of ethnicity in countries where acceptance of cultural diversity is the societal norm. This finding is in line with GNT (Crandall et al., 2002; Sherif & Sherif, 1953), which describes prejudice as a product of socialization. One of the central points of criticism of GNT is that norms might reduce the expressions of prejudice but not personal beliefs (Crandall et al., 2002). If it were only the expression of prejudice that was suppressed in countries with higher acceptance of cultural diversity, we would expect similar suppression effects for ethnicity and religion. However, religion induced strong ingroup bias in all countries. Going back to the idea that ingroup bias emerges from perceived belief dissimilarity, we can re-interpret the mechanism through which inclusive social norms reduce prejudice. Inclusive social norms might be accompanied by the process of individuation, wherein group membership is disassociated from the beliefs and values of the group. The positive effect of social norms may then be limited by how strongly specific beliefs are ascribed to members of a group. It might be easier to accept that someone's ethnicity does not reflect their beliefs than to disentangle someone's religion or political ideology from their beliefs.

Context played an even larger role in how participants reacted to targets' socioeconomic group memberships. The positive effects of higher levels of education and occupation were stronger in countries with low inequality. In countries with low inequality, social mobility is typically high. When group boundaries are permeable, individuals in low-status groups prefer individual mobility as a strategy of identity maintenance, which leads to dis-identification with the ingroup and favoring of the higher status outgroup (Brown & Wade, 1987; Ellemers et al., 1988). Our findings are in line with this reasoning, showing yet another example of the "irony of meritocracy" (Kuppens et al., 2018). When inequality is high, moving up the social ladder proves to be difficult. People observe the children of the rich and powerful become rich and powerful, and the children of the poor and disadvantaged being trapped in the cycle of poverty. It is then hard to see the ones at the top as deserving their position, and higher status does not have the same positive connotation it has in more equal societies (see also Grigoryan et al., 2020).

The test of socio-structural moderators was limited to four countries. These countries cannot be considered representative of the global variation in inequality and acceptance of diversity. With this limited evidence at hand, we cannot predict whether these findings would replicate if a different set of countries was selected. Moreover, the labels chosen to reflect low, average, and high-status groups in each country could have affected the results. We aimed for functional equivalence rather than an exact match in labels, maximizing the comparability of samples in meaning; however, this approach has its limitations, as a perfect equivalence in meaning is difficult to achieve. A larger cross-cultural study with additional steps in data collection process to ensure the comparability of group labels would allow a more robust test of the role of country-level contextual moderators in person evaluations.

Table S5.1. Cross-level interactions between country-level acceptance of cultural diversity and shared group membership on the dimensions of ethnicity and religion in predicting attitudes.

Parameter	Model 1			Model 2 — Model 2a			Model 2 — Model 2b			Model 3 — Model 3a			Model 3 — Model 3b		
	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p
							Fixed effects								
Intercept	4.08	0.06	< .001	4.08	0.06	< .001	4.10	0.06	< .001	4.10	0.06	< .001	4.10	0.06	< .001
Level 1 (Within-Persons)															
Vignette dimensions															
Age: Young															
Age: Middle–aged	-0.04	0.02	.030	-0.04	0.02	.033	-0.04	0.02	.031	-0.04	0.02	.033	-0.04	0.02	.029
Age: Elderly	-0.03	0.02	.146	-0.03	0.02	.144	-0.03	0.02	.136	-0.03	0.02	.134	-0.03	0.02	.131
Gender: Female															
Gender: Male	-0.08	0.01	< .001	-0.08	0.01	< .001	-0.08	0.01	< .001	-0.08	0.01	< .001	-0.08	0.01	< .001
Ethnicity: Majority															
Ethnicity: Minority1	0.01	0.02	.548	0.02	0.02	.397	0.01	0.02	.542	0.01	0.02	.507	0.01	0.02	.531
Ethnicity: Minority2	0.03	0.02	.073	0.04	0.02	.034	0.04	0.02	.055	0.04	0.02	.066	0.04	0.02	.063
Place: Capital city															
Place: Regional town	0.03	0.02	.077	0.03	0.02	.073	0.03	0.02	.084	0.03	0.02	.077	0.03	0.02	.085
Place: Village	0.01	0.02	.559	0.01	0.02	.558	0.01	0.02	.517	0.01	0.02	.587	0.01	0.02	.493
Religion: Majority															
Religion: Minority	-0.09	0.02	< .001	-0.09	0.02	< .001	-0.09	0.02	< .001	-0.09	0.02	< .001	-0.10	0.02	< .001
Religion: Not religious	-0.03	0.02	.125	-0.03	0.02	.131	-0.03	0.02	.138	-0.03	0.02	.121	-0.04	0.02	.053
Country-specific: Majority															
Country-specific: Minority1	-0.26	0.02	< .001	-0.26	0.02	< .001	-0.26	0.02	< .001	-0.26	0.02	< .001	-0.26	0.02	< .001
Country-specific: Minority2	-0.13	0.02	< .001	-0.13	0.02	< .001	-0.14	0.02	< .001	-0.13	0.02	< .001	-0.14	0.02	< .001
Education: High															
Education: Average	-0.04	0.02	.041	-0.04	0.02	.044	-0.04	0.02	.037	-0.04	0.02	.047	-0.04	0.02	.035
Education: Low	-0.05	0.02	.014	-0.05	0.02	.015	-0.05	0.02	.013	-0.05	0.02	.016	-0.05	0.02	.013
Occupation: High															
Occupation: Average	-0.11	0.02	< .001	-0.11	0.02	< .001	-0.11	0.02	< .001	-0.11	0.02	< .001	-0.11	0.02	< .001
Occupation: Low	-0.30	0.02	< .001	-0.30	0.02	< .001	-0.30	0.02	< .001	-0.30	0.02	< .001	-0.30	0.02	< .001

