Relational versus Structural Goals Prioritize Different Social Information

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Abstract

People gather information about others along a few fundamental dimensions; their current goals determine which dimensions they most need to know. As proponents of competing social-evaluation models, we sought to study the dimensions that perceivers spontaneously prioritize when gathering information about unknown social groups. Because priorities depend on functions, having relational goals (e.g., deciding whether and how to interact with a group) vs. structural goals (e.g., getting an overview of society) should moderate dimensional priorities. Various candidate dimensions could differentiate perceivers' impressions of social groups. For example, the Stereotype Content Model argues that people evaluate others in terms of their Warmth (i.e., their Sociability and Morality) and Competence (i.e., their Ability and Assertiveness). Alternatively, the Agency-Beliefs-Communion (ABC) model proposes conservative-progressive Beliefs. Five studies (N = 2,268) found that participants consistently prioritized learning about targets' Warmth. However, goal moderated priority: When participants had a relational goal, such as an unknown group increasing in their neighborhood, they showed more interest in targets' Sociability, a facet of Warmth. When participants had a structural goal, such as an unknown group increasing in their nation, they showed more interest in the groups' Beliefs, as well as increased interest in Competence-related facets. Diverse methods reveal interest in all dimensions, reconciling discrepancies among social-evaluation models by identifying how relational vs. structural goals differentiate priorities of the fundamental dimensions proposed by current models. Results have implications for fundamental dimensions of social cognition, more generally.

Keywords: Stereotype content, information gathering, goal moderator, open-ended, natural language

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People navigate the world according to the map that suits their current concerns. Social information organizes along a few known dimensions, including horizonal warmth/communion and vertical competence/agency (Abele et al., 2021), as well as conservative-progressive beliefs (Koch et al., 2016). We propose here that people use these dimensions functionally, depending on their goals.

Social psychological research has long acknowledged at least two fundamental dimensions, namely warmth and competence (or agency and communion). Asch's (1946) impression formation experiments were the first to show the distinctive impact of the warm-cold dimension, along with a lesser reliance on competence information. Others later demonstrated the two dimensions' distinct roles for person perception more formally (Rosenberg et al., 1968; Zanna & Hamilton, 1972). The Stereotype Content Model (SCM; Fiske, 2018; Fiske et al., 2002) suggests that these dimensions of Warmth and Competence also operate in group stereotypes.

However, despite the historical consensus on these dimensions, some current person-perception models debate the priority of these and other dimensions in impression formation about individuals and social groups. In particular, the Agency-Beliefs-Communion (ABC) model (Koch et al., 2016) failed to find a priority of Warmth, and instead proposed that people prioritize Agency/socioeconomic Status and conservative-progressive Beliefs[1].

Given these and other models' disagreement about how social perceivers prioritize dimensions (for reviews, see Abele et al., 2021; Koch, Yzerbyt, et al., in press), and given the relevance of such priorities for social perception, both in applications and theoretical models, this

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[1] The Beliefs dimension includes ideological beliefs broadly defined, and it is believed to be driven by exploitation-exploration (status-quo preservation vs. change) dilemmas.

paper aims to determine which dimensions people spontaneously prioritize when they search

information about unknown social groups, with implications for social cognition more generally.

The next section overviews the most relevant models for the present question, and then

delineates the aims of this research.

Current Models

Following a functional approach of "thinking is for doing" (Fiske, 1992), the Stereotype

Content Model proposes that, in order to interact, people need to know two dimensions: the

others' intent for good or ill, called Warmth, and whether the others can enact that intent, called

Competence (Fiske et al., 2002). In theory, this implies a priority on Warmth, but the main SCM

paradigm has never tested it. Typically, survey respondents rate a dozen known societal groups

on Warmth, as being friendly and trustworthy, and on Competence, as being capable and

effective, although measures have varied (Fiske, 2018).

Recently, other models (e.g., the Dual Perspectives Model; Abele et al., 2016; see also

Abele et al., 2008; Carrier et al., 2014) suggest that each of these dimensions has two facets:

Communion/Warmth subdivides into Morality and Sociability; Agency/Competence subdivides

into Ability and Assertiveness. Related models differ in which facets or dimensions are primary.

For example, the Behavioral Regulation Model (BRM; Ellemers, 2017; Leach et al., 2007) and

other models (see Goodwin, 2015; Brambilla & Leach, 2014) suggest that one

Warmth/Communion facet, Morality, is primary.

Finally, the recently proposed ABC model (Koch et al., 2016) differs in significant ways

from the SCM. In the paradigm of judging the similarity of many (up to ~ 50) societal groups

(Koch, Speckmann, et al., 2020), the ABC model identifies three dimensions that organize social

groups based on how similar they seem. Agency and socioeconomic Status make up the first

dimension, similar to the SCM's Competence and its structural predictor, Status. The second dimension, Beliefs, is distinct from the other models. One end of Beliefs represents all religious, conservative, and other traditional groups; at the other end are progressives, artists, scientists, and LGBTQ groups.

In the current paper, representatives from some of the current models together attempt to clarify which content dimensions have priority at the outset of group perception, the stage of information gathering about unknown social groups. Differences between models may result from their respective approaches. One such difference and potential moderator is structural versus relational impression formation goals. That is, each model's paradigm supplies a context that might be more generally a moderator, leading to diverging outcomes. Identifying and testing these potential moderators supplies both a conceptual advance and a testable proposal. Thus, the ABC and SCM models' respective methods might prompt structural versus relational impression formation goals. Additionally, measurement choices (i.e., scales vs. unstructured tasks; self-report vs. behavior in a cognitive task) may contribute to different results. These concerns (information-seeking, goals, measures) all apply to individual and dyadic perception, as much as intergroup perception. Thus, this paper contributes a novel focus on information gathering, distinctive moderators, and converging measures—all relevant to social cognition generally—as well as illustrating an adversarial collaboration.

Dimension Priority

Throughout, the current studies explore which stereotype content dimensions have priority during information gathering. Here, priority is defined as the weight given to learning about a particular dimension of information when sampling only a subset of all available

information about a novel social group. Thus, priority does not refer to the speed or order of seeking information, although these concepts may be related.

Testing dimension priority included the six focal dimensions proposed by the major models discussed above, including their facets: Sociability, Morality, Assertiveness, Ability, Status, and Beliefs. This addresses criticisms that current paradigms have artificially inflated the priority of Warmth and Competence by preventing participants from choosing alternative dimensions (Koch et al., 2016).

