Groups' warmth is a personal matter: Understanding consensus on stereotype dimensions reconciles adversarial models of social evaluation[☆],[☆☆]

Alex Koch[a,b,*], Roland Imhoff[b,c], Christian Unkelbach[b], Gandalf Nicolas[d], Susan Fiske[d], Julie Terache[e], Antonin Carrier[f], Vincent Yzerbyt[e]

[a] University of Chicago Booth School of Business, IL, U.S
[b] University of Cologne, Germany
[c] University of Mainz, Germany
[d] Princeton University, NJ, U.S
[e] Catholic University of Louvain, Belgium
[f] University of Bordeaux, France

ABSTRACT

As proponents of two theories of social evaluation, we disagree whether people spontaneously differentiate societal groups' conservative-progressive beliefs (distinct claim of the agency-beliefs-communion or ABC model) or warmth/communion (distinct claim of the stereotype content model or SCM). Our adversarial collaboration provides one way to resolve this debate. Examining people from four continents who differentiated groups in their country ($N = 2356$), we found lower consensus on groups' warmth/communion compared to agency/~competence and beliefs (Studies 1–4). Consensus on groups' warmth/communion was lower because people differed in self-rated agency and beliefs, and they inferred groups' warmth/communion from perceived similarity in agency and beliefs between the groups and the self (Studies 5–8). Previous ABC studies only examined consensual differentiation of groups and thereby did not find evidence for spontaneous differentiation of groups' warmth/communion. Instead, we next examined non-consensual (personal) differentiation of groups: People spontaneously differentiated groups by their agency/~competence, beliefs, and also warmth/communion (Studies 7 and 8). Based on these data, the ABC model and SCM concede that people spontaneously differentiate groups' warmth/communion and beliefs, respectively, providing one way to resolve the models' debate.

1. Introduction

People use group stereotypes (Fiske & Neuberg, 1990). According to the stereotype content model (SCM; Fiske, Cuddy, Glick, & Xu, 2002; for reviews, see Fiske, 2018; Yzerbyt, 2016), people predominantly use the stereotype dimensions warmth and competence. The SCM has been challenged recently by research that brought forth agency/socio-economic status (A; related to, but not the same as, competence) and conservative-progressive beliefs (B) as the dimensions people spontaneously use to stereotype groups when rating their similarity to one another; warmth/communion (C) was not confirmed as a spontaneously used stereotype dimension (ABC model; Koch et al., 2016). In the spirit of curious-constructive debate, theory-driven cumulative science (Fiedler, 2017), and adversarial collaboration, as proponents of the SCM and ABC model we jointly searched for explanations of this discrepancy.

After a talk of the SCM's senior author (Fiske, 2018) at the university at which most ABC model authors taught and conducted research at the time, we began discussing the discrepancy. Further discussion via email substantiated our idea that the key to resolving the discrepancy might be to distinguish between more and less consensual dimensions of group stereotypes. To build trust and at close quarters devise studies and oversee data collection, analysis, and interpretation, the first and junior author of the ABC model (Koch et al., 2016) visited the university and lab of the SCM's senior author. During and after this time, everyone contributed to hypothesizing and designing via email and was kept in the loop. We sought feedback on our interim results and conclusions at several international conferences at which we planned further scientific progress. We present the fruits of our adversarial collaboration here, discussing when and why each model is adequate for understanding how people organize groups along stereotype dimensions (see also Abele, Ellemers, Fiske, Koch, & Yzerbyt, 2020; Ellemers, Fiske, Abele,

Table 1
ABC of stereotypes about social groups.

A (agency/socioeconomic success)	B (conservative-progressive beliefs)	C (communion)
Powerless – Powerful	Traditional – Modern	Untrustworthy – Trustworthy
Low status – High status	Religious – Science-oriented	Dishonest – Sincere
Dominated – Dominant	Conventional – Alternative	Cold – Warm
Poor – Wealthy	Conservative – Liberal	Threatening – Benevolent
Unconfident – Confident		Repellent – Likable
Unassertive – Assertive		Egoistic – Altruistic

Koch, & Yzerbyt, 2020).

1.1. The stereotype content model (SCM)

The SCM (Fiske et al., 2002) posits that people first differentiate groups on a warmth dimension ranging from harmful/suspected to helpful/trustworthy. Thus, people stereotype groups as scoring low to high on warmth. This dimension appears under various labels with slightly different meanings, such as communion (e.g., Abele & Wojciszke, 2007), morality (e.g., Ellemers, 2017; Wojciszke, 1994), trustworthiness (e.g., Oosterhof & Todorov, 2008; Sutherland et al., 2013), other-profitability (e.g., Peeters, 1992), and social goodness (Rosenberg, Nelson, & Vivekananthan, 1968). Next, people secondarily differentiate whether groups are able to act upon their (harmful or helpful) intentions. Thus, people stereotype groups as scoring low to high on competence. This dimension is also known as agency (e.g., Abele & Wojciszke, 2007), dominance (e.g., Oosterhof & Todorov, 2008; Sutherland et al., 2013), self-profitability (Peeters, 1992), and intellectual goodness (Rosenberg et al., 1968).

Several studies show that warmth and competence stereotypes matter. First, the targets of warmth and competence stereotypes are not just groups, but also nations (Bergsieker, Leslie, Constantine, & Fiske, 2012; Cuddy et al., 2009), animals (Sevillano & Fiske, 2016), and even brands (Aaker, Garbinsky, & Vohs, 2012, Kervyn, Fiske, & Malone, 2012). Second and more importantly, warmth and competence stereotypes influence a variety of important responses to groups, including imagined facial appearance (Imhoff, Woelki, Hanke, & Dotsch, 2013), physiological arousal and neurological activity (Harris & Fiske, 2006; van Prooijen, Ellemers, Van Der Lee, & Scheepers, 2018), emotional states (admiration, envy, pity, and contempt; Cuddy, Fiske, & Glick, 2007), behavioral intentions (approach and support; Becker & Asbrock, 2012; Cuddy et al., 2007; Sweetman, Spears, Livingstone, & Manstead, 2013), and communication (Kervyn, Bergsieker, & Fiske, 2012; Swencionis & Fiske, 2016). The priority of warmth over competence stereotypes has received support, too. Ratings of groups' warmth compared to competence matter more for their global evaluation (Brambilla, Sacchi, Pagliaro, & Ellemers, 2013, Brambilla, Sacchi, Rusconi, Cherubini, & Yzerbyt, 2012, Cottrell, Neuberg, & Li, 2007) and intentions to support their members (Brambilla, Hewstone, & Colucci, 2013).

In sum, the SCM showed that people differentiate groups on warmth and competence, that these stereotype dimensions predict theory-driven variables (Abele & Wojciszke, 2014; Paulhus & Trapnell, 2008), and that people seem to prioritize warmth over competence (Fiske, 2018). An approach focusing on spontaneous usage of stereotype dimensions challenged this view, however.

1.2. The agency-beliefs-communion (ABC) model

Recently, Koch et al., 2016 argued that participants in studies testing the SCM could rate groups on dimensions related to warmth and competence only. Thus, these studies did not show that warmth and competence are fundamental dimensions in the sense that people spontaneously use them to stereotype groups. Koch et al., 2016 argued

for studying spontaneous usage of stereotype dimensions.

These authors started by having participants name groups that together form society, to arrive at an ecologically valid sample (Brunswik, 1955, 1956). (The SCM used a similar technique.) Other participants then rated the similarity of the most frequently named groups. The logic behind these similarity ratings is that people must construe similarity with respect to one or another dimension before they rate it. For example, people may construe the similarity of doctors and bankers with respect to warmth, competence, or any other desired dimension. If people use warmth, they might rate the occupations' similarity as low; if they use competence, their might rate their similarity as high. Because people can rate group similarity with respect to any desired dimension(s), similarity ratings provide access to the dimensions people spontaneously use to stereotype groups.

To extract the dimensions participants had spontaneously used to stereotype the groups, a mean similarity rating was computed for each group pair. These mean similarity ratings were visualized in a statistically well-fitting two-dimensional (2D) space (for a review of multi-dimensional scaling, see Hout, Papesh, and Goldinger, 2013). In this space, groups' mean similarity was given by their Euclidean closeness. To identify the two stereotype dimensions that spanned the 2D space, new participants rated the groups on more than twenty candidate dimensions including warmth and competence. A principal component analysis of groups' mean ratings on the candidate dimensions summarized these in the three dimensions (see Table 1) **a**gency/socioeconomic success (A; ~ competence), conservative-progressive **b**eliefs (B), and **c**ommunion(C)/warmth.

To test whether agency/~competence, beliefs, and communion/warmth stereotypes spanned the similarity space, a dimension was rotated around the center of the space. At every rotation angle, groups' coordinates on the rotated dimension were correlated with the groups' mean ratings in agency. The rotation stopped at the angle at which the groups' coordinates on the rotated dimension correlated highest with the groups' mean ratings in agency, and agency was mapped onto the space where the dimension stopped rotating. Mean beliefs and communion were mapped in the same way, an analysis called property fitting (e.g., Koch, Kervyn, Kervyn, & Imhoff, 2018; Lammers et al., 2017).

Groups' mean ratings in agency and beliefs but not communion correlated almost perfectly with the groups' coordinates on a rotation of the dimension. So, agency and beliefs but not communion spanned the 2D space (see Fig. 1), suggesting that participants had spontaneously used agency and beliefs to rate the similarity of the groups. In the ABC view, agency/~competence and beliefs are thus fundamental stereotypes, whereas communion/warmth is not, apparently contradicting the SCM (Fiske et al., 2002).