Parameter	Model 1			Model 2a			Model 2b			Model 3a			Model 3b		
					Model 2						Model 3				
	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p
Income: High															
Income: Average	0.07	0.02	< .001	0.07	0.02	< .001	0.07	0.02	< .001	0.07	0.02	< .001	0.07	0.02	< .001
Income: Low	<.01	0.02	.832	<.01	0.02	.807	<.01	0.02	.779	<.01	0.02	.771	<.01	0.02	.775
Shared group membership															
Age (ingroup)	0.02	0.02	.128	0.02	0.02	.151	0.02	0.02	.138	0.02	0.02	.143	0.02	0.02	.138
Gender (ingroup)	0.04	0.01	.002	0.04	0.01	.002	0.04	0.01	.003	0.04	0.01	.002	0.04	0.01	.003
Ethnicity (ingroup)	0.07	0.02	< .001	0.07	0.02	< .001	0.07	0.02	< .001	0.03	0.02	.151	0.07	0.02	< .001
Place (ingroup)	0.01	0.02	.573	0.01	0.02	.556	0.01	0.02	.514	0.01	0.02	.558	0.01	0.02	.528
Religion (ingroup)	0.18	0.02	< .001	0.19	0.02	< .001	0.18	0.02	< .001	0.18	0.02	< .001	0.21	0.02	< .001
Country-specific (ingroup)	0.28	0.02	< .001	0.28	0.02	< .001	0.28	0.02	< .001	0.28	0.02	< .001	0.28	0.02	< .001
Education (ingroup)	0.01	0.02	.574	0.01	0.02	.582	0.01	0.02	.587	0.01	0.02	.591	0.01	0.02	.591
Occupation (ingroup)	-0.01	0.02	.481	-0.01	0.02	.454	-0.01	0.02	.486	-0.01	0.02	.452	-0.01	0.02	.469
Income (ingroup)	-0.02	0.02	.205	-0.02	0.02	.207	-0.02	0.02	.244	-0.02	0.02	.212	-0.02	0.02	.250
Level 2 (Between-Persons)															
Country-level ACD (low)	-0.67	0.05	< .001	-0.66	0.05	< .001	-0.69	0.05	< .001	-0.69	0.06	< .001	-0.65	0.06	< .001
Country-level Inequality (high)	0.85	0.05	< .001	0.84	0.05	< .001	0.82	0.05	< .001	0.84	0.05	< .001	0.82	0.05	< .001
Cross-level interactions															
Ethnicity (ingroup) *ACD										0.06	0.03	.041			
Religion (ingroup) * ACD													-0.06	0.03	.079
Random parameters															
Residual (Within-Persons)	0.658	.81		0.657	.81		0.652	.81		.657	.81		0.652	.81	
Ethnicity (ingroup) / Intercept				0.909	.95					.909	.95				
Ethnicity (ingroup) / Slope				0.003	.06	.002				.003	.06	.002			
Religion (ingroup) / Intercept							0.950	.98					0.950	.98	
Religion (ingroup) / Slope							0.025	.16	<.001				0.024	.16	< .001
AIC		34352			34343			34306			34341			34304	
BIC		34583			34589			34552			34594			34558	
Log-likelihood		-17145			-17138			-17120			-17136			-17118	

Note. Model 1 = Fixed effects model, Model 2 = Model 1 + random slopes for Ethnicity (ingroup) and Religion (ingroup), Model 3 = Model 2 + interactions

Table S5.2. Cross-level interactions between country-level inequality and vignette person's education, occupation, and income in predicting attitudes.