The SCM predicts Warmth (i.e., Sociability and Morality) to dominate information seeking, followed by Competence (i.e., Assertiveness and Ability). Likewise, another model prioritizes Warmth/Communion in perceiving others (Abele & Wojciszke, 2007). Other akin models would suggest that the Morality facet of Warmth would have priority (e.g., Ellemers, 2017; cf. Brambilla et al., 2011; Goodwin et al., 2014; Hartley et al., 2016). However, the priority of Warmth is not unanimous. The original ABC model, extrapolating from its stereotype content results, would predict that conservative-progressive Beliefs and Agency/socioeconomic Status have priority over Warmth. The current examination focuses on the priority of all these dimensions and facets, as a function of information-seeking goals.

Moderation by Structural and Relational Goals

The main aim here is to contrast two distinct goals that may differentiate people's attention to particular dimensions when gathering information about groups. These *structural* and *relational* goals overlap with prior theorizing: sections and forces in field theory (Lewin, 1997), description and experience as learning modes (Hertwig & Erev, 2009; Wulff et al., 2018), main effects of target and interaction effects of target and perceiver in partitioning social

assessment (Hehman et al., 2017; Hoenekopp, 2006; Kenny et al., 1994), and psychological

distance and proximity (Trope & Liberman, 2010).

Structural goals. A structural goal means that people want to organize the various

entities in their environment. The constructs of space and time, for example, serve people's goal

to structure the physical environment, and they describe where, how, and when various entities

occur, each at some distance, in some direction, and at some past or future moment. The

construct of society serves people's goal to structure the social environment, and it *describes*

what various groups are, have, and do (i.e., their characteristics). Pursuing this social structural

goal is informative because it pinpoints characteristics that are *relatively stable* across space and

time (i.e., context-invariant). And pursuing the goal bestows shared reality (Echterhoff &

Higgins, 2017), because assessments of groups on these dimensions are *consensual* (i.e., shared

with all perceivers). Assessments that fulfill these criteria of structural goals (being descriptive,

informative, and consensual) are social groups' Status and Beliefs (Koch et al., 2018; Koch,

Imhoff, et al., 2020). Thus, pursuing the social structural goal should increase people's attention

to groups' descriptive, stable, consensual Status and Beliefs.

What contexts activate social structural goals? People regularly consider *many groups*

from a *psychologically distant* perspective – for example, when reading about groups

in newspapers and on websites that cover national events (e.g., laws and other rulings, the state

of the economy, and immigration and other demographic changes), and when conversing with

strangers, acquaintances, and colleagues about national events that involve groups. Considering

many distant groups calls for *mapping* (i.e., getting an overview of) society through describing

consensual, relatively stable characteristics of the groups. So, *distance* between the self and *many

groups* should motivate pursuing the social structural goal.

In the typical ABC model study, people's task is to map the similarities and differences between dozens of groups on one screen (Koch et al., 2016, Koch, Speckmann, et al., 2020). This task prompts a distant perspective because many groups co-occur when there is distance between the self and groups (e.g., when reading a national newspaper). Also, the task of creating a map resembles a geographical map that consensually describes the permanent whereabouts of things, and thus the task prompts consensual descriptions of relatively stable characteristics. So, the typical ABC model study might increase attention to groups' Status and Beliefs by activating a social structural goal – wanting to orient in society through consensual description of groups' relatively stable characteristics.

Relational goals. A relational goal means wanting to navigate society through personal evaluation of groups' affordances as context-dependent opportunities for, or challenges to, the self interacting with others. Anticipating a relationship is up close and personal, with mutual impact of self and other. Those others act on their characteristics and their current contexts in potentially predictable ways that can affect the self (Ames et al., 2011; Erber & Fiske, 1984; Jones & Davis, 1965). The others' plans or intentions relate to the self (and vice versa); they are relatively *volatile*, and thus require ongoing evaluation with respect to one's own choices. This relational goal, *intent evaluation,* pinpoints *opportunities* for, and *challenges* to, the self (e.g., others' cooperation and sharing vs. competition and retaining; Koch, Dorrough, et al., in press; Walsh et al., 2020). People evaluate others' intent, in order to approach or avoid them; to coordinate, help, or hinder their respective goals, and to control their own and others' outcomes. That is, the relational goal is socially functional; it guides the perceiver's behavior (Carrier et al., 2019) and aids interactions and relationships. And it bestows distinctive identity because assessments of groups and individuals on relational dimensions depend on *personal* perspective

(i.e., either individual or shared with ingroup perceivers). Assessments of groups' Warmth are intent-evaluative and personal (Koch et al., 2018; Koch, Imhoff, et al., 2020). Thus, pursuing the relational goal should increase people's attention to groups' Warmth (i.e., Morality and Sociability).[2]

What contexts activate relational goals? People regularly consider few groups from a *psychologically proximal* perspective – for example, when meeting group members while running errands in the neighborhood, when sharing social spaces like the gym or coffee shop, and when planning with neighbors, friends, and family about group events. Considering a few proximal groups calls for *navigation* (i.e., finding one's way) in society through personally evaluating groups' relatively stable characteristics as context-dependent opportunities for, or challenges to, the self. Thus, proximity between the self and few groups should motivate pursuing a relational goal.

In the typical SCM study, people assess the Warmth of one group per screen (Fiske et al., 2002; Kervyn et al., 2015). Thus, this task increases people's attention to groups' Warmth directly by explicitly asking about the dimension. In addition, the task indirectly increases attention to groups' Warmth because encountering fewer groups, one at a time, prompts a proximal perspective, resembling interactions between self and others.

SCM-ABC overlap. More recently, the ABC model found that without further context, people assessed a group as high on Warmth if they assessed this group's Status and Beliefs as

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[2] Competence matters in the context of Warmth: whether the others can enact their intent. In prioritizing information, if one could know only one dimension, Warmth would have preference. But if one could know both, Competence tells whether the other's Warmth matters at all. Thus, within a given ingroup (Warm) or dealing with an outgroup (less Warm), once knowing Warmth, attention to others depends on their competence (or power), for the perceiver to further infer their intent (Fiske, 1993). However, the studies here ask perceivers to choose information; hence the priority of Warmth.

similar to their own Status and Beliefs (Koch, Imhoff, et al., 2020). This suggests that the structural goal precedes navigating society via the relational goal. That is, structuring distant groups (by consensually describing their relatively stable characteristics) facilitates relating them to the self (by personally evaluating their characteristics as context-dependent opportunities for, or challenges to, the self) should they become proximal at a later time.

The SCM posits the origins of Warmth and Competence evaluations in societal structures that overlap with the ABC model. In the SCM, a group's perceived Status in society predicts seeing them as Competent (Caprariello et al., 2009; Fiske et al., 2002). The ABC model sees Status/Competence as a single dimension, so both models argue they are connected. The other SCM dimension, perceived Warmth, results from the nature of groups' interdependence. If situations align groups' outcomes or pit them against each other, perceivers infer that cooperative positions beget Warm intentions and competitive positions the opposite. Thus, the ABC model's finding that perceived similarity on Beliefs or on Status/Competence increases perceived Warmth and cooperation (Koch, Dorrough, et al., 2020; Koch, Imhoff, et al., 2020) makes the two models overlap somewhat in predicting Warmth from socio-structural antecedent dimensions. So, while the ABC model and SCM respectively emphasize structural, descriptive versus relational, evaluative goals and dimensions, both models include both goals and dimensions; they also support a structural antecedent as facilitating the relational judgment (see also Abele et al., 2021; Koch et al., in press).