However, there was a substantial correlation between groups' proximity to the center of the space and the groups' mean ratings on communion/warmth. Thus, communion emerged as centrality in the space spanned by agency and beliefs, suggesting that the relation between agency and communion, and between beliefs and communion, is curvilinear. That is, groups seen as average in agency and beliefs are seen as high in communion, whereas groups seen as extreme in agency and/or beliefs are seen as low in communion. This 2D ABC model of
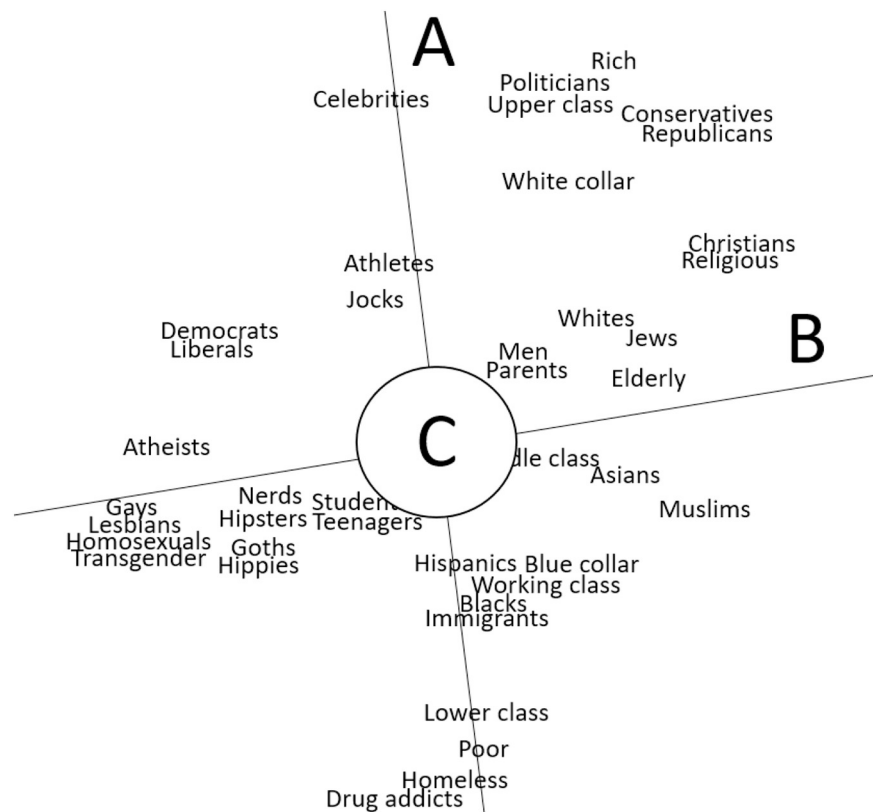
Fig. 1. How consensual/mean-level agency (A), beliefs (B), and communion (C) stereotypes mapped onto consensual/mean-level similarity in Koch et al., 2016.

fundamental stereotypes generalized across four samples of groups located in eight spaces computed based on similarity rated in two ways by >4000 participants (Koch et al., 2016; for related models of fundamental values and traits, see Peabody, 1967, 1985; Peeters, 2008; Schwartz, 1994; Schwartz & Bilsky, 1987). Imhoff and Koch (2017) generalized the curvilinear relation between agency and communion from mean ratings for U.S. and German group samples to mean ratings for 30+ group samples from 20+ countries (see Durante et al., 2013), and to individual ratings for German groups, persons, and animals. Thus, like the SCM, the ABC model has strong empirical support.

1.3. Explaining the Discrepancy: Warmth/Communion Stereotypes may be Less Consensual

The SCM and ABC model overviews highlight their main discrepancy: The SCM's primary warmth/communion dimension is not a spontaneously used dimension according to the ABC model but rather emerges as centrality (i.e., averageness) in the 2D similarity space spanned by the two spontaneously used dimensions agency and beliefs. And the ABC model's spontaneous beliefs dimension is not fundamental according the SCM. To probe this discrepancy, our adversarial collaboration proposes that agency and beliefs stereotypes are more consensual, whereas warmth stereotypes are more personal.

First, the ABC model (Koch et al., 2016) examined the U.S. groups listed most often (i.e., consensually) in response to "[…] what various types of people do you think today's [U.S.] society categorizes into groups?" Most of these consensual groups can be partially to fully defined by low or high agency and/or conservative or progressive beliefs (see Table 2). So, people may use agency and beliefs to consensually compose society (i.e., A and B stereotypes are *societal*). Further, because the main purpose of language is shared reality and mutual understanding, definition entails consensus. Thus, agency and beliefs stereotypes may be *more consensual* because most consensual groups can be partially to fully defined by their agency and/or beliefs.

Second, consistent with 'similarity breeds trust/liking' (Alves, Koch, & Unkelbach, 2017, 2018; Montoya, Horton, & Kirchner, 2008), people may use warmth stereotypes to navigate through society's structure (i.e., agency and beliefs) by stereotyping groups they see as more compatible with their own identity, values, and goals (i.e., groups perceived as more similar to the self in agency and beliefs) as warmer. That is, warmth stereotypes may be more *relational*. If people who differ in self-rated agency infer groups' warmth from perceived self-group similarity in agency, people who rate the self as low versus average versus high in agency should disagree on groups' warmth. And if people who differ in self-rated beliefs and infer groups' warmth from perceived self-group similarity in beliefs, people who rate the self as conservative versus moderate versus progressive in beliefs should also disagree on groups' warmth. This lack of consensus was shown for beliefs and prejudice (Brandt, 2017; Brandt, Reyna, Chambers, Crawford, & Wetherell, 2014; Brandt & Van Tongeren, 2017; Chambers, Schlenker, & Collisson, 2013; Crawford & Brandt, 2019), which is related to warmth. Thus, raters' stereotypes about groups' warmth compared to agency and beliefs may be *more personal*/less consensual.

Crucially, averaging across participants averages out lack of consensus. For example, if rater #1 scores the groups "men" and" women" "0″ and "100″, and if rater #2 scores "men" and "women" "100″ and "0″, both groups' average rating would be the same: 50. If warmth stereotypes are less consensual than agency and beliefs stereotypes, and if an equal number of people spontaneously use agency, beliefs, and warmth stereotypes to rate groups' similarity, groups' perceived similarity averaged across participants would contain less variance in mean perceived warmth compared to mean perceived agency and beliefs. The ABC model's 2D visualization of groups' mean perceived similarity extracted dimensions in the order of high to low variance. Thus, this 2D space (see Fig. 1) may be spanned by groups' mean perceived agency and beliefs and not so much their mean perceived warmth even though an equal number of people spontaneously used agency, beliefs, and warmth stereotypes to rate the groups' similarity in the first place.

Table 2
Most frequently named groups in Studies 1–4.

U.S. (N = 213)	Germany (N = 178)	Tamil Nadu (N = 148)	South Africa (N = 111)
Blacks (50%)	Students (70%)	Gounder (65%)	Coloureds (50%)
Whites (41%)	Children (58%)	Chettiar (56%)	Zulu (45%)
Poor (37%)	Employed (56%)	Iyer (55%)	Indian
Middle class (34%)	Unemployed	Nadar (53%)	Whites (44%)
Rich (33%)	Young (47%)	Vanniyar (52%)	Xhosa (43%)
Hispanics (31%)	Pupils (46%)	Mukkulathor (48%)	Sotho (38%)
Asians (29%)	Pensioners (44%)	Kallar (41%)	Afrikaaners (35%)
Democrats	Muslims (38%)	Mudaliar	Venda (30%)
Republicans	Officials (37%)	Vellalar (39%)	Blacks (28%)
Gays (27%)	Workers (36%)	Paraiyar (33%)	Tswana (24%)
Christians (26%)	Athletes (34%)	Iyengar (30%)	Ndebele (21%)
Liberals	Politicians (33%)	Narikurava (29%)	English (20%)
Conservatives	Migrants	Reddiar (28%)	Poor
Working class (22%)	Artists (31%)	Vannar	Swazi
Transgender (21%)	Middle class	Udayar (23%)	Christians (19%)
Elderly (20%)	Punks (30%)	Desigar (20%)	Rich
Students (19%)	Elderly	Agamudayar (20%)	Muslims (18%)
Lesbians (17%)	Disabled (29%)	Konar	Tsonga (17%)
Women (16%)	Rich	Badagas (19%)	Chinese (15%)
Upper class (15%)	Homeless (28%)	Adi Dravida (17%)	Asians (14%)
Muslims	Christians (27%)	Arunthathiyar (16%)	Pedi (13%)
Athletes	Foreigners	Koravar	Middle class (12%)
Parents	Religious	Brahmin (15%)	Young (11%)
Nerds (14%)	Academics (26%)	Irula	Politicians (9%)
Hippies	Homosexuals	Pallar	Gays
Immigrants	Musicians	Scheduled castes	Educated
Atheists (13%)	Jews (24%)	Iluvar (14%)	Africans (8%)
Blue collar	Trainees	Paliyan (14%)	Businesspeople
Religious	Parents (23%)	Devanga (13%)	Uneducated (7%)
Men (12%)	Vegans (22%)	Muslims	Hindu (6%)
Teenagers	Hipsters	Sengunthar	Working class
White collar	Singles	Naidu (12%)	Foreigners
Politicians	Teachers (21%)	Reddy	Jews
Jocks (11%)	Atheists	Jains (11%)	
Hipsters	Vegetarians (20%)	Kapu	
Celebrities	Poor	Telgugu	
Drug addicts	Urban	Christians	
Homosexuals (10%)	Doctors	Maravar	
Homeless	Heterosexuals	Paravar	
Jews	Families	Pillai	
Goths	Adults		
Lower class	Drug addicts		
	Catholics (19%)		
	Conservatives		
	Self-employed (18%)		
	Welfare recipients		
	Criminals		
	Lower class (16%)		
	Upper class		
	Leftists		
	Rural		
	Libertarians		
	Employers		
	Car drivers (15%)		
	Nerds		
	Educated		
	Buddhists		
	Hippies		
	Environmentalists		

Note. Percentage in parentheses is proportion of participants who spontaneously named the respective group as part of the respective society. Proportion of participants for groups without percentage in parentheses is equal to the next group with percentage in parentheses shown above the respective group without percentage in parentheses. To keep number of groups per study/society between 30 and 60, the inclusion criterion was stricter in Germany (15%) and more lax in South Africa (6%) compared to the U.S. (10%) and Tamil Nadu in India (10%).

Thus, due to averaging out individual-level variance in groups' perceived warmth, the ABC research so far (Koch et al., 2016) may have overlooked warmth as a spontaneously used, fundamental stereotype dimension as claimed by the SCM (Fiske, 2018). Perhaps modeling individual-level variance in groups' perceived similarity based on individual-level variance in groups' perceived agency, beliefs, and warmth shows evidence for spontaneous usage of all three dimensions. If true, the ABC model and SCM would concede that warmth and beliefs can be spontaneously used stereotype dimensions, respectively. In sum, we propose that one key to reconciling the ABC model and SCM lies in distinguishing between more consensual agency and beliefs stereotypes and less consensual warmth stereotypes.