Parameter	Model 1									Model 2					
	Model 1a			Model 1b			Model 1c			Model 2b			Model 2c		
	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p
Intercept	4.08	0.06	< .001	4.08	0.06	< .001	4.08	0.06	< .001	4.12	0.06	< .001	4.13	0.06	< .001
Level 1 (Within-Persons)															
Vignette dimensions															
Age: Young															
Age: Middle–aged	-0.04	0.02	.031	-0.04	0.02	.027	-0.04	0.02	.024	-0.04	0.02	.020	-0.04	0.02	.010
Age: Elderly	-0.03	0.02	.145	-0.03	0.02	.095	-0.03	0.02	.110	-0.03	0.02	.061	-0.03	0.02	.106
Gender: Female															
Gender: Male	-0.08	0.01	< .001	-0.08	0.01	< .001	-0.08	0.01	< .001	-0.08	0.01	< .001	-0.08	0.01	< .001
Ethnicity: Majority															
Ethnicity: Minority1	0.01	0.02	.565	0.01	0.02	.452	0.01	0.02	.500	0.01	0.02	.512	0.01	0.02	.442
Ethnicity: Minority2	0.03	0.02	.078	0.04	0.02	.043	0.03	0.02	.075	0.04	0.02	.032	0.03	0.02	.082
Place: Capital city															
Place: Regional town	0.03	0.02	.077	0.03	0.02	.077	0.03	0.02	.067	0.03	0.02	.059	0.03	0.02	.069
Place: Village	0.01	0.02	.542	0.01	0.02	.571	0.01	0.02	.580	0.01	0.02	.595	0.01	0.02	.697
Religion: Majority															
Religion: Minority	-0.09	0.02	< .001	-0.09	0.02	< .001	-0.09	0.02	< .001	-0.09	0.02	< .001	-0.08	0.02	< .001
Religion: Not religious	-0.03	0.02	.120	-0.03	0.02	.103	-0.03	0.02	.117	-0.03	0.02	.132	-0.03	0.02	.162
Country-specific: Majority															
Country-specific: Minority1	-0.26	0.02	< .001	-0.26	0.02	< .001	-0.27	0.02	< .001	-0.26	0.02	< .001	-0.26	0.02	< .001
Country-specific: Minority2	-0.13	0.02	< .001	-0.13	0.02	< .001	-0.13	0.02	< .001	-0.14	0.02	< .001	-0.13	0.02	< .001
Education: High															
Education: Average	-0.04	0.02	.041	-0.03	0.02	.067	-0.04	0.02	.027	-0.04	0.02	.031	-0.05	0.02	.009
Education: Low	-0.05	0.02	.014	-0.05	0.02	.010	-0.05	0.02	.009	-0.07	0.02	<.001	-0.06	0.02	.004
Occupation: High															
Occupation: Average	-0.11	0.02	< .001	-0.11	0.02	< .001	-0.11	0.02	< .001	-0.14	0.03	< .001	-0.11	0.02	< .001
Occupation: Low	-0.30	0.02	< .001	-0.30	0.02	< .001	-0.30	0.02	< .001	-0.44	0.03	< .001	-0.29	0.02	< .001
Income: High															
Income: Average	0.07	0.02	< .001	0.07	0.02	< .001	0.07	0.02	< .001	0.08	0.02	< .001	0.06	0.02	.025