Secondary Aims

In addition to the main aim to determine the role of structural vs. relational goals in dimension priority, the current studies also advance science by connecting the stereotype-content

and information-gathering literatures, as well as exploring how measures (e.g., scales vs.

free response) affect dimension priority.

Information gathering. To study the content of social-group impressions, previous

research has asked for descriptions of existing impressions, bypassing the stereotype-formation

process. Other research has studied stereotype-relevant information-gathering for existing social

groups (e.g., Cameron & Trope, 2004; Skov & Sherman, 1986; Trope & Thompson, 1997).

These studies often focus on information-gathering strategies and general tendencies to seek

confirmatory information. Asking participants to gather information about unknown others also

has precedents in person perception (Fiske & Cox, 1979; Ostrom, 1975, as described in Park,

1986; Wojciszke et al., 1998; Yzerbyt & Leyens, 1991). For example, in constrained

information-gathering studies, participants might rate which of several traits (Morality,

Sociability, and Competence dimensions) they would want to know about another person,

depending on explicit goals and context (e.g., ingroup vs. outgroup target; Brambilla et al.,

2011). However, these are impressions about individuals. Previous research into the

discontinuity effect (see Schopler & Insko, 1992) and person vs. people perception (e.g., Phillips

et al., 2018) shows that an intergroup context can differ from an interpersonal one. Additionally,

because structural goals involve information about groups systems, they may be particularly

relevant for intergroup information gathering.

Here, the focus is assessing social groups (rather than individuals), testing different goals

(structural assessment vs. relational assessment), and including subtler manipulations (i.e., nation

vs. neighborhood; rather than just explicit goals). The focus on information gathering about

unknown social groups allows exploring dimension priority in a stereotype-generating stage,

unburdened by groups' extant stereotypes (see Koch, Imhoff, et al., 2020, for a related study of existing stereotype content).

      Predetermined dimensions versus spontaneous measures. The ABC model proponents argued that previous research's reliance on theory-driven dimensions, measured through a priori scales, precluded participants from spontaneously using the dimensions of Agency/Status and Beliefs for differentiating groups and other social categories (job holders: Imhoff et al., 2018; state residents: Koch et al., 2018). Indeed, a growing literature suggests that the reliance on forced-choice and rating scales of predetermined content may be hindering the discovery of participants' unconstrained responses, limiting conclusions in areas ranging from the study of basic emotions (e.g., Gendron et al., 2015) to the study of ambiguous racial categorization (e.g., Nicolas et al., 2018). An advantage of a more data-driven approach is being: "discovery oriented… what participants perceive spontaneously" (Gendron et al., 2015).

      To remedy this constraint, Studies 2 and 3 allow responses beyond scales of predetermined items, by asking respondents to list trait terms, which the respondents then self-coded based on the six dimensions of interest. In addition to participant's own coding, techniques from natural language processing complement participants' self-coding with more objective measures that reflect semantic associations in language. These methods, adapted from recent developments in other fields (such as machine learning, see Nicolas et al., 2020; Nicolas et al., 2019) rarely appear in social psychological research. Our paper illustrates how these methods allow for the analysis of open-ended responses without the need for resource-intensive human coding, thus making research into spontaneous, natural-language stereotyping a more viable alternative to traditional methods.

Finally, to complement self-report measures, a behavioral measure of information seeking involved a dynamic cognitive task (Andersen et al., 2019). This task asks participants to choose information about dimensions of interest under conditions that mimic real life information consumption (e.g., news media). For example, the task limits the amount of information participants can obtain, and the information scrolls past dynamically, such that participants must choose among different types of information simultaneously. These tasks have documented various information gathering preferences, particularly as related to political communication (see Andersen et al., 2019).

Overview

The current studies, consequently, aim to assess dimensions' priority in information gathering, with a focus on the moderating role of structural versus relational goals. In addition, the studies seek to examine differences in dimension priority between traditional scale measures and more spontaneous open-ended measures. An initial motivating study confirmed the intuition that the models that have given rise to current contested dimensions of content differ in how much their tasks elicit structural versus relational cognitions. Then, five studies tested how relational and structural goals affect spontaneous information-seeking about a new group, using various spontaneous and scaled measures on several models' proposed dimensions (see Table 1).

To capture the structural versus relational distinction empirically, the current studies assigned participants to consider what they would want to know about a new group in their nation or neighborhood (i.e., the structural and relational condition in Studies 1 and 2, respectively), or about a generic unknown group, when information-seeking goals were directly manipulated as either relational or structural (Studies 3-5).

Information-gathering measures used self-reported interest in information (Studies 1-4), as well as direct information selection (Study 5). Studies 1-4 test dimension priority by measuring frequency (open-ended) or intensity (scale) of self-reported interest in learning about a dimension. This operationalization is in line with previous studies exploring dimension priority in information gathering (e.g., Brambilla et al., 2011). Study 5 tests whether the same pattern replicates when information gathering needs to prioritize a subset of dimensions under time constraints. This approach to information selection has previously appeared in multiple contexts (see Andersen et al., 2019).

Open Science Disclaimers

This project reports all studies run, without excluding any outcomes or manipulations. All studies provide power calculations in text, as well as data, materials, and code in the online repository: (https://osf.io/sg95z/?view_only=1eb39348c6a84cac94db2cc80ed41752).