We are not the first to make this distinction (Ashmore & Del Boca, 1979, 1981). The social relations model literature (e.g., Kenny, 1994, 2004; Kenny, Albright, Malloy, & Kashy, 1994; Kenny & West, 2011) also distinguishes between more consensual impressions of individuals' personality (e.g., extraversion and openness to experiences) and less consensual impressions of individuals' likability. We generalize the distinction to impressions of groups (for impressions of faces, see Hehman, Sutherland, Flake, & Slepian, 2017; Sutherland, Rhodes, Burton, & Young, 2019), and we show that it reconciles the ABC model with the SCM.

1.4. The present research

We claim that impressions of groups' agency/socioeconomic success (A) and conservative-progressive beliefs (B) are more consensual, whereas impressions of groups' warmth/communion (C) are less consensual, more personal (Hypothesis #1). Studies 1–4 test the generality of this effect by examining hundreds of people from four continents who rated dozens of groups in their country (U.S., Germany, Tamil Nadu in India, and South Africa). One reason for less consensus on groups' communion compared to agency and beliefs may be that people differ in self-rated agency and beliefs, and they infer groups' communion from perceived self-group similarity in agency and beliefs (Hypothesis #2, see Studies 5 and 6). As illustrated above, mean ratings of groups' similarity may overlook that individuals spontaneously use communion (vs. agency and beliefs) to rate groups' similarity because impressions of groups' communion (vs. agency and beliefs) are less consensual. If this is true, then modeling individual ratings of groups' similarity based on individual ratings of groups' agency, beliefs, and communion should reveal that people spontaneously use agency, beliefs, and communion to rate groups' similarity (Hypothesis #3 tested in Studies 7 and 8). Based on this finding, the ABC model would concede spontaneous usage of warmth/communion, and the SCM would concede spontaneous beliefs stereotypes, at least for rating groups' similarity. This would provide one way to reconcile the SCM (Fiske, 2018; Fiske et al., 2002) with the ABC model (Koch et al., 2016).

From the set of conducted studies, we omit two studies for reasons of brevity. These studies were similar to, and confirmed the results of, Studies 3 and 6. For all studies in this article, we obtained ethics approval where required (Study 6; the other studies were conducted in Germany where obtaining ethics approval is neither required nor a standard practice). We did not pre-register the studies. We report all conditions, measures, and exclusions, and all materials, data, code, and results are available online (https://osf.io/bvpk4/). For all studies in this article, sample size was determined before any data analysis.

Table 3
Greater consensual differences between groups' perceived agency and beliefs, greater non-consensual (personal) differences between groups' communion.

	Group σ^2 (in % of total σ^2)	Group*rater σ^2 (in % of total σ^2)
Study 1 (U.S.; *N* = 201)		
Agency	**0.55 [0.45, 0.67]**	0.28 [0.21, 0.34]
Beliefs	**0.46 [0.36, 0.57]**	0.38 [0.30, 0.45]
Communion	0.16 [0.10, 0.23]	**0.47 [0.41, 0.53]**
Study 2 (Germany; *N* = 142)		
Agency	**0.55 [0.46, 0.65]**	0.31 [0.24, 0.37]
Beliefs	**0.54 [0.45, 0.64]**	0.26 [0.20, 0.31]
Communion	0.17 [0.12, 0.23]	**0.42 [0.37, 0.47]**
Study 3 (Tamil Nadu; *N* = 180)		
Agency	**0.36 [0.26, 0.47]**	0.37 [0.30, 0.43]
Beliefs	**0.13 [0.07, 0.20]**	0.43 [0.36, 0.50]
Communion	0.06 [0.03, 0.09]	**0.55 [0.49, 0.61]**
Study 4 (South Africa; *N* = 192)		
Agency	**0.30 [0.20, 0.42]**	0.35 [0.29, 0.41]
Beliefs	**0.31 [0.21, 0.42]**	0.35 [0.28, 0.41]
Communion	0.10 [0.05, 0.15]	**0.48 [0.42, 0.53]**
Across countries		
Agency	**0.45 [0.40, 0.51]**	0.32 [0.28, 0.35]
Beliefs	**0.37 [0.32, 0.43]**	0.36 [0.33, 0.39]
Communion	0.12 [0.10, 0.15]	**0.48 [0.45, 0.51]**

Note. 95% CIs in brackets. We predicted bold values to turn out as higher within context (i.e., U.S., Germany, Tamil Nadu, South Africa, and across countries) and variance component (i.e., relative group σ^2 and relative group*rater σ^2).

2. Studies 1–4: Groups' communion/warmth is less consensual (more personal) than groups' agency/socioeconomic status and conservative-progressive beliefs

We first report the methods of Studies 1–4, and then report their results and discussion. Studies 1–4 examined raters and groups from the U.S., Germany, the state of Tamil Nadu in India, and South Africa, respectively. Within each country as well as across countries, we used linear mixed models to compare the size of *consensual differences* between groups' perceived agency/socioeconomic success (A), conservative-progressive beliefs (B), and communion (C), and to compare the size of *non-consensual differences* between groups' perceived agency, beliefs, and communion. In linear mixed models, statistical power depends on both participants and stimuli (Judd, Westfall, & Kenny, 2017). Across countries, we sampled > = 200 raters per dimension (i.e., per between-subjects condition) and 174 groups, achieving statistical power of 1-β = .99 to detect medium-size effects (*d* = .5) based on non-overlapping bootstrapped 95% confidence intervals (i.e., with α = .007; Cummings & Finch, 2005). We predicted greater consensual differences between groups' agency and beliefs (vs. communion) and greater non-consensual (personal) differences between groups' communion (vs. agency and beliefs). To anticipate our results, the large gaps between the respective 95% confidence intervals (CIs) in Table 3, all *p*s < = .001, all *d*s > = .57, show the robustness of these two key findings of Studies 1–4.

2.1. Methods

2.1.1. Study 1: Groups and raters from the U.S.

We paid 201 U.S. American MTurkers (100 women, 100 men, 1 prefer not to say; *M* = 37.93 years, *SD* = 12.93) $1 to "rate 42 groups on a dimension twice." Raters scored all 42 U.S. groups named by at least 10% of participants in Study 5 in Koch et al., 2016. Participants' instructions in this earlier study were "Off the top of your head, what various types of people do you think today's society categorizes into groups?" This instruction was based on Fiske et al. (2002, p. 883), except that the phrase "based on ethnicity, race, gender, occupation, ability, etc." was dropped to avoid priming groups. Table 2 shows the

42 groups. Raters used bipolar 0–10 slider scales to score the groups one atop the other on agency only, beliefs only, or communion only in random order. Figs. S1–S3 in the online supplementary materials show the verbatim rating instructions. The endpoints of the A, B, and C scales were as shown in Table 1. After rating the groups on one of the three dimensions, raters scored the groups again in random order on the same dimension. Finally, raters provided demographic information.

2.1.2. Studies 2, 3, and 4: Groups and raters from Germany, India, and South Africa

Except for country, the methods of Studies 1–4 were almost the same (see Text S1).

2.1.3. Quantifying consensual and non-consensual differences between groups' perceived agency, beliefs, and communion

We used the R package lme4 (Bates, Maechler, Bolker, & Walker, 2015) to predict groups' perceived agency, beliefs, and communion in separate linear mixed models (Judd, Westfall, & Kenny, 2012; Raudenbush & Bryk, 2002) without fixed effects but with group, rater, and group*rater interaction as random intercepts. As in numerous contributions of the social relations model (Kenny, 1994; Kenny, 2004; Kenny et al., 1994; Kenny & West, 2011), these models partitioned total variance in groups' perceived agency, beliefs, and communion into (1) group variance (i.e., variance of group means obtained by averaging impressions across raters separately for each group), (2) rater variance (i.e., variance of rater means obtained by averaging impressions across groups separately for each rater), (3) group*rater variance (i.e., variance of unique group-rater combination means that is independent of both group and rater variance), and (4) error variance (i.e., variance of the two assessments around the mean of the respective unique group-rater combination). Each rater assessed each group twice because otherwise it would not have been possible to separate group*rater variance from error variance.

Group variance quantified consensual differences between groups (e.g., across raters, "celebrities" scored higher in A compared to "homeless"). Rater variance (e.g., across groups, rater #1 assigned higher A scores compared to rater #2) was not relevant for our hypothesis. Group*rater variance quantified non-consensual differences between groups (e.g., "academics" compared to "white collar" scored higher in A for rater #1, but lower in A for rater #2). Finally, error variance (e.g., rater #1's first compared to second A score for "celebrities" was higher) was not relevant for our hypothesis. Across and within countries, we compared between dimensions the relative size of two of these variance components, namely *group σ^2* and *group*rater σ^2* (for the utility of this variance partitioning approach to understanding face perception, see Hehman et al., 2017; Hönekopp, 2006; Xie, Flake, & Hehman, 2020). Our central predictions were greater consensual (agreed-upon) differences between groups' agency and beliefs compared to communion (see group σ^2 in Table 3), and greater non-consensual (disagreed-upon, i.e., personal) differences between groups' communion compared to agency and beliefs (see group*rater σ^2 in Table 3).

2.2. Results

We bootstrapped 95% CIs around the variances indicating consensual differences between groups (group σ^2), non-consensus on society as a whole and/or scale usage (rater σ^2), non-consensus on differences between groups (group*rater σ^2), and inconsistency in scoring groups (error σ^2; for code and instructions, see Xie et al., 2020). For brevity, Table 3 only shows (95% CIs around) group variance and group*rater variance (the other two σ^2s were irrelevant for our hypotheses; see Table S1 for comparing all non-error σ^2s).

For brevity and rigor, we interpreted non-overlapping 95% CIs (i.e., *p* < .007; Cummings & Finch, 2005) as a statistically meaningful difference. Across countries and within most countries, samples confirmed

greater consensual differences between groups' agency and beliefs compared to communion (compare 95% CIs around group σ^2 in Table 3), as well as greater non-consensual differences between groups' communion compared to agency and beliefs (compare 95% CIs around group*rater σ^2 in Table 3).

2.3. Discussion

Studies 1–4 examined raters around the world (from the U.S., Germany, Tamil Nadu in India, and South Africa) who stereotyped entirely different groups (e.g., Blacks, Whites, employed, punks, Gounder, Chettiar, Coloureds, and Zulu, see Table 2). Consistent with the social relations model literature (Kenny, 1994; Kenny, 2004), the studies' key findings are that agency and beliefs (vs. communion) are more consensual stereotype dimensions, whereas communion (vs. agency and beliefs) is a more personal, less consensual stereotype dimension.