Parameter	Model 1									Model 2					
	Model 1a			Model 1b			Model 1c			Model 2b			Model 2c		
	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p
Income: Low	<.01	0.02	.845	<.01	0.02	.740	<0.01	0.02	.844	<0.01	0.02	.982	-0.13	0.02	< .001
Shared group membership															
Age (ingroup)	0.02	0.02	.128	0.02	0.02	.145	0.02	0.02	.156	0.02	0.02	.133	0.02	0.02	.189
Gender (ingroup)	0.04	0.01	.003	0.04	0.01	.002	0.04	0.01	.002	0.04	0.01	.001	0.04	0.01	.002
Ethnicity (ingroup)	0.06	0.02	< .001	0.06	0.02	< .001	0.07	0.02	< .001	0.06	0.02	< .001	0.07	0.02	< .001
Place(ingroup)	0.01	0.02	.580	0.01	0.02	.590	0.01	0.02	.589	0.01	0.02	.581	0.01	0.02	.553
Religion (ingroup)	0.18	0.02	< .001	0.18	0.02	< .001	0.18	0.02	< .001	0.18	0.02	< .001	0.18	0.02	< .001
Country-specific (ingroup)	0.28	0.02	< .001	0.29	0.02	< .001	0.29	0.02	< .001	0.29	0.02	< .001	0.29	0.02	< .001
Education (ingroup)	0.01	0.02	.608	0.01	0.02	.531	0.01	0.02	.640	0.01	0.02	.570	0.01	0.02	.647
Occupation (ingroup)	-0.01	0.02	.510	-0.01	0.02	.695	-0.01	0.02	.548	<.01	0.02	.998	-0.01	0.02	.535
Income (ingroup)	-0.02	0.02	.201	-0.02	0.02	.202	-0.02	0.02	.168	-0.02	0.02	.230	<0.01	0.02	.836
Level 2 (Between-Persons)															
Country-level ACD (low)	-0.66	0.05	< .001	-0.64	0.05	< .001	-0.69	0.05	< .001	-0.63	0.05	< .001	-0.69	0.05	< .001
Country-level Inequality (high)	0.84	0.05	< .001	0.81	0.05	< .001	0.88	0.05	< .001	0.69	0.06	< .001	0.76	0.06	< .001
Cross-level interactions															
Occupation: Average * Inequality										0.09	0.04	.024			
Occupation: Low * Inequality										0.30	0.04	< .001			
Income: Average * Inequality													0.01	0.04	.694
Income: Low * Inequality													0.26	0.04	< .001
Random parameters															
Residual (Within-Persons)	0.657	.81		0.636	.80		0.648	.80		0.635	.80		0.646	.80	
Education / Intercept	0.845	.92													
Education / Slope	.0002/.001	.01/.04	.528												
Occupation / Intercept				0.867	.93					0.866	.93				
Occupation / Slope				.03/.12	.17/.35	< .001				.03/.10	.17/.32	< .001			
Income / Intercept							0.900	.95					0.897	.95	
Income / Slope							.02/.05	.15/.22	.008				.02/.04	.14/.20	.058
AIC		34358			34311			34346			34252			34287	

Parameter	Model 1									Model 2					
	Model 1a			Model 1b			Model 1c			Model 2b			Model 2c		
	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p	Est.	S.E.	p
BIC		34626			34580			34615			34536			34571	
Log-likelihood		-17143			-17120			-17137			-17088			-17106	

Note. Model 1 = random slopes for education, occupation, and income. Model 2 = Model 1 + interactions.

Table S6. Sample characteristics (Study 2)

	Australia	India
Gender	57% women 42% men 1% non-binary	24% women 76% men
Age	$M = 31.3$, $SD = 9.5$	$M = 30.8$, $SD = 5.2$
Ethnicity	65% European Australian 27% as Asian Australian 3% Aboriginal Australian 5% "Not listed"	76% Tamil 2% Bengali 1% Bihari 21% "Not listed"
Religion	69% not religious 20% Christian 4% Muslim 4% Buddhist 3% "Not listed"	68% Hindu 22% Christian 7% Muslim 3% "Not religious"
Education	63% university degree 20% vocational training 17% high school or lower	88% university degree 12% high school or lower
Occupation	56% professional 13% tradesperson 19% unemployed 12% "other"	72% professional 14% laborer 11% unemployed 3% "other"
Income	21% higher than average 61% average income 18% lower than average	11% higher than average 84% average income 5% lower than average
Language	82% native English speaker 8% fluent in English	
Caste		43% OBC 33% Forward caste 24% Scheduled caste/tribe