Table 1. Summary of Studies

	Key question	**Manipulation**	**Outcomes**
Motivating Study	Do the SCM vs ABC emphasize relational vs. structural goals?	SCM vs. ABC task	Survey of how much each task elicited relational vs. structural cognitions
Study 1	Which dimensions are prioritized when learning about a new group in the neighborhood (relational) vs. nation (structural) in scales of self-reported interest?	Vignette about a neighborhood vs. national newspaper describing a new kind of people in the area	Scale measure of self-reported interest in learning about the target (along 6 dimensions of interest)
Study 2	Which dimensions are prioritized when learning about a new group in the neighborhood (relational) vs. nation (structural) in spontaneous self-reports?	Vignette about a neighborhood vs. national newspaper describing a new kind of people in the area	Dictionary & participant-coded open-ended measures of self-reported interests in learning about the target
Study 3	Which dimensions are prioritized under explicit relational vs. structural goals, in scaled and spontaneous self-report?	Instructions varied to prompt participants seek information about an unknown group under relational ("to personally interact with them") vs. structural ("to understand them in a societal context") goals	Word embedding-coded open-ended measures and scale measures of self-reported interests in learning about the target
Study 4	Which dimensions are prioritized under a baseline condition vs. explicit relational vs. structural goals, in scaled and spontaneous self-report?	Instructions varied to prompt participants seek information about an unknown group with no explicit goal (baseline), and under relational ("to personally interact with them") vs. structural ("to understand them in a societal context") goals	Scale measures of self-reported interests in learning about the target
Study 5	Which dimensions are prioritized under explicit relational vs. structural goals, in information gathering behavior?	Instructions varied to prompt participants seek information about an unknown group under relational ("to personally interact with them") vs. structural ("to understand them in a societal context") goals	Behavioral measure of information gathering in a dynamic, timed, cognitive task

Motivating Study: The SCM vs. ABC Model Emphasize Relational vs. Structural Goals

The motivation behind this series of studies arose from the observation that the dimensions that emerged from the SCM, particularly its primary Warmth dimension, were more relational, while the dimensions of Status and Beliefs, highlighted by the ABC model, reflected more societal-structural characteristics. While these observations may be evident in the outcome of both models, this motivating study examined whether the original SCM and ABC model methods differentially prompt participants to focus on relational vs. structural features of social groups. Previously discussed reasons for differences in relational vs. structural focus include the ABC paradigm presenting a large number of groups that participants similarity-rate simultaneously in a relatively abstract spatial-arrangement task. This may lead to a larger focus on structural concerns than the SCM approach, which asks about specific ratings for a small number of groups on traits such as Warmth and Competence, emotions, and behaviors, typically one group at a time.

To test the respective paradigms, participants completed either SCM- or ABC model-based tasks and asked them to what extent the tasks made them think about relational or structural goals and concerns. The SCM methods should focus people on thinking about groups with relational goals, while the ABC model methods focus on thinking about the groups with structural goals.

Method

Participants. We collected data from 504 Amazon Mechanical Turk workers (Mean age = 37.03 years; 65% women). Using a power analysis, such a sample size provides over 80% power for the planned pairwise comparisons (two sample t-tests), to detect a small-to-medium

effect size, $d \sim .25$ to.3. Power analyses throughout this paper are calculated using either

G*Power (Faul et al., 2009) or simr (Green & MacLeod, 2015) for more complex simulations.

Only Mturk workers with at least 100 hits approved and approval rates of 95% or more

were recruited. In addition, most studies asked participants to rate the quality of their

participation, which tended to be scored highly, and exclusions did not change results (we

present results from all data).

Materials and procedure. Participants were randomly assigned to complete one of three

tasks: the traditional SCM task, and two versions of the ABC task used in the development of the

model. The traditional SCM task asked participants to rate 9 representative social groups (e.g.,

Adults, Asians, Catholics, Criminals, Doctors), randomly sampled for each participant from a

pool of 85 groups. We obtained these group labels from the literature, including previous SCM

and ABC model studies. Rating items were scales measuring perceptions of the groups as being

sincere, *warm*, *competent*, and *confident* on a "1) not at all" to "5) extremely" scale.

We had two versions of the ABC model method as additional between-subjects

conditions. In the first version, based on Koch and colleagues (2016, Study 2), participants

completed a spatial arrangement task with a sample of 18 groups based on how similar they were

in undetermined dimensions. More specifically, participants saw labels for the 18 groups in the

center of a blank screen and were instructed to drag the labels around the screen such that groups

that were more similar to each other were placed closer together and groups that were dissimilar

were placed further apart. In the second version, participants completed the same spatial

arrangement task, but this time x- and y- axes were visible on the screen and were labeled with

the ABC model dimensions of Status and Beliefs. This task is similar to Koch and colleagues

(2016, Study 3), except that the labels were researcher-determined.

The results from these three different SCM vs. ABC model tasks were not of interest here and are thus not analyzed. Instead, we were interested in the results from a second block of items. In the second block, participants saw an image of the task they just completed -- to refresh their memory about the details of the task and their responses. Then they were asked what the task is good for, followed by ten items intended to measure relational cognitions and ten items intended to measure structural cognitions (see Table 2). The 7-point scale ranged from *strongly disagree* to *strongly agree*. Finally, participants completed a series of demographic questions.

Table 2. Items included in PCA and retained for the Motivating Study

Dimension	Item	Included after PCA
Relational	Knowing if I can approach them	Yes
	Judging whether they pose a risk to me	Yes
	Realizing what they have to offer to me	Yes
	Studying what they might need from me	Yes
	Deciding if I should chat with them	Yes
	Protecting myself from them cheating me	Yes
	Seeing opportunities they provide for me	Yes
	Learning how I will get along with them	Yes
	Thinking about how I relate to them	No
Structural	Describing the part they play in society	Yes
	Comparing them to other societal groups	Yes
	Spotting their niche in society	Yes
	Understanding the structure of society	Yes
	Getting an overview of society	Yes
	Getting a sense of their impact on society	No
	Considering their goals/role in society	No
	Figuring out their contribution to society	No
	Recalling the societal values they have	No

Analysis strategy. We organized the data such that each observation is each participant's average rating for each of the structural and the relational items. These scores are being predicted by an indicator of which construct they measure (relational vs. structural cognitions). We

conducted two analyses, comparing the SCM task to each of the ABC model tasks implemented here. Thus, for each comparison, we predicted average response to the second-block items from the main effects and interaction between task type (SCM vs. no-labels ABC or SCM vs. labeled ABC) and goal type (structural vs. relational items). This interaction is the result of interest, which will reveal whether relational and structural cognitions vary depending on the task completed. All models are mixed effects regressions with participants as random intercept (models with random slopes did not converge) and were run using the R packages *lme4* (Bates, et al., 2015) and *lmerTest* (Kuznetsova, et al., 2017; ANOVAs estimated with Satterthwaite degrees of freedom). For contrasts, we use estimated marginal means and pairwise comparisons with their appropriate multiple comparison corrections using the R package *emmeans* (Lenth, 2016). Effect sizes are calculated ignoring the multilevel structure.

Originally, we had 10 relational items and 10 structural items, which were then evaluated through varimax-rotated principal components analysis, resulting in the removal of one relational item and four structural items, based on pre-established loading cutoffs (remove items that after varimax rotation do not have a primary loading of <=.60 and a secondary loading of >.40).

Results

We compare the SCM with both the stripped-down, no-labels ABC model task (no dimension labels), and with the labeled ABC model task. In a model including goal type, task type, and their interaction, we find effects for all three: goals, $F(1,501) = 405.68$, $p = <.001$, $\omega^2 = .38$, task, $F(2,501) = 5.07$, $p = .007$, $\omega^2 = .02$, and the interaction, $F(1,501) = 26.65$, $p < .001$, $\omega^2 = .11$. Next, we focus on the simple effects within goal, comparing across tasks, controlling for a family of three estimates (Tukey).