3. Study 5: Groups' communion/warmth may be less consensual (more personal) because people infer it from perceived self-group similarity in agency and beliefs

Study 5 tested whether lower consensus on groups' communion (Studies 1–4) compared to agency and beliefs might be due to people differing in self-rated agency and beliefs, and inferring groups' communion from perceived self-group similarity in agency and beliefs. We reached 291 raters per dimension (i.e., per within-subjects condition) and 42 groups, achieving statistical power of $1-\beta > = 0.99$ to detect medium-size effects ($d = 0.5$) based on 95% confidence intervals excluding 0 ($\alpha = 0.007$). Study 5's key predictions were that perceived communion of groups correlates with their perceived similarity to the self in agency, and with perceived similarity to the self in beliefs. We confirmed both predictions, all $ps < = 0.001$, all $ds > = 0.77$ (see Table 4 below).

3.1. Methods

We paid 291 pretested (see Text S2) MTurkers (140 women, 150 men, 1 prefer not to say; $M = 37.44$ years, $SD = 12.05$) $1 to "rate 42 social groups on 3 dimensions." Raters read "… how [e.g., low A as shown in Table 1 and measured in Study 1] versus [e.g., high A as shown in Table 1 and measured in Study 1] do you think are members of these groups?" Then, they used bipolar 0–10 slider scales (same A, B, and C labels as in Table 1) to score the U.S. groups shown in Table 2

only once on agency, beliefs, and communion in random order on separate screens in the same way as in Study 1. Then, they rated the self on agency, beliefs, and communion on a 0–100 scale (see Text S2) and provided demographic information. There was variance in self-rated agency and beliefs ($M_A = 44.87$, $SD_A = 21.15$; $M_B = 54.07$, $SD_B = 29.52$; $M_C = 79.41$, $SD_C = 15.25$).

3.1.1. Predicting perceived communion of groups from perceived self-group similarity in agency and beliefs

First, we divided self-rated agency and beliefs by 10 each to align the 0–100 scales measuring self-rated agency and beliefs with the 0–10 scales measuring perceived agency and beliefs of groups. Next, we used the R package lme4 (Bates et al., 2015) to predict perceived communion of groups in a linear mixed model (Judd et al., 2012, 2017) with two fixed effects. First, absolute similarity in agency between each group and a rater as perceived by this rater and centered at 5, the midpoint of the agency scale (*similarity in A*). And second, absolute similarity in beliefs between each group and a rater as perceived by this rater and centered at 5, the midpoint of the beliefs scale (*similarity in B*). The random effects structure of the model included group and rater as random intercepts. We constrained all random slope variances to 0 because if estimating them our models would fail to converge (Barr, Levy, Scheepers, & Tily, 2013). We predicted that both fixed effects would emerge as significantly positive, consistent with the idea that lower consensus on groups' communion compared to agency and beliefs is due to people inferring groups' communion from perceived self-group similarity in agency and beliefs.

3.2. Results and discussion

The non-overlap between 0 and the 95% CIs around the *b*s in Table 4 shows that perceived communion of groups independently increased with perceived self-group similarity in agency and beliefs in Study 5, both $ps < 0.007$. In Studies 7 and 8, subsequent to other tasks, U.S. raters scored the top 30 U.S. groups (see Table 2) and the self on agency, beliefs, and communion as in Study 5, which allowed us to retest and replicate this finding (Table 4).

4. Study 6: Perceived self-outgroup similarity in agency and beliefs increases perceived communion/warmth of outgroups and vice versa

Study 6 (vs. Study 5) tested in a more compelling way whether perceiving a group (vs. other groups) as more similar to the self in

Table 4
Perceived communion of groups increased with perceived self-group similarity in agency and beliefs.

	b	*t*	*p*	Est. for min. similarity	Est. for max. similarity
Study 5 (*N* = 291)					
Similarity in agency	0.116 [0.098, 0.134]	12.64	< 0.001	3.87	5.03
Similarity in beliefs	0.254 [0.239, 0.269]	33.30	< 0.001	3.18	5.72
Studies 7 (*N* = 199)					
Similarity in agency	0.209 [0.181, 0.236]	15.08	< 0.001	3.71	5.80
Similarity in beliefs	0.318 [0.298, 0.338]	31.00	< 0.001	3.17	6.35
Studies 8 (*N* = 190)					
Similarity in agency	0.263 [0.235, 0.291]	18.32	< 0.001	3.06	5.69
Similarity in beliefs	0.286 [0.265, 0.306]	27.20	< 0.001	2.94	5.80

Note. 95% CIs in brackets; *b* = estimate. We used the R package lsmeans (Lenth, 2016) to estimate perceived communion of groups for minimum perceived self-group similarity in agency (group and rater scored at the opposite ends of the agency scale) and maximum self-group similarity in agency (same agency score for group and rater); same for beliefs. We thank a stats-savvy reviewer who pointed us to R's brms package (Buerkner, 2017) that through Bayesian estimation increases chance of converge for maximal linear mixed models. Using this package, we refitted all models in Table 4 after specifying all random slopes, their correlation, and their correlation with their random intercept (i.e., we refitted maximal models). Indeed, all models now converged, with near-identical results. In Studies 5, 7, and 8, the Bayesian estimate for the fixed effect of similarity in agency was 0.11 [0.06, 0.15], 0.14 [0.08, 0.20], and 0.21 [0.15, 0.27], and the Bayesian estimate for the fixed effect of similarity in beliefs was 0.19 [0.14, 0.24], 0.25 [0.18, 0.31], and 0.23 [0.17, 0.29], respectively. In Study 6, however, the brms package did not help with convergence of maximal models, and thus we do not report (95% CIs around) Bayesian estimates in Study 6.

agency and beliefs causes people to infer that this group is higher in communion/warmth. Study 5 showed positive correlations between perceived self-group similarity in agency and beliefs and perceived communion of groups. Thus, it could be that perceived self-group similarity in agency and beliefs does not cause people to infer higher communion of groups. In this case, perceived self-group similarity in agency and beliefs does not explain the lower consensus on groups' communion we found in Studies 1–4. To provide more compelling evidence that perceived self-group similarity in agency and beliefs explains lower consensus on groups' communion, Study 6 manipulated perceived self-group similarity in agency and beliefs before measuring perceived communion of groups.

In one condition, people listed one outgroup downright low in agency, another outgroup slightly low in agency, another outgroup slightly high in agency, and another outgroup downright high in agency before they rated all four groups and the self on agency. Computing absolute similarity in agency between each outgroup and rater transformed this manipulation of perceived agency of outgroup into a manipulation of perceived self-outgroup similarity in agency. In a second condition, people listed one outgroup downright conservative in beliefs, another outgroup slightly conservative in beliefs, another outgroup slightly progressive in beliefs, and another outgroup downright progressive in beliefs before they rated all four outgroup and the self on beliefs. Computing absolute similarity in beliefs between each outgroup and rater transformed this manipulation of perceived beliefs of outgroup into a manipulation of perceived self-outgroup similarity in beliefs.

We reached > = 227 raters per between-subjects condition, achieving statistical power of 1-β > = 0.99 to detect medium-size effects (d = 0.5) based on 95% confidence intervals excluding 0 (α = 0.007). Study 6's key predictions were that perceived self-outgroup similarity in agency and beliefs increase perceived communion of outgroups. To anticipate, we confirmed both predictions, all $ps <$ = 0.001, all $ds >$ = 0.44 (see Table 5 below).

4.1. Methods

We paid 961 pretested (see Text S3) MTurkers (476 women, 476 men, 4 other, and 5 prefer not to say; M = 38.04 years, SD = 11.66) \$1 to "list 4 groups and rate them and yourself on 2 dimensions." There were four between-participant conditions:

#1 Raters in the *similarity in A ➔ communion* condition first named four outgroups ("you are not a member of this group"), one "downright powerful/[see Table 1]", one "only slightly powerful […]", one "only slightly powerless/[…]", and one "downright powerless […]". Then, they used 0–100 slider scales to score these outgroups' agency in random order and twice (to increase measurement reliability; we averaged these two scores), and to score agency of the

self four times (we averaged these four scores, too). Then, raters used 0–100 slider scales to score the outgroups' communion in random order and twice (we averaged these two scores, too). Finally, they provided demographic information.

#2 The *similarity in B ➔ communion* condition was the same except that raters named one "downright traditional/[see Table 1]", one "only slightly traditional […]", one "only slightly modern […]", and one "downright modern […]" outgroup before scoring these outgroups' beliefs, beliefs of the self, and the outgroups' communion.

#3 In addition, there was a *communion ➔ similarity in A* condition in which raters first named one "downright trustworthy/[see Table 1]", one "only slightly trustworthy […]", one "only slightly untrustworthy […]", and one "downright untrustworthy […]" outgroup before scoring these outgroups' communion, the outgroups' agency, and agency of the self.

#4 Finally, there was a *communion ➔ similarity in B* condition (Figs. S15–S20 show the verbatim naming and rating instructions in all four conditions).

The first two conditions tested whether perceived self-outgroup similarity in agency and beliefs increase perceived communion of outgroups. The last two conditions tested the reverse direction of influence.

4.1.1. Predicting perceived communion of groups from perceived self-outgroup similarity in agency and beliefs, and vice versa

We divided raters' and outgroups' agency and beliefs scores, and outgroups' communion scores, by 10 to align these with the scales examined in Studies 5, 7, and 8. In the similarity in A ➔ communion condition (#1), we used the R package lme4 (Bates et al., 2015) to predict outgroups' communion in a linear mixed model (Judd et al., 2012) with one fixed effect: Perceived self-outgroup *similarity in A* computed and centered as in Study 5. In the similarity in B ➔ communion condition (#2), the fixed effect was perceived self-outgroup *similarity in B* as computed and centered in Study 5. And for conditions #3 and #4, we exchanged with each other the dependent and independent variables in conditions #1 and #2, respectively. The random effects structure of all models included outgroup and rater as random intercepts. As in Study 5, we constrained all random slope variances to 0 because if estimating them our models would fail to converge (Barr et al., 2013). We predicted the fixed effect in all conditions to emerge as positive and significant.

4.2. Results

For brevity and rigor, we again interpreted non-overlap of a 95% CI with 0 or non-overlap of two 95% CIs (i.e., $p < .007$) as statistically significant. Table 5 shows that perceived self-outgroup similarity in agency increased perceived communion of outgroups (see condition #1), and vice versa (see condition #3), and the regression coefficient

Table 5

Perceived self-outgroup similarity in agency and beliefs increased perceived communion of outgroups more strongly than vice versa in Study 6.