Table S7. BISI scale reliability: Multilevel CFA

	Australia								India							
	Level 1 (within)				Level 2 (between)				Level 1 (within)				Level 2 (between)			
Items	*b*	*SE*	*β*	*p*	*b*	*SE*	*β*	*p*	*b*	*SE*	*β*	*p*	*b*	*SE*	*β*	*p*
Belief-indicative (BI)																
Values	1.00		.89		1.00		0.99		1.00		.50		1.00		1.00	
Beliefs	0.97	0.04	.88	<.001	1.04	0.03	1.00	<.001	0.96	0.10	.48	<.001	1.03	0.04	0.99	<.001
Trustworthy	0.38	0.02	.48	<.001	1.00	0.05	0.97	<.001	0.90	0.10	.47	<.001	1.12	0.04	0.98	<.001
Status-indicative (SI)																
Successful	1.00		.90		1.00		1.01		1.00		.60		1.00		1.00	
High / low status	0.94	0.03	.85	<.001	0.95	0.05	0.91	<.001	0.83	0.08	.50	<.001	0.91	0.04	0.98	<.001
Competent	0.75	0.02	.75	<.001	1.07	0.04	0.97	<.001	0.80	0.08	.51	<.001	1.00	0.04	0.98	<.001
Model fit	CFI = .966, TLI = .936, RMSEA = .085, SRMR (within) = .098, SRMR (between) = .012								CFI = .996, TLI = .992, RMSEA = .019, SRMR (within) = .014, SRMR (between) = .007							

Scale invariance

To test the measurement invariance of the BISI scale, we ran a multigroup CFA across 20 groups (10 targets x 2 countries). The model fit indices and the modifications made to the scale are presented in Table S8. Given the large sample size ($N = 2960$) and equal sample size across groups ($N = 148$), we used the cutoff criteria of ΔCFI $\geq$ -.010 and ΔRMSEA $\geq$ .015 (Chen, 2007) as indicators of noninvariance.

Table S8. Configural, metric, and scalar invariance of the BISI scale across target groups and countries.

	CFI	RMSEA	SRMR	ΔCFI	ΔRMSEA
Configural	.971	.139	.023		
Metric (all loadings constrained)	.953	.118	.077	-.018	-.021
Partial metric (all loadings except "trust" constrained)	.964	.108	.061	-.007	-.031
Scalar (all loadings except "trust" and all intercepts constrained)	.942	.117	.078	-.022	.009
Partial scalar (all loadings except "trust" and all intercepts except "competence" constrained)	.958	.103	.070	-.006	-.005

The configural model showed a reasonably good fit, suggesting that the items form two factors across all target groups and countries. Full metric invariance was not established: although RMSEA improved, the CFI showed a significantly poorer fit for the constrained vs. unconstrained model. The largest differences were found in the loadings of the "trust" item. After removing the equality constraint for this item, partial metric invariance was established. Similarly, full scalar invariance was not achieved. Largest variation was observed for the intercepts of the "competence" item. Partial scalar invariance was established after freeing the intercept of this item.

The belief- and status-indicativeness of groups (BISI) scale

English version

Imagine the only thing you know about someone is their [group]. What can you tell about this person?

	You cannot tell at all (1)	(2)	You can tell to some extent (3)	(4)	You can tell for sure (5)
Can you tell what kind of values this person has? (BI)	○	○	○	○	○
Can you tell what kind of moral beliefs this person has? (BI)	○	○	○	○	○
Can you tell whether this person's values and beliefs are similar to your own? (BI)	○	○	○	○	○
Can you tell how successful this person is? (SI)	○	○	○	○	○
Can you tell if this person has high or low status in the society? (SI)	○	○	○	○	○
Can you tell how competent this person is? (SI)	○	○	○	○	○

German version

Stellen Sie sich vor, dass Sie nichts über eine Person wissen, außer ihre [Gruppe]. Worauf können Sie bei dieser Person schließen?

	Sie können überhaupt nicht darauf schließen (1)	(2)	Sie können einigermaßen darauf schließen (3)	(4)	Sie können mit Sicherheit darauf schließen (5)
Können Sie darauf schließen, welche Werte diese Person hat? (BI)	○	○	○	○	○
Können Sie darauf schließen, welche Moralischen Überzeugungen diese Person hat? (BI)	○	○	○	○	○
Können Sie darauf schließen, ob die Werte und Überzeugungen dieser Person mit Ihren Eigenen übereinstimmen? (BI)	○	○	○	○	○
Können Sie darauf schließen, wie erfolgreich diese Person ist? (SI)	○	○	○	○	○
Können Sie darauf schließen, ob diese Person einen hohen oder niedrigen sozialen Status hat? (SI)	○	○	○	○	○
Können Sie darauf schließen, wie kompetent diese Person ist? (SI)	○	○	○	○	○

Deviations from the preregistered protocol, Study 3

      Sample size. We initially planned to collect only 100 responses due to time

constraints. Although an N of 100 would have been sufficient for the multilevel analyses we

planned, we decided to collect as much data as possible within the time available. We did not analyze the data before the data collection was stopped.