First, in line with our hypothesis, the SCM task leads participants to think about relational concerns more ($M = 4.21$) than the no-labels ABC model task ($M = 3.26$), $t(854) = 6.05$, $p <$ .001, $d = .67$, and the labeled ABC model task ($M = 3.55$), $t(854) = 4.22$, $p < .001$, $d = .46$. We also found evidence that the SCM task lead participants to think less about structural concerns ($M = 4.87$), but only against the labeled ABC model task ($M = 5.27$), $t(854) = 2.60$, $p = .026$, $d = .28$; difference with the no-labels ABC model task ($M = 5.00$) was not significant, $t(854) = .832$, $p = .683$, $d = .09$. There was no significant difference between the no-labels and labeled ABC model tasks in terms of relational or structural concerns, ts$(854) < 1.77$, ps $> .142$, ds $< .21$.

Discussion

This initial study provides evidence consistent with the observation that the ABC model dimensions describe relatively more structural stereotypes about social groups, while the SCM dimensions describe relatively more relational stereotypes. Specifically, the SCM task prompted participants to think more about their relation to the presented social groups than both ABC model tasks. To a smaller degree, with mixed evidence dependent on the task used, the ABC model results also supported the idea that structural concerns are heightened when simultaneously comparing several groups in the spatial arrangement paradigm. In sum, we have motivating evidence that the models rely on methods that emphasize relational and structural goals differently, potentially leading to differences on which dimensions are prioritized.

The rest of this paper explores in more depth how relational and structural goals can give different priority to the different dimensions proposed by the SCM and ABC model of stereotypes. We will explore these dimensions at an initial stage of stereotype formation: when information is being gathered about novel groups. Exploring the role of relational and structural

goals in information gathering is a potential avenue to reconcile existing models and establish

meaningful moderator for the priority of different dimensions.

Study 1: Priorities Toward a New Group in Our Neighborhood or Nation

Study 1 begins to address our main aim: testing relational vs. structural goals as

moderating information gathering on the different social-cognitive dimensions and their facets.

Specifically, a vignette prompted participants to think about an unknown social group that is

increasing in number and to indicate how interested they are in learning about this group's

Sociability and Morality (hypothesized to be more relational) or Status and Beliefs (hypothesized

to be more structural). Predictions about Competence (Ability, Assertiveness) are more

ambiguous as the dimension combines both relational and structural information. To manipulate

relational vs. structural information gathering goals, the group was reportedly increasing in the

participants' neighborhood (relational) or nation (structural). As noted, the SCM and related

theories have taken a relational approach to social group stereotypes, so they focus on what

perceivers need to know for interacting with others, as in one's neighborhood. In contrast, the

ABC model originally approached group stereotypes from a structural perspective, resulting in

structural features such as Socioeconomic Status and Beliefs.

We hypothesized that, overall, participants would be most interested in learning about the

Warmth dimension (i.e., Sociability and Morality), based on the agreement between several

models (vs. the ABC model) on the importance of this dimension, as reviewed previously.

However, we expected this result to be moderated, such that participants would be distinctively

interested in some dimensions more than others depending on their relational vs. structural goals.

In particular, Warmth should be more relevant in the neighborhood (relational) than nation

(structural) condition, while the opposite would be true for Status and Beliefs. Patterns for

Competence are less clear given both its high correlation with the structural dimension of Status, and its role in relational concerns within the SCM (see Fiske et al., 2002).

Method

Participants. Participants were 197 workers recruited through Amazon Mechanical Turk (after removing three participants due to incomplete surveys). Participants' mean age was 36.12, most were women (59%), and most were White (77%, 11% Asian, 6% Hispanic, 4% Black). To select the sample size for our initial study, we used a heuristic of 100 participants per between-subjects condition, which provides over 80% power for a medium-small effect size (equivalent to $d = .4$) in a two-sample t-test (an approximation to the pairwise comparisons we would run between conditions for each dimension).

Materials. The vignette had the following phrasing: "Suppose your neighborhood (national) newspaper describes a new kind of people recently increasing in your neighborhood (nation)"; parentheses here indicate the experimental manipulation.

A validation study of the vignettes (used in Studies 1 and 2) supported their manipulating relational vs. structural goals as expected. A sample of 204 Amazon Mechanical Turk workers indicated what they would think about if told that a new group of people was increasing in their neighborhood (or nation, depending on condition). They responded on a 7-point scale (ranging from *disagree* to *agree*) to three relational and three structural items indicating, for example, whether they would think about how to approach or chat with the group (relational goals) or about the group's role or impact in society (structural goals; see Supplement for all items). Indeed, thoughts about relational goals were higher in the neighborhood ($M = 5.31$) than nation ($M = 4.94$) manipulations, $t(609) = 3.59$, $p < .001$. On the other hand, structural goals were higher in the nation ($M = 5.07$) than neighborhood ($M = 4.67$) vignettes, $t(609) = 3.93$, $p < .001$.

To measure interest in gathering information about the different dimensions, after participants read the vignettes, we then indicated: "You have certain priorities in what you would like to find out about them. How important is it to know if they are:" followed by 6 items, rated on a scale from 1 (*Extremely low priority*) to 7 (*Extremely high priority*). The items for each dimension or facet (presented in random order) were: *Friendly/Sociable* (Sociability), *Trustworthy/Honest* (Morality), *Self-confident/Assertive* (Assertiveness), *Competent/Skilled* (Ability), *Wealthy/High-Status* (Status), and *Traditional/Conservative* (Beliefs).

Procedure. After participants consented, they read the vignette and responded to our outcome measure. Finally, participants completed a series of demographic questions.

Analysis strategy. The models in this and subsequent studies have a similar structure. The data are organized such that each observation is each participant's score for a particular dimension. The model then includes this score as an outcome, with a predictor indicating the facet/dimension the score corresponds to (Sociability, Morality, Ability, Assertiveness, Status, or Beliefs). A variable indicating the condition (relational vs. structural) under which the observation was provided is also included, as well as an interaction between the condition and dimension indicators. Across all studies, we focus first on the main effect of facets to provide general dimensional patterns *at the average of the conditions* (all categorical predictors are effect-coded), given that looking at all pairwise comparisons would prove complicated and involve multiple testing requiring additional significance corrections. We interpret the main effects accordingly, given significant interactions. Figures are provided for most results and may also be helpful in evaluating the patterns within conditions in a descriptive way. The interaction between the condition manipulation and the dimension indicator then test the key question, by showing whether interest in the different dimensions vary based on condition. All models are

mixed effects regressions with participants as random intercept (models with random slopes did

not converge).