Condition and IV DV	b	t	p	Est. DV for IV = min.	Est. DV for IV = max.
#1 Similarity in A ➔ Communion (N = 249)	0.252 [0.182, 0.323]	7.01	< 0.001	3.33	5.85
#2 Similarity in B ➔ Communion (N = 227)	0.479 [0.425, 0.532]	17.67	< 0.001	2.36	7.15
#3 Communion ➔ Similarity in A (N = 232)	0.158 [0.118, 0.202]	7.44	< 0.001	6.57	8.16
#4 Communion ➔ Similarity in B (N = 253)	0.343 [0.276, 0.412]	11.09	< 0.001	4.68	8.12

Note. 95% CIs in brackets; DV = dependent variable; IV = independent variable; b = estimate; A = agency; B = beliefs. We used the R package lsmeans (Lenth, 2016) to estimate outgroups' perceived communion and perceived self-outgroup similarity in agency and beliefs.

Table 6

Correlating averages (i.e., consensual/mean-level data) versus averaging correlations (i.e., individual-level data) in Studies 7 (N = 199) and 8 (N = 190).

	Correlating averages			Averaging correlations	
	M Koch et al., 2016	Study 7	Study 8	Study 7	Study 8
Dimension					
R(A dim.)	**0.84**	**0.89**	**0.97**	**0.49 [0.46,0.52]**	**0.59 [0.55,0.63]**
R(B dim.)	**0.88**	**0.97**	**0.97**	**0.54 [0.50,0.57]**	**0.55 [0.51,0.59]**
R(C dim.)	0.21	0.59	0.39	**0.46 [0.43,0.49]**	**0.53 [0.49,0.56]**
r(A cent.)	0.15	−0.21	−0.18	−0.03 [−0.07,0.00]	−0.06 [−0.09,-0.02]
r(B cent.)	0.09	0.24	0.13	0.03 [−0.01,0.07]	0.01 [−0.03,0.04]
r(C cent.)	**0.58**	**0.79**	**0.75**	0.14 [0.10,0.18]	0.12 [0.09,0.16]

Note. 95% CIs in brackets. Bold values indicate that agency, beliefs, or communion were better modeled as a dimension (*dim.*) or centrality (*cent.*) in the respective 2D similarity map(s). Correlating averages (i.e., correlating consensual, mean-level similarity with consensual, mean-level A, B, and C), communion was better modeled as centrality, and agency and beliefs were better modeled as a dimension, in Studies 7 and 8 – just as in Koch et al., 2016 ABC research. Averaging correlations (i.e., averaging correlations of individual-level similarity with individual-level A, B, and C), all three dimensions were better modeled as a dimension in Studies 7 and 8. That is, considering (ignoring) non-consensual differences between groups revealed (missed) spontaneous usage of communion for mapping/rating groups' similarity.

$b_{\text{similarity in A} \rightarrow \text{communion}}$ was statistically equal in size compared to the regression coefficient $b_{\text{communion} \rightarrow \text{similarity in A}}$. So, our manipulation of perceived self-outgroup similarity in agency increased perceived communion of outgroups, and the reverse manipulation had a descriptively but not statistically (*p* = .027) smaller effect. Furthermore, self-outgroup similarity in beliefs increased perceived communion of outgroups (see condition #2), and vice versa (see condition #4), and the regression coefficient $b_{\text{similarity in B} \rightarrow \text{communion}}$ was statistically greater in size compared to the regression coefficient $b_{\text{communion} \rightarrow \text{similarity in B}}$. That is, our manipulation of self-outgroup similarity in beliefs increased outgroups' perceived communion, and the reverse manipulation had a significantly (*p* = .001) smaller effect.

4.3. Discussion

Study 6 showed that perceived self-outgroup similarity in agency and beliefs increased perceived communion of outgroups. Thus, lower consensus on groups' communion compared to agency and beliefs (as shown in Studies 1–4) can indeed be explained in terms of raters inferring groups' communion from perceived self-group similarity in agency and beliefs (as suggested in Study 5).

5. Studies 7 and 8: Rediscovering spontaneous usage of communion/warmth stereotypes, reconfirming spontaneous usage of agency and beliefs stereotypes

After establishing and explaining lower consensus on groups' warmth/communion (C) compared to agency/socioeconomic success (A) and conservative-progressive beliefs (B), Studies 7 and 8 aimed to show that reverse-engineering individual-level (vs. mean-level) ratings of groups' similarity based on individual-level (vs. mean-level) ratings of groups' agency, beliefs, and communion provides one way to reconcile the ABC model (Koch et al., 2016) with the SCM (Fiske, 2018; Yzerbyt, 2016).

The SCM (Fiske, 2018) posits that communion is a fundamental stereotype dimension. In contrast, the ABC model (Koch et al., 2016) posits that people do not spontaneously use communion to rate groups' similarity, and thus communion is not fundamental. In the ABC research so far, some raters mapped subjectively more similar groups closer together on the computer screen, and other raters scored these groups' agency, beliefs, and communion. The groups' proximity on the map (i.e., similarity) was averaged across the first set of raters, and the groups' agency, beliefs, and communion was averaged across the second set of raters. This averaging retained consensual but deleted non-consensual (personal) differences between the groups' similarity, agency, beliefs, and communion. Dimensions that ran through the consensual, mean-level map of the groups' similarity predicted their consensual, mean-level agency and beliefs but not communion. The conclusion was

that the first raters had spontaneously used agency and beliefs but not communion to map the groups' similarity, and thus communion is not fundamental. However, evidence for spontaneous usage of communion might have gotten lost in averaging similarity across raters (see Text S4).

The solution to this problem is to predict groups' agency, beliefs, and communion as scored by individual raters from groups' similarity as mapped by the same individual raters, and only then average evidence for spontaneous usage across raters separately for agency, beliefs, and communion. In Study 7 (raters mapping groups' similarity on a blank screen) and Study 8 (raters mapping groups' similarity in a 2D coordinate system), we applied both this alternative analysis of averaging correlations (i.e., modeling stereotypes at the level of individuals) and the status quo analysis of correlating averages (i.e., modeling stereotypes at the level of means) to the same data. For *averaging correlations* (alternative, individual-level analysis), we predicted spontaneous usage of not just agency and beliefs but also communion. For *correlating averages* (status quo, mean-level analysis), however, we predicted spontaneous usage of agency and beliefs only, as has been shown in the ABC research so far (Koch et al., 2016). These two findings would reconcile the main discrepancy between the SCM (Fiske, 2018; Fiske et al., 2002) and ABC model if the two models concede that in addition to agency/~competence, people may spontaneously use communion (concession of the ABC model) and beliefs (concession of the SCM) stereotypes to organize groups by rating their similarity to one another.

In Studies 7 and 8, 199 and 190 raters mapped 30 groups' similarity and then scored their agency, beliefs, and communion (i.e., 199 and 190 per within-subjects condition), respectively, achieving statistical power of 1-β > = 0.99 to detect medium-size effects (*d* = 0.5) with α = 0.007 as in Studies 1–6. Our key predictions were stronger evidence for spontaneous usage of communion when modeling stereotypes at the level of individuals rather than means. To anticipate, we confirmed this prediction in both studies, all *ps* < = 0.001, all *ds* > = 1.28 (see Table 6 below).

5.1. Methods

5.1.1. Study 7: Group mapping (on a blank screen) and scoring by the same raters

We paid 199 MTurk workers (85 women, 113 men, 1 prefer not to say; *M* = 34.41 years, *SD* = 10.79) $2 to "sort 30 social groups on the screen and rate them on 3 dimensions." On the first slide, people read "[…] Your task is to sort 30 social groups on the computer screen according to how similar or dissimilar you perceive these groups to be. […] Please sort the groups as follows: 1) Use the entire screen; 2) place more similar groups closer together; 3) place more dissimilar groups further apart […, for the verbatim instructions, see Figure S21]." People

mapped the top 30 U.S. groups shown in Table 2 (for an example of this efficient spatial arrangement method [SpAM; Koch, Speckmann, & Unkelbach, 2020] to rate similarity, see Figs. S22 and S23; for validations of SpAM, see Hout, Goldinger, & Ferguson, 2013; Koch, Alves, Krüger, & Unkelbach, 2016; for recent applications of SpAM, see Alves, Koch, & Unkelbach, 2016; Koch et al., 2018; Slepian & Koch, 2020). Next, people scored the groups and themselves on agency, beliefs, and communion (M_A = 41.67, SD_A = 20.52; M_B = 70.70, SD_B = 28.48; M_C = 77.14, SD_C = 18.09) as described in Study 5. Finally, they provided demographic information.

5.1.2. Study 8: Group mapping (in a coordinate system) and scoring by the same raters

We paid 190 MTurk workers (82 women, 107 men, 1 prefer not to say; M = 33.58 years, SD = 9.69) $2 to "sort 30 social groups on the screen and rate them on 3 dimensions." On the first slide, people read "[…] Your first task is to rate 30 social groups on two different dimensions of your choice. Choose the two dimensions that you think are most relevant for distinguishing the groups. […] To give a group a higher (lower) rating on the first dimension, move that group further to the right (left). To give a group a higher (lower) rating on the second dimension, move that group further up (down) […]", for the verbatim instructions, see Fig. S24. To help people map the groups (same as in Study 7) on the two dimensions seemingly most relevant for distinguishing them, the screen displayed a coordinate system (i.e., a horizontal and a vertical axis; the two axes crossed in the middle of the sorting screen) during the entire task (see Figs. S25 and S26).

After people had finalized the task, the groups could not be moved any further but remained visible in the coordinate system, and we instructed people to use two text boxes at the bottom of the screen to label the two dimensions they had spontaneously chosen to map the groups (see Fig. S27). On the next screen, people categorized the two dimension labels they had just entered as relating to high agency ("powerful" etc.), low agency ("powerless" etc.), progressive beliefs ("modern" etc.), conservative beliefs ("traditional" etc.), high communion ("sincere" etc.), low communion ("dishonest" etc., Table 1 shows all items), or none of these (see Fig. S28). Next, people scored the 30 groups and themselves on agency, beliefs, and communion (M_A = 46.01, SD_A = 19.74; M_B = 68.32, SD_B = 27.89; M_C = 77.53, SD_C = 16.53) as in Studies 5 and 6. Finally, they indicated their age and sex.