Operationalization of ingroup bias. The preregistered protocol operationalizes bias as within-participant variance of group evaluations within a single dimension of categorization. In the presented analysis, we decided to use a difference score between the evaluation of the ingroup and the average of all outgroup evaluations on the feeling thermometer, as this measure better corresponds to the theoretical meaning of ingroup bias.

The test of the association between BISI and entitativity. We planned to test the link between BISI and the different facets of entitativity as proposed by (Blanchard et al., 2020). Since this extended analysis is not central to the core argument of the paper, we instead present only the link between BISI and the core measure of entitativity.

Analysis following the preregistration protocol, Study 3

We re-analyzed the data to test the core hypothesis of Study 3 following the preregistration protocol. Three changes were made to the analysis presented in the manuscript: we (1) selected the first 100 participants who completed the survey and met the inclusion criteria; (2) re-calculated the BI score using the original trust item from Study 2; and (3) re-calculated the bias score as a within-participant standard deviation of group evaluations within each dimension. We tested a multilevel regression model where BI and SI (unstandardized) predicted the variance in group evaluations. Both BI ($b = 4.52$, $SE = 0.49$, $p < .001$) and SI ($b = 0.86$, $SE = 0.34$, $p = .013$) predicted more variance in group evaluations.

It is important to keep in mind that variance in group evaluations simply captures how different group evaluations within a dimension of categorization are. A larger variance score could indicate a preference for the ingroup or an outgroup, as well as preference for groups with higher, lower, or average status. Nevertheless, the link with BI was 5 times stronger than the link with SI, suggesting that perceived belief-indicativeness of groups creates much larger differences in attitudes than their status-indicativeness.

Table S9. Means, standard deviations, and correlations of aggregated BISI scores with Essentialist Beliefs.

Variable	*M*	*SD*	1	2	3	4	5
1. BI	2.07	0.51					
2. SI	1.92	0.37	.75**				
			[.68, .81]				
3. Essentialism: Biological bases	3.22	0.75	.14	.17*			
			[-.02, .29]	[.01, .32]			
4. Essentialism: Informativeness	3.32	0.66	.30**	.26**	.15		
			[.15, .44]	[.11, .40]	[-.01, .30]		
5. Essentialism: Discreteness	2.76	0.59	.12	.11	.20*	.52**	
			[-.04, .27]	[-.04, .27]	[.05, .35]	[.39, .63]	
6. Essentialism: Total	3.09	0.48	.25**	.25**	.69**	.72**	.75**
			[.10, .39]	[.10, .39]	[.60, .77]	[.64, .79]	[.68, .82]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates $p < .05$. ** indicates $p < .01$.

Table S10. Estimates of a multilevel model predicting ingroup bias, controlling for socio-demographic variables

	b	*SE*	*df*	*t-value*	*p-value*
Intercept	6.45	11.33	114.52	0.57	.570
Woman vs. man	-0.41	2.30	115.54	-0.18	.860
Non-binary vs. man	-13.56	7.81	115.98	-1.74	.085
Age	0.24	0.12	116.30	1.98	.050
Ethnic minority vs. German	2.78	3.49	120.56	0.80	.426
West vs. East Germany	0.74	4.38	114.11	0.17	.866
Education	-0.94	1.17	113.75	-0.81	.421
Student vs. non-student	2.16	3.13	113.36	0.69	.490
Income	2.38	1.33	113.04	1.79	.076
Muslim vs. Christian	-2.83	4.64	115.44	-0.61	.543
Atheist vs. Christian	1.74	2.04	113.35	0.85	.396
Other vs. Christian	0.50	6.23	125.12	0.08	.937
Conservatism	-1.16	1.61	113.74	-0.72	.471
Belief-indicativeness (BI)	**5.27**	**0.62**	**1120.03**	**8.53**	**< .001**
Status-indicativeness (SI)	-0.55	0.55	1083.21	-1.02	.310
Entitativity	**2.46**	**0.69**	**1039.72**	**3.56**	**< .001**
Essentialism	0.36	0.96	116.90	0.37	.713

Note. Significant effects (p < .05) are in bold.

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