Results

In a model including condition, facets, and their interaction, we find effects for all three:

facets, $F(5,975) = 145.58$, $p = <.001$, $\omega^2 = .42$, condition, $F(1,195) = 5.17$, $p = .024$, $\omega^2 = .02$,

and the interaction, $F(5,975) = 9.04$, $p < .001$, $\omega^2 = .04$. Because it was neither hypothesized nor

conceptually relevant, the condition main effect is not discussed further in any of the analyses.

Dimension use. Breaking the main effect of facet down (Tukey adjustment for 6

estimates) reveals that, averaging across conditions, Morality garnered the most interest ($M =$

6.24; $ps < .001$ for all pairwise comparisons), followed by Sociability ($M = 5.49$; $ps < .001$ for all

pairwise comparisons), and Ability ($M = 4.95$; $ps < .001$ for all pairwise comparisons).

Assertiveness and Beliefs followed at means of 3.85 and 3.99, respectively, and were not

significantly different from each other ($p = .900$; but $ps < .001$ for all other pairwise

comparisons). The dimension of least interest was Status ($M = 3.31$; $ps < .001$ for all pairwise

comparisons). When facets were combined we found a similar pattern, with Warmth being

higher than all other dimensions, followed by Competence which was in turn higher than Status

and Beliefs. For a summary of pairwise comparisons and effect sizes for Dimension-level models

(i.e., Warmth vs. Competence vs. Status vs. Beliefs) across all studies, see Supplement.

Effect of structure vs. relational condition. Breaking down the interaction (see Figure

1), we find that Sociability is significantly higher in the neighborhood ($M = 5.74$) than nation (M

$= 5.24$) condition, $t(918.77) = 2.34$, $p = .020$, $d = .33$. On the other hand, the following

facets/dimensions were higher in the nation than the neighborhood condition: Assertiveness, 4.14

vs. 3.56, $t(918.77) = 2.75$, $p = .006$, $d = .39$; Ability, 5.49 vs. 4.41, $t(918.77) = 5.11$, $p < .001$, $d =$

.73; and Beliefs 4.25 vs. 3.73, $t(918.77) = 2.51$, $p = .012$, $d = .36$. Morality was not significantly different between the nation and neighborhood, 6.20 vs. 6.28, $t(918.77) = 0.35$, $p = .727$, $d = .05$, and neither was Status, 3.36 vs. 3.26, $t(918.77) = 0.52$, $p = .607$, $d = .07$. If facets are combined, Warmth showed no difference between conditions, but Competence showed the same higher effect of its facets, with higher interest in the nation condition. For all analyses of combined facets, see the Supplement.
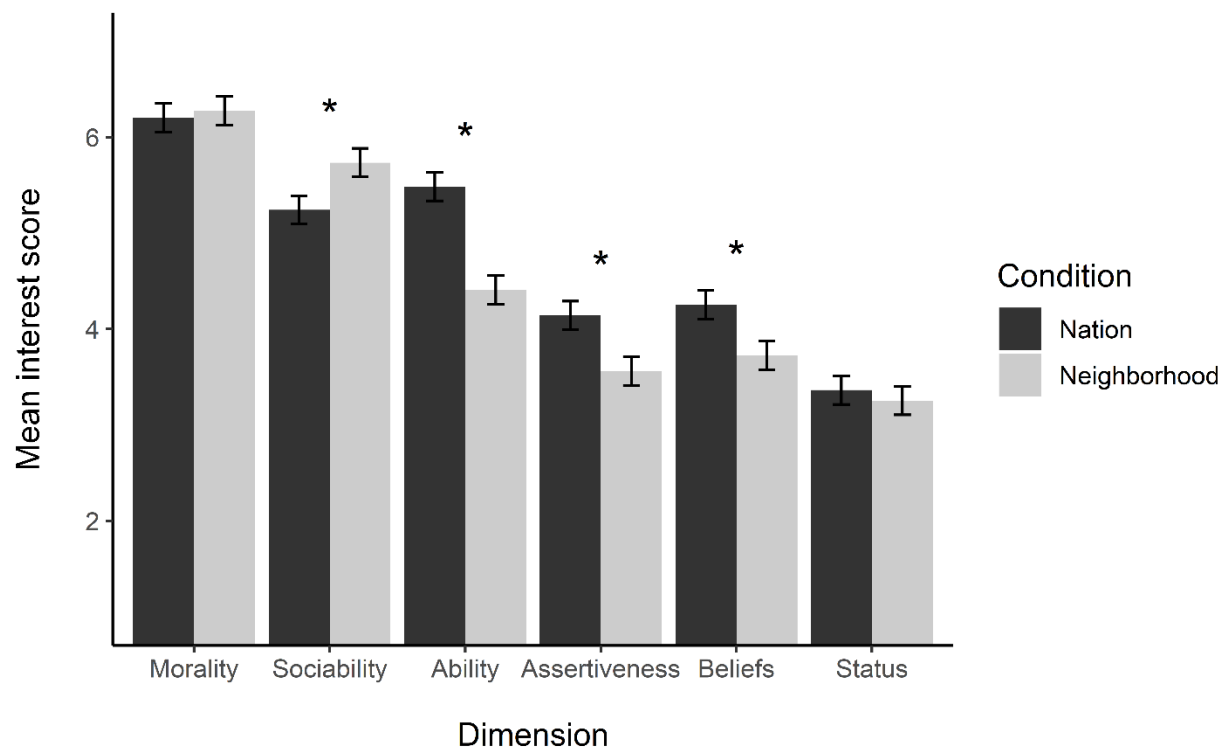

Figure 1. Effect of condition on the facets/dimensions, Study 1. Nation and neighborhood conditions correspond to structural and relational goals, respectively. Error bars indicate standard errors.

* p < .05 for pairwise comparison.

Discussion

Overall, the results from Study 1 support our hypotheses. Specifically, Warmth was the most used dimension when gathering information about a novel group, followed by Competence, Beliefs, and Status. When looking at each of the facets separately, Morality was more common than Sociability, in line with a growing literature showing the priority of Morality (e.g., Brambilla et al., 2011; Ellemers, 2017; Goodwin et al., 2014; Leach et al., 2007; Wojciszke et al., 1998). For Competence, participants were more interested in Ability than Assertiveness.

In terms of the manipulation interaction effect, we found the expected moderating role of a relational (neighborhood) versus structural (nation) context. Specifically, Sociability was higher in the neighborhood than nation condition. This result suggests that the relevance of Morality may be less context dependent, at least in terms of relational versus structural goals. Additionally, we found the expected higher interest in Competence (both Ability and Assertiveness) and Beliefs in the nation condition. Thus, information gathering emphasizing relational concerns resulted in higher interest in the Sociability facet of Warmth, while emphasizing socio-structural concerns resulted in higher interest in Competence and Beliefs. Although we also expected to find a difference for Status, in line with Competence, interest in this dimension was equally low in both conditions. However, in previous SCM and ABC model studies, status and competence/agency correspond so highly that Competence may have preempted Status. Using scales with predetermined dimensions indicates that participants pay most attention to Warmth (Sociability and Morality) in information gathering, a finding in line with the SCM.