Taken together, Studies 7 and 8 were the same except that the blank space in Study 7 left it up to people to use dimensions for spontaneously mapping the groups, whereas the coordinate system in Study 8 prompted people to choose, use, name, and categorize two relevant dimensions. We prompted people to name their dimensions after they had chosen and used them. The prompt thus did not influence people's choice and usage of dimensions. In other words, Study 8 took a more unforced, non-verbal approach, whereas Study 7 took a more forced, verbal approach to revealing people's spontaneous group stereotypes. We did not expect results to differ between Studies 7 and 8.

5.2. Results

5.2.1. Correlating averages (status quo, mean-level analysis)

For each unique pair of groups mapped by each person, we recorded the Euclidean distance between these two groups as a proportion of the greatest possible Euclidean distance – the diagonal of the screen. A 0 indicated that the two groups had been mapped to the same spot (maximum similarity). A 1 indicated that the two groups had been mapped to diametrically opposite screen corners (minimum similarity). For each unique pair of groups, we averaged this similarity index across all people in the respective study. Next, separately for Studies 7 and 8 we visualized groups' consensual, mean-level similarity in a statistically well-fitting 2D space (for an introduction to multidimensional scaling, see Hout, Papesh, & Goldinger, 2013; we used the ALSCAL algorithm/ version, see Young, Takane, & Lewyckyj, 1978). The closer two groups

were in these spaces, the more similar they had, on average, been mapped.

We proceeded with searching for the dimensional model that best described the groups' distribution in the 2D spaces. To this end, we averaged groups' agency, beliefs, and communion scores across raters separately for Studies 7 and 8. Finally, we predicted groups' consensual, mean-level agency, beliefs, and communion from groups' consensual, mean-level similarity (coordinates) in the respective 2D space. The higher the multiple correlation (R) returned by this property fitting analysis (Chang & Carroll, 1969), the better consensual, mean-level agency, beliefs, or communion mapped onto the respective 2D space as a dimension. Table 6 shows that $R(A \, dim.)$ and $R(B \, dim.)$ approximated 1 and were substantially higher than $R(C \, dim.)$ in both studies. Further, consensual, mean-level agency and beliefs mapped onto the 2D spaces as almost orthogonal dimensions (Study 7: 87°, see Fig. S29; Study 8: 83°, see Fig. S30). In other words, correlating averages (status quo analysis) suggested spontaneous usage of agency and beliefs but not so much communion for mapping groups' similarity exactly as in the ABC research so far (see Table 6).

Communion mapped onto Koch et al., 2016 2D spaces as centrality. To generalize this, separately for Studies 7 and 8 we predicted groups' consensual, mean-level agency, beliefs, and communion from centrality in the respective 2D group similarity space. The higher the correlation r ([A, B, or C] $cent.$), the better consensual, mean-level agency, beliefs, or communion mapped onto the respective 2D space as centrality. Table 6 shows that agency and beliefs each mapped better as a dimension compared to centrality, and communion mapped better as centrality compared to a dimension in both studies. So, correlating averages (status quo, mean-level analysis) suggested that raters had spontaneously used agency and beliefs but not communion to map groups' similarity. Communion was best understood as centrality (i.e., moderateness) in agency and beliefs. Thus, by correlating averages we fully replicated Koch et al., 2016 2D ABC model. Next, we reanalyzed the data from Studies 6 and 7. Now, we considered non-consensual differences between groups by averaging correlations.

5.2.2. Averaging correlations (alternative, individual-level analysis)

To take into account non-consensual differences between groups' similarity, agency, beliefs, and communion, we reran the property fitting analyses described above but on the level of individual raters rather than means computed across raters. Specifically, for each individual rater we predicted groups' agency as scored by this rater from groups' similarity (coordinates) as mapped by the same rater, and we predicted groups' beliefs and communion in the same way. That is, we computed $R(A \, dim.)$, $R(B \, dim.)$, and $R(C \, dim.)$ separately for each individual rater before averaging any variable. Also, for each individual rater we predicted groups' agency, beliefs, and communion as scored by this rater from groups' centrality in the same rater's 2D similarity map. That is, we computed $r(A \, cent.)$, $r(B \, cent.)$, and $r(C \, cent.)$ separately for each individual rater before averaging any variable. Finally, we averaged these six indices across raters separately for Studies 7 and 8 to test how (i.e., as a dimension vs. centrality) and how well individual-level differences between groups' agency, beliefs, and communion predicted groups' similarity as mapped by the same individual rater.

Despite starting from the same data, the two analyses (status quo, mean-level vs. alternative, individual-level) yielded remarkably different results (see Table 6). In both studies, individual-level (vs. consensual, mean-level) differences between groups' agency, beliefs, and communion predicted individual-level (vs. consensual, mean-level) differences between groups' similarity less well – probably because the individual-level differences between groups' agency, beliefs, communion, and similarity were noisier (e.g., two variables with a retest reliability of 0.80 each can correlate no higher than r = 0.80 * 0.80 = 0.64.).

More importantly, in both studies the 95% CIs around $R(A, B, and \, C$ dim.$)$ ranged substantially higher, and did not overlap with, the 95%

CIs around *r(A, B, and C cent.)*, respectively. That is, individual-level variance in perceived agency, beliefs, and also communion of groups fitted better as a dimension (vs. centrality) onto individual-level variance in groups' similarity as mapped by the same individual rater. Also, in Study 7 the 95% CIs around *R(A dim.)* and *R(B dim.)*, and around *R(A dim.)* and *R(C dim.)*, overlapped, and the 95% CIs around *R(B dim.)* and *R(C dim.)* almost overlapped. In Study 8, the 95% CIs around *R(A dim.)*, *R(B dim.)*, and *R(C dim.)* all overlapped. In other words, individual-level variance in perceived agency, beliefs, and communion of groups fitted equally well as a dimension onto individual-level variance in groups' similarity as mapped by the same individual rater. So, modeling non-consensual (personal) differences between groups' perceived similarity, agency, beliefs, and communion by averaging correlations (alternative, individual-level analysis), we found equal support for agency, beliefs, and communion as spontaneously used, fundamental stereotype dimensions in both Study 7 (unforced, non-verbal approach to group stereotypes) and Study 8 (forced, verbal approach).

In Study 8, raters' categorization of self-generated labels for the two dimensions they had spontaneously used to map groups' similarity corresponded to individual-level *R(A dim.)*, *R(B dim.)*, and *R(C dim.)*. That is, *R(A dim.)*, *R(B dim.)*, and *R(C dim.)* was higher for raters who indicated that they had (vs. had not) spontaneously used agency, beliefs, and communion to map groups' similarity, respectively (see Text S5). 84.2% of raters indicated that they had spontaneously used at least one of the dimensions agency, beliefs, and/or communion to map groups' similarity (see Table S3), consistent with agency, beliefs, and also communion as spontaneously used, fundamental stereotype dimensions.

5.3. Discussion

In sum, focusing on consensual, mean-level differences between groups by correlating averages, as in the ABC research so far (Koch et al., 2016), fully replicated the 2D ABC model claiming that agency and beliefs are spontaneously used, fundamental stereotype dimensions, whereas communion is not. Taking into account non-consensual (individual-level) differences between groups, by averaging correlations, confirmed the spontaneous usage of all three dimensions, however. Through reconfirming spontaneous usage of agency/~competence and beliefs (concession of the SCM), and by rediscovering (less consensual but nevertheless) spontaneous usage of communion/warmth for rating groups' similarity (concession of the ABC model), Studies 7 and 8 provided one way to reconcile the main discrepancy between the ABC model and the SCM (Fiske, 2018; Yzerbyt, 2016).

6. General discussion

People around the world organize groups along stereotype dimensions (Cuddy et al., 2009; Durante et al., 2013) that guide their emotions and behavior (Correll, Park, Judd, & Wittenbrink, 2007; Koch, Dorrough, Glöckner, & Imhoff, 2020; Unkelbach, Forgas, & Denson, 2008). Identifying the number, meaning, nature, and relation of spontaneously used stereotype dimensions is a highly relevant research question. We contrasted two models that address these questions. The stereotype content model (SCM; Fiske, 2018; Yzerbyt, 2016) claims that warmth and competence are fundamental stereotype dimensions. The ABC model (Koch et al., 2016; Koch & Imhoff, 2018) instead suggests agency/socioeconomic success (A; related to, but not the same as, competence) and conservative-progressive beliefs (B) as fundamental stereotype dimensions. The main discrepancies between the two models are the roles of two dimensions: in the SCM, beliefs are not fundamental, but warmth/communion is; in the ABC model, beliefs were found, and warmth/communion was not found, to be a spontaneously used dimension in the ABC model's similarity-rating task.

Our adversarial collaboration resulted in three hypotheses, which were supported here. First, across countries we confirmed higher consensus on groups' agency/socioeconomic success (A) and conservative-progressive beliefs (B) compared to warmth/communion (C). Second, lower consensus on groups' communion compared to agency and beliefs was due to people differing in self-rated agency and beliefs, and inferring groups' communion from self-group similarity in agency and beliefs. Third, and most importantly, averaging across raters retains only consensual differences between groups. Thus, previous ABC studies' (Koch et al., 2016) mean-level analysis (i.e., averaging and then correlating) that examined only consensual differences between groups was biased against communion compared to agency and beliefs. Switching to an individual-level analysis (i.e., correlating and then averaging), we confirmed spontaneous usage of agency, beliefs and also communion for rating groups' similarity. That is, statistically taking into account non-consensual (personal) differences between groups showed that, in addition to agency/~competence, both beliefs and communion/warmth stereotypes are necessary to explain how people spontaneously organize groups when rating their similarity to one another (Koch et al., 2016). This provided one way to reconcile the main discrepancy between the ABC model and the SCM (Fiske, 2018).

6.1. Future directions

If agency and beliefs are societal stereotypes, spontaneous usage of agency and beliefs should be more pronounced when people's goal is to describe groups in an impartial and informative way (i.e., the lay sociologist perspective). This goal could be active when the groups are many, when encountering and interacting with them is rather unlikely, or when talking to colleagues and other acquaintances whose self-ratings on agency and beliefs (and thus less consensual group ratings on communion) are not evident. Tendency for bottom-up and accurate processing of social information may also increase spontaneous usage of agency and beliefs. If communion is a relational stereotype, spontaneous usage of communion should be more pronounced when people's goal is to evaluate groups in a more subjective way (i.e., the lay psychologist perspective). This role and goal could be active when the groups are few, when encountering and interacting with them is likely, or when talking to family and friends whose self-ratings on agency and beliefs (and thus less consensual group ratings on communion) are known. Tendency for top-down and speedy processing of social information may also increase spontaneous usage of communion (Nicolas et al., 2020).

For sure, certain situations, motives/needs, and personality traits should selectively influence attention to groups' agency, beliefs, or communion. People's extremity (vs. averageness) on agency, beliefs, and communion, for example, may selectively increase their spontaneous usage of agency, beliefs, and communion, respectively. Intelligence, wisdom (Grossmann, 2017), openness to experience, conscientiousness, extraversion, agreeableness, neuroticism (i.e., the Big Five; Soto & John, 2017), narcissism, Machiavellianism, and psychopathy (i.e., the Dark Triad; Muris, Merckelbach, Otgaar, & Meijer, 2017) may also selectively influence spontaneous usage of agency, beliefs, and communion (e.g., it could be that people higher in Machiavellianism pay more attention to agency and less attention to communion). Other moderators might include need for self-protection and affiliation (should increase attention to communion), status/esteem (agency), mate acquisition, retention, and parenting (beliefs; Kenrick, Griskevicius, Neuberg, & Schaller, 2010), duty and intellect (agency), sociality and mating (beliefs), adversity, positivity, negativity, and deception (communion; Rauthmann et al., 2014).

Finally, we measured a rater's spontaneous usage of agency, beliefs, and communion to stereotype groups (when mapping their similarity on the screen) based on agency, beliefs, and communion scores for the groups by the same rater. Agency, beliefs, and communion explained well how the raters mapped the groups' similarity, but this analysis might have overlooked other dimensions for which we did not obtain group ratings (e.g., youthfulness, attractiveness, foreignness;

Sutherland, Oldmeadow, & Young, 2016; Zou & Cheryan, 2017). For example, several social perception models complement warmth/communion (a.k.a. morality) with sociability and, just as the SCM (Fiske, 2018), include competence complemented by agency/assertiveness (e.g., Abele et al., 2016; Abele, Ellemers, Fiske, Koch, & Yzerbyt, 2020; Ellemers, 2017; Leach, Ellemers, & Barreto, 2007). Future studies may examine the extent to which raters spontaneously use these group stereotypes, too, and how they relate to agency, beliefs, and communion.

7. Conclusion

People infer groups' warmth/communion (C) from perceived self-group similarity in agency/socioeconomic success (A) and perceived self-group similarity in conservative-progressive beliefs (B). Thus, people agree less on groups' communion compared to agency and beliefs. Further, people spontaneously use agency and beliefs (the dimension proposed by the ABC model [Koch et al., 2016] but not SCM [Fiske, 2018; Yzerbyt, 2016; Yzerbyt, Kervyn, & Judd, 2008]) in a more consensual way, and communion (the dimension proposed by the SCM but not ABC model) in less consensual ways, to stereotype societal groups by rating their similarity to one another. This new evidence for the spontaneous usage of all three dimensions provides one way to reconcile the main discrepancy between the ABC model and SCM.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jesp.2020.103995.

References

Aaker, J., Garbinsky, E. N., & Vohs, K. D. (2012). Cultivating admiration in brands: Warmth, competence, and landing in the golden quadrant. *Journal of Consumer Psychology, 22*, 191–194.

Abele, A., Ellemers, N., Fiske, S., Koch, A., & Yzerbyt, V. (2020). *Navigating the social world: Shared horizontal and vertical evaluative dimensions.* (Manuscript submitted for publication).

Abele, A. E., Hauke, N., Peters, K., Louvet, E., Szymkow, A., & Duan, Y. (2016). Facets of the fundamental content dimensions: Agency with competence and assertiveness –communion with warmth and morality. *Frontiers in Psychology, 7*, 1810.

Abele, A. E., & Wojciszke, B. (2007). Agency and communion from the perspective of self versus others. *Journal of Personality and Social Psychology, 93*, 751–763.

Abele, A. E., & Wojciszke, B. (2014). Communal and agentic content in social cognition: A dual perspective model. *Advances in Experimental Social Psychology, 50*, 195–255.

Alves, H., Koch, A., & Unkelbach, C. (2016). My friends are all alike – the relation between liking and perceived similarity in person perception. *Journal of Experimental Social Psychology, 62*, 103–117.

Alves, H., Koch, A., & Unkelbach, C. (2017). The "common good" phenomenon: Why similarities are positive and differences are negative. *Journal of Experimental Psychology: General, 146*, 512–528.

Alves, H., Koch, A., & Unkelbach, C. (2018). A cognitive-ecological explanation of intergroup biases. *Psychological Science, 29*, 1126–1133.

Ashmore, R. D., & Del Boca, F. K. (1979). Sex stereotypes and implicit personality theory: Toward a cognitive-social psychological conceptualization. *Sex Roles, 5*, 219–248.

Ashmore, R. D., & Del Boca, F. K. (1981). Conceptual approaches to stereotypes and stereotyping. In D. L. Hamilton (Ed.). *Cognitive processing in stereotyping and intergroup behavior* (pp. 1 35). Hillsdale, NJ: Lawrence-Erlbaum.

Barr, D. J., Levy, R., Scheepers, C., & Tily, H. J. (2013). Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language, 68*, 255–278.

Bates, D., Maechler, M., Bolker, B., & Walker, S. (2015). *lme4: Linear mixed-effects models using Eigen and S4. R package version 1.1–7.* 2015.

Becker, J. C., & Asbrock, F. (2012). What triggers helping versus harming of ambivalent groups? Effects of the relative salience of warmth versus competence. *Journal of Experimental Social Psychology, 48*, 19–27.

Bergsieker, H. B., Leslie, L. M., Constantine, V. S., & Fiske, S. T. (2012). Stereotyping by omission: Eliminate the negative, accentuate the positive. *Journal of Personality and Social Psychology, 102*, 1214–1238.

Brambilla, M., Hewstone, M., & Colucci, F. P. (2013). Enhancing moral virtues: Increased perceived outgroup morality as a mediator of intergroup contact effects. *Group Processes & Intergroup Relations, 16*, 648–657.

Brambilla, M., Sacchi, S., Pagliaro, S., & Ellemers, N. (2013). Morality and intergroup relations: Threats to safety and group image predict the desire to interact with outgroup and ingroup members. *Journal of Experimental Social Psychology, 49*, 811–821.

Brambilla, M., Sacchi, S., Rusconi, P., Cherubini, P., & Yzerbyt, V. Y. (2012). You want to give a good impression? Be honest! Moral traits dominate group impression formation. *British Journal of Social Psychology, 51*, 149–166.

Brandt, M. J. (2017). Predicting ideological prejudice. *Psychological Science, 28*, 713–722.

Brandt, M. J., Reyna, C., Chambers, J. R., Crawford, J. T., & Wetherell, G. (2014). The Ideological-Conflict Hypothesis: Intolerance Among Both Liberals and Conservatives. *Current Directions in Psychological Science, 23*, 27–34.

Brandt, M. J., & Van Tongeren, D. R. (2017). People both high and low on religious fundamentalism are prejudiced toward dissimilar groups. *Journal of Personality and Social Psychology, 112*, 76–97.

Brunswik, E. (1955). Representative design and probabilistic theory in a functional psychology. *Psychological Review, 62*, 193–217.

Brunswik, E. (1956). *Perception and the representative design of psychological experiments.* Berkeley: University of California Press.

Bürkner, P. C. (2017). brms: An R package for Bayesian multilevel models using Stan. *Journal of Statistical Software, 80*, 1–28.

Chambers, J. R., Schlenker, B. R., & Collisson, B. (2013). Ideology and prejudice: The role of value conflicts. *Psychological Science, 24*, 140–149.

Chang, J. J., & Carroll, J. D. (1969). *How to use PROFIT, a computer program for property fitting by optimizing nonlinear or linear correlation.* Murray Hill, NJ: Bell Telephone Laboratories.

Correll, J., Park, B., Judd, C. M., & Wittenbrink, B. (2007). The influence of stereotypes on decisions to shoot. *European Journal of Social Psychology, 37*, 1102–1117.

Cottrell, C. A., Neuberg, S. L., & Li, N. P. (2007). What do people desire in others? A sociofunctional perspective on the importance of different valued characteristics. *Journal of Personality and Social Psychology, 92*, 208–231.

Crawford, J. T., & Brandt, M. J. (2019). Who Is Prejudiced, and Toward Whom? The Big Five Traits and Generalized Prejudice. *Personality and Social Psychology Bulletin, 45*, 1455–1467.

Cuddy, A. J., Fiske, S. T., & Glick, P. (2007). The BIAS map: Behaviors from intergroup affect and stereotypes. *Journal of Personality and Social Psychology, 92*, 631–648.

Cuddy, A. J., Fiske, S. T., Kwan, V. S., Glick, P., Demoulin, S., Leyens, J. P., ... Ziegler, R. (2009). Stereotype content model across cultures: Towards universal similarities and some differences. *British Journal of Social Psychology, 48*, 1–33.

Cummings, G., & Finch, S. (2005). Inference by eye: Confidence intervalsand how to read pictures of data. *American Psychologist, 60*, 170–180.

Durante, F., Fiske, S., Kervyn, N., Cuddy, A. J. C., Akande, A., Adetoun, B. E., ... Storaric, C. (2013). Nations' income inequality predicts ambivalence in stereotype content: How societies mind the gap. *British Journal of Social Psychology, 52*, 726–746.

Ellemers, N. (2017). *Morality and the regulation of social behavior: Groups as moral anchors.* Routledge.

Ellemers, N., Fiske, S., Abele, A., Koch, A., & Yzerbyt, V. (2020). Adversarial alignment enables competing models to engage in cooperative theory-building, toward cumulative science. *Proceedings of the National Academy of Sciences, 17*, 7561–7567.

Fiedler, K. (2017). What constitutes strong psychological science? The (neglected) role of diagnosticity and a priori theorizing. *Perspectives on Psychological Science, 12*, 46–61.

Fiske, S. T. (2018). Stereotype content: Warmth and competence endure. *Current Directions in Psychological Science, 27*, 67–73.

Fiske, S. T., Cuddy, A. J., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology, 82*, 878–902.

Fiske, S. T., & Neuberg, S. L. (1990). A continuum of impression formation, from category-based to individuating processes: Influences of information and motivation on attention and interpretation. *Advances in Experimental Social Psychology, 23*, 1–74.

Grossmann, I. (2017). Wisdom in context. *Perspectives on Psychological Science, 12*, 233–257.

Harris, L. T., & Fiske, S. T. (2006). Dehumanizing the lowest of the low: Neuro-imaging responses to extreme outgroups. *Psychological Science, 17*, 847–853.