One critical difference between the SCM and ABC model is that the latter attempts to use more data-driven approaches to arrive at more spontaneous dimensions. Thus, Study 2

incorporates traditional (i.e., participant coding) as well as more recent, automated, methods developed through machine learning and natural language processing techniques (i.e., dictionaries) to explore open-ended, spontaneous dimension use.

Study 2: Priorities Toward a New Group in Our Neighborhood or Nation

Study 2 aimed to replicate the previous findings using a more spontaneous, open-ended measure of information seeking. We expected to find that, regardless of coding method (participants' self-coding or dictionary), participants would be most interested in the Warmth dimension overall. That is, we expected to rule out that the (non) spontaneity of the response is relevant to the preference for more relational (e.g., Sociability, Morality) over more structural (e.g., Competence, Status, Beliefs) dimensions in information gathering. Instead, we expected to strengthen our argument that structural vs. relational goals moderate how participants prioritize dimensions in information gathering. That is, we expected to replicate participants being relatively more interested in Sociability in the neighborhood than in the nation condition, and more interested in Competence and Beliefs in the nation than in the neighborhood condition.

Method

Participants. Participants were 250 workers recruited through Amazon Mechanical Turk. Participants' mean age was 35.6 years, 52% were male, and 76% were White (9% Asian, 8% Black, 7% Hispanic). Given the complexity of estimating power for a 2 (between) x 6 (within) generalized mixed regression, we again simplified the analysis to account for the smallest contrasts that test our interaction hypothesis. Specifically, we translated a Cohen's *d* of ~ .35 (about the size of our smaller contrasts in Study 1) into a rate ratio of ~1.54 (this was the average of the small and medium rate ratios effect guidelines provided by Olivier et al., 2015), which assuming an average base rate of Sociability words at .57 (i.e., assuming that participants

would respond randomly from the 7 options to the four questions), mean exposure of 1, and a

predictor with a binomial distribution parameter of .5 (i.e., a 2-level predictor with equal sample

sizes) resulted in a suggested 241 participants for 80% power, which we rounded to 250.

Materials. Study 2 used the same vignette as Study 1, which introduced an unknown

group increasing either in the participant's neighborhood (relational condition) or nation

(structural condition). However, participants in this study were asked to "Please type 4 things

you would like to know" about the target group, and to use single words following the prompt "I

would like to know if they are…" In a second block, participants saw their 4 responses again,

one at a time, and categorized each into one of the 6 facets/dimensions. For example, if the

participant reported wanting to know whether the target group is "nice," the prompt asked:

"Please select the category to which *nice* fits best" with the single-choice options

Friendly/Sociable OR Unfriendly/Unsociable (Sociability), *Trustworthy/Honest OR*

Untrustworthy/Dishonest (Morality), *Competent/Skilled OR Incompetent/Unskilled* (Ability),

Confident/Assertive OR Not Confident/Not Assertive (Assertiveness), *Traditional/Conservative*

OR Progressive/Liberal (Beliefs), *Wealthy/High-Status OR Poor/Low-Status* (Status), and *NO*

MATCH. Both high and low end-points of the dimensions were provided to clarify that we were

interested in content and not direction. We asked for single words in order to minimize

complexity and maximize the utility of our coding methods.

Procedure. Participants consented, and then they read the vignette and provided their

open-ended responses in an initial block, followed by a block where they categorized each

response into one of the different dimensions (or no match). Finally, participants completed

demographic questions.

Analysis strategy. The data structure and models are the same as in Study 1: we present main effects of dimension priority first, followed by the key test of an interaction between nation vs. neighborhood condition and dimension.

Our analyses for Study 2 included two different ways to code the outcome variable. One approach, presented first, is the participants' codes for their own responses, a previously discussed part of the survey. The second approach made use of novel social cognition dictionaries. The coverage, reliability, and validity of these dictionaries has been established (Nicolas et al., 2020), allowing us to obtain a comprehensive account of all the different facets and dimensions explored in this paper as they are reflected in open-ended responses. Specifically, the dictionaries (of which we use a subset here) covered over 80% of stereotype content, achieved acceptable levels of internal consistency, and predicted theoretically-related constructs. The dictionaries consist of pools of words related to each of the facets/dimensions studied here. We expect the approach of dictionary-coding to converge with the self-coding by participants to the extent that participants were guided in their coding by the dominant semantics of their responses (rather than, for example, by stereotypic associations such as "conservatives are untrustworthy," or by social desirability). In our opinion, both approaches have their strengths and weaknesses, with the self-codes allowing participants to indicate the subjective meaning of their responses and the dictionaries providing a semantically-guided (and thus more systematic) measure.

The procedure for dictionary coding was as follows: first, participants' responses were preprocessed (i.e., transformed to lower case, cleared of symbols, and lemmatized [removal of inflectional endings]) such that they matched the format of the dictionaries. Then, we used the procedure and software described in Nicolas and colleagues (2020) to match them to the

Sociability, Morality, Ability, Assertiveness, Beliefs, and Status dictionaries, and coded each response as either a 0 (absent) or 1 (present) in 6 variables, one per dictionary. Thus, a single response could be coded into more than one dictionary. As duplicate responses could either be allowed or eliminated, which is the better strategy remains ambiguous. Here, we report the strategy retaining all matches. We re-ran these analyses with exclusive matches, which largely resulted in similar results with some subtle differences in terms of stronger support for the hypothesized effect of context (see Supplement). Responses not included in any dictionaries were recoded into a single, separate variable, to quantify coverage.

To simplify the analyses, we summed over each participant's four responses for each dimension. Thus, the outcome variables (for both self-coding and dictionaries) could range from 0 to 4. Given that we had a count outcome, for analysis we used either Poisson or negative binomial (self-coded facets models where overdispersed) mixed models with participants as random intercepts (models with random slopes did not converge).

Results

Participants coded into one of the dimensions (rather than "no match") over 73% of their responses, and the dictionaries (including all content) accounted for 80% of the valid responses while the dimensions used here accounted for 51% of the valid responses. Thus, both from the participant's subjective perspective and from a semantic approach, the dominant dimensions in the literature covered most of the information gathering content in our study. An exploration of the order of the four open-ended responses revealed no significant effects in any of the studies.

Participant self-coding. A model including condition, dimension, and their interaction, found no effect of condition, $\chi2(1) = 0.88$, $p = .349$, but a significant effect of facet/dimension, $\chi2(5) = 112.07$, $p < .001$, and a significant interaction, $\chi2(5) = 19.69$, $p = .001$.