Hehman, E., Sutherland, C. A., Flake, J. K., & Slepian, M. L. (2017). The unique contributions of perceiver and target characteristics in person perception. *Journal of Personality and Social Psychology, 113*, 513–529.

Hout, M. C., Goldinger, S. D., & Ferguson, R. W. (2013). The versatility of SpAM: A fast, efficient, spatial method of data collection for multidimensional scaling. *Journal of Experimental Psychology: General, 142*, 256–281.

Hout, M. C., Papesh, M. H., & Goldinger, S. D. (2013). Multidimensional scaling. *Wiley Interdisciplinary Reviews: Cognitive Science, 4*, 93–103.

Hönekopp, J. (2006). Once more: is beauty in the eye of the beholder? Relative contributions of private and shared taste to judgments of facial attractiveness. *Journal of Experimental Psychology: Human Perception and Performance, 32*, 199–209.

Imhoff, R., & Koch, A. (2017). How orthogonal are the big two of social perception? On the curvilinear relation between agency and communion. *Perspectives on Psychological Science, 12*, 122–137.

Imhoff, R., Woelki, J., Hanke, S., & Dotsch, R. (2013). Warmth and competence in your face! Visual encoding of stereotype content. *Frontiers in Psychology, 4*(386).

Judd, C. M., Westfall, J., & Kenny, D. A. (2012). Treating stimuli as a random factor in social psychology: A new and comprehensive solution to a pervasive but largely ignored problem. *Journal of Personality and Social Psychology, 103*, 54–69.

Judd, C. M., Westfall, J., & Kenny, D. A. (2017). Experiments with more than one random factor: Designs, analytic models, and statistical power. *Annual Review of Psychology, 68*, 601–625.

Kenny, D. A. (1994). *Interpersonal perception: A social relations analysis.* Guilford Press.

Kenny, D. A. (2004). PERSON: A general model of interpersonal perception. *Personality and Social Psychology Review, 8*, 265–280.

Kenny, D. A., Albright, L., Malloy, T. E., & Kashy, D. A. (1994). Consensus in interpersonal perception: Acquaintance and the big five. *Psychological Bulletin, 116*, 245–258.

Kenny, D. A., & West, T. V. (2011). Similarity and agreement in self and other perception: A meta-analysis. *Personality and Social Psychology Review, 14*, 196–213.

Kenrick, D. T., Griskevicius, V., Neuberg, S. L., & Schaller, M. (2010). Renovating the

pyramid of needs: Contemporary extensions built upon ancient foundations. *Perspectives on Psychological Science, 5*, 292–314.

Kervyn, N., Bergsieker, H. B., & Fiske, S. T. (2012). The innuendo effect: Hearing the positive but inferring the negative. *Journal of Experimental Social Psychology, 48*, 77–85.

Kervyn, N., Fiske, S. T., & Malone, C. (2012). Brands as intentional agents framework: How perceived intentions and ability can map brand perception. *Journal of Consumer Psychology, 22*, 166–176.

Koch, A., Alves, H., Krüger, T., & Unkelbach, C. (2016). A general valence asymmetry in similarity: Good is more alike than bad. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 42*, 1171–1192.

Koch, A., Dorrough, A., Glöckner, A., & Imhoff, R. (2020). *The ABC of society: Perceived similarity in agency/socioeconomic success and conservative-progressive beliefs increases intergroup cooperation.* (Manuscript submitted for publication).

Koch, A., & Imhoff, R. (2018). Rethinking the nature and relation of fundamental dimensions of meaning. In A. Abele, & B. Wojciszke (Eds.). *Agency and communion in social psychology* (pp. 167–179). Abingdon, UK: Routledge.

Koch, A., Imhoff, R., Dotsch, R., Unkelbach, C., & Alves, H. (2016). The ABC of stereotypes about groups: Agency/socioeconomic success, conservative–progressive beliefs, and communion. *Journal of Personality and Social Psychology, 110*, 675–709.

Koch, A., Kervyn, N., Kervyn, M., & Imhoff, R. (2018). Studying the Cognitive Map of the US States: Ideology and Prosperity Stereotypes Predict Interstate Prejudice. *Social Psychological and Personality Science, 9*, 530–538.

Koch, A., Dorrough, A., Glöckner, A., & Imhoff, R. (2020). The ABC of society: Similarity in agency and beliefs predicts cooperation across groups. *Journal of Experimental Social Psychology*.

Lammers, J., Koch, A., Conway, P., & Brandt, M. J. (2017). The political domain appears simpler to the politically extreme than to political moderates. *Social Psychological and Personality Science, 8*, 612–622.

Leach, C. W., Ellemers, N., & Barreto, M. (2007). Group virtue: The importance of morality (vs. competence and sociability) in the positive evaluation of in-groups. *Journal of Personality and Social Psychology, 93*, 234–249.

Lenth, R. V. (2016). Least-squares means: the R package lsmeans. *Journal of Statistical Software, 69*, 1–33.

Montoya, R. M., Horton, R. S., & Kirchner, J. (2008). Is actual similarity necessary for attraction? A meta-analysis of actual and perceived similarity. *Journal of Social and Personal Relationships, 25*, 889–922.

Muris, P., Merckelbach, H., Otgaar, H., & Meijer, E. (2017). The malevolent side of human nature: A meta-analysis and critical review of the literature on the dark triad (narcissism, Machiavellianism, and psychopathy). *Perspectives on Psychological Science, 12*, 183–204.

Nicolas, G., Bai, X., Fiske, S., Terache, J., Carrier, A., Yzerbyt, V., ... Unkelbach, C. (2020). *Warmth is a central social cognitive dimension: Natural language analysis of intergroup information seeking.* (Manuscript in preparation).

Oosterhof, N. N., & Todorov, A. (2008). The functional basis of face evaluation. *Proceedings of the National Academy of Sciences, 105*, 11087–11092.

Paulhus, D. L., & Trapnell, P. D. (2008). Sroelf-presentation of personality. *Handbook of Personality Psychology, 19*, 492–517.

Peabody, D. (1967). Trait inferences: Evaluative and descriptive aspects. *Journal of Personality and Social Psychology, 7*, 1–18.

Peabody, D. (1985). *National characteristics*. Editions de la Maison des Sciences de l'Homme.

Peeters, G. (1992). Evaluative meanings of adjectives invitro and in context: Some theoretical implications and practical consequences of positive-negative asymmetry and behavioral-adaptive concepts of evaluation. *Psychologica Belgica, 32*, 211–231.

Peeters, G. (2008). The evaluative face of a descriptive model: Communion and agency in Peabody's tetradic model of trait organization. *European Journal of Social Psychology, 38*, 1066–1072.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods. Vol. 1*. Sage.

Rauthmann, J. F., Gallardo-Pujol, D., Guillaume, E. M., Todd, E., Nave, C. S., Sherman, R. A., ... Funder, D. C. (2014). The Situational Eight DIAMONDS: A taxonomy of major dimensions of situation characteristics. *Journal of Personality and Social Psychology, 107*, 677–718.

Rosenberg, S., Nelson, C., & Vivekananthan, P. S. (1968). A multidimensional approach to the structure of personality impressions. *Journal of Personality and Social Psychology, 9*, 283–294.

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues, 50*, 19–45.

Schwartz, S. H., & Bilsky, W. (1987). Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology, 53*, 550–562.

Sevillano, V., & Fiske, S. T. (2016). Warmth and competence in animals. *Journal of Applied Social Psychology, 46*, 276–293.

Slepian, M., & Koch, A. (2020). *The harms of secrecy: Integrating data-driven dimension identification with experimental intervention to improve coping with secrecy.* (Manuscript submitted for publication).

Soto, C. J., & John, O. P. (2017). The next Big Five Inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *Journal of Personality and Social Psychology, 113*, 117–143.

Sutherland, C., Oldmeadow, J. A., Santos, I. M., John, T., Burt, D. M., & Young, A. (2013). Social inferences from faces: Ambient images generate a three-dimensional model. *Cognition, 127*, 105–118.

Sutherland, C., Rhodes, G., Burton, N., & Young, A. (2019). Do facial first impressions reflect a shared social reality? *British Journal of Psychology, 111*, 215–232.

Sutherland, C. A. M., Oldmeadow, J. A., & Young, A. W. (2016). Integrating social and facial models of person perception: Converging and diverging dimensions. *Cognition, 157*, 257–267.

Sweetman, J., Spears, R., Livingstone, A. G., & Manstead, A. S. (2013). Admiration regulates social hierarchy: Antecedents, dispositions, and effects on intergroup behavior. *Journal of Experimental Social Psychology, 49*, 534–542.

Swencionis, J. K., & Fiske, S. T. (2016). Promote up, ingratiate down: Status comparisons drive warmth-competence tradeoffs in impression management. *Journal of Experimental Social Psychology, 64*, 27–34.

Unkelbach, C., Forgas, J. P., & Denson, T. F. (2008). The turban effect: The influence of Muslim headgear and induced affect on aggressive responses in the shooter bias paradigm. *Journal of Experimental Social Psychology, 44*, 1409–1413.

van Prooijen, A. M., Ellemers, N., Van Der Lee, R., & Scheepers, D. T. (2018). What seems attractive may not always work well: Evaluative and cardiovascular responses to morality and competence levels in decision-making teams. *Group Processes & Intergroup Relations, 21*, 73–87.

Wojciszke, B. (1994). Multiple meanings of behavior: Construing actions in terms of competence and morality. *Journal of Personality and Social Psychology, 67*, 222–232.

Xie, S. Y., Flake, J. K., & Hehman, E. (2019). Perceiver and target characteristics contribute to impression formation differently across race and gender. *Journal of Personality and Social Psychology, 177*, 364–385.

Young, F. W., Takane, Y., & Lewyckyj, R. (1978). ALSCAL: A nonmetric multidimensional scaling program with several individual-differences options. *Behavior Research Methods, 10*, 451–453.

Yzerbyt, V. (2016). Intergroup stereotyping. *Current Opinion in Psychology, 11*, 90–95.

Yzerbyt, V. Y., Kervyn, N., & Judd, C. M. (2008). Compensation versus halo: The unique relations between the fundamental dimensions of social judgment. *Personality and Social Psychology Bulletin, 34*, 1110–1123.

Zou, L. X., & Cheryan, S. (2017). Two axes of subordination: A new model of racial position. *Journal of Personality and Social Psychology, 112*, 696–717.