Dimension use. The main effect of dimension (with a Tukey correction for 6 estimates) shows that Sociability (*response rate* = 0.80) was larger than all dimensions ($ps < .002$), except Morality (*rate* = 0.63; $p = .283$). Morality was significantly higher than Assertiveness (*rate* = 0.11; $p < .001$) and Status (*rate* = 0.37; $p = .001$), but not Ability (*rate* = 0.50; $p = .420$) or Beliefs (*rate* = 0.49; $p = .347$). Assertiveness was significantly smaller than Ability, Status, and Beliefs ($ps < .001$). Ability was not significantly different from Status or Beliefs ($ps > .270$). Status and Beliefs were not significantly different ($p = .325$). When looking at the overarching dimensions (collapsing over facets), Warmth was significantly higher than all other dimensions, Competence was higher than Status, but not than Beliefs.

Effect of structure vs. relational condition. Breaking down the interaction (see Figure 2), Study 2 replicated the significant difference on Sociability, which was higher in the neighborhood (*rate* = 0.95) than the nation (*rate* = 0.68) condition, $Z = 2.28$, $p = .023$. Ability was also again higher in the nation (*rate* = 0.64) than the neighborhood (*rate* = 0.39) condition, $Z = 2.68$, $p = .007$. However, the difference between nation and neighborhood for Beliefs (*rates* = 0.59 vs. 0.41; $Z = 1.88$, $p = .060$) and Assertiveness (*rates* = 0.13 vs. 0.09; $Z = 1.07$, $p = .283$) was not statistically significant in this study. Morality was not significantly different between nation and neighborhood (*rates* = 0.61 vs. 0.65, $Z = 0.40$, $p = .690$), and neither was Status (*rates* = 0.31 vs. 0.44, $Z = 1.58$, $p = .115$). Combining the facets, Warmth was higher in the neighborhood, while Competence was higher in the nation conditions.
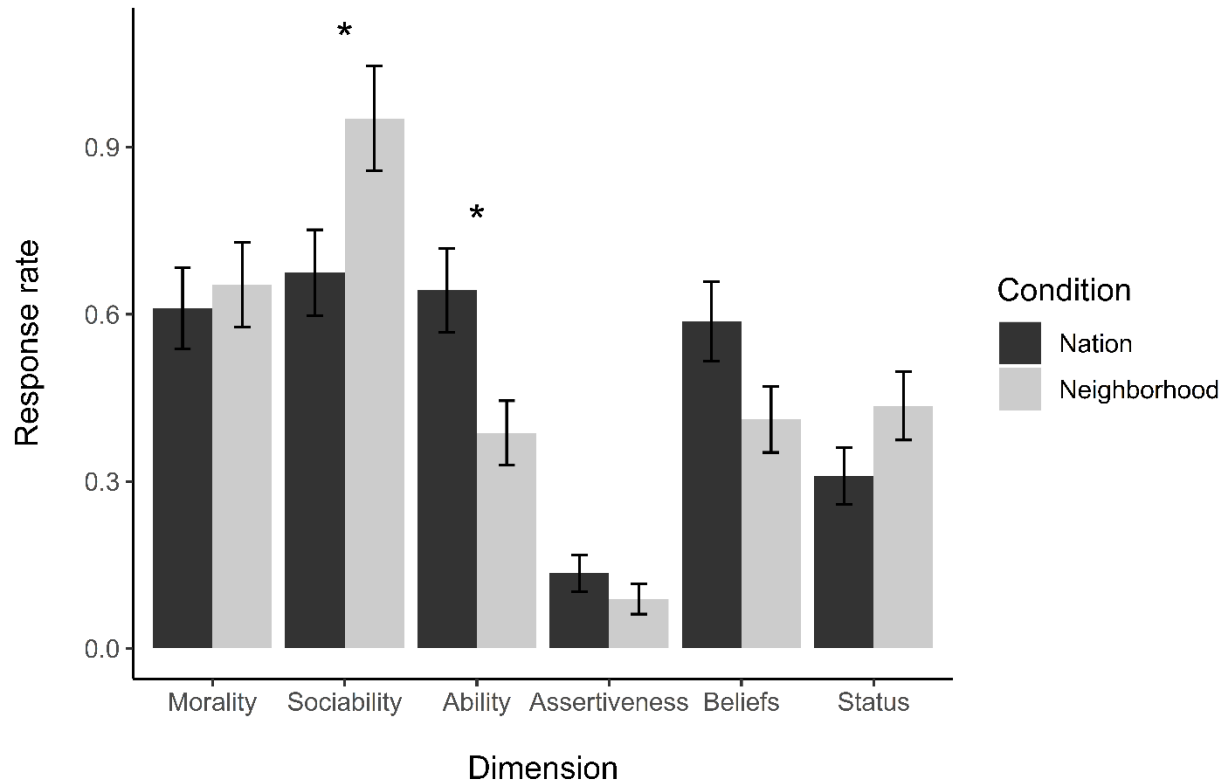
Figure 2. Effect of condition on the self-coded facets/dimensions, Study 2. Nation and neighborhood

conditions correspond to structural and relational goals, respectively. Error bars indicate standard errors.

* p < .05 for pairwise comparison.

Dictionary coding. The model found significant effects for condition, $\chi2(1) = 7.99$, $p =$

.005, dimension, $\chi2(5) = 123.95$, $p < .001$, and their interaction, $\chi2(5) = 24.82$, $p < .001$.

Dimension use. Breaking down the dimension main effect (Tukey correction for 6

estimates), Morality had the largest rate at 0.65, which was significantly higher than every other

dimension (ps < .001) except Sociability (*rate* = 0.48; p = .081). Sociability in turn was higher

than all other dimensions (ps < .001) except Beliefs (*rate* = 0.33; p = .102). Beliefs was

significantly higher than Status (*rate* = 0.15; p < .001) but not than Ability (*rate* = 0.25; p = .414)

or Assertiveness (*rate* = 0.21; p = .076). Ability and Assertiveness were not significantly

different ($p = .947$) and neither was significantly different from Status (ps $> .151$). When combining the facets, Warmth again was the most common dimension. Competence was larger than Status but not Beliefs.

   Effect of structure vs. relational condition. Looking at the interaction (see Figure 3), Sociability was higher in the neighborhood (*rate* $= 0.59$) than the nation (*rate* $= 0.38$) condition, $Z = 2.35$, $p = .019$, as in Study 1 and the self-coded model. Also, as in Study 1 and the self-coded model, Ability was higher in the nation (*rate* $= 0.32$) than the neighborhood (*rate* $= 0.19$) condition, $Z = 2.02$, $p = .044$. Additionally, as in Study 1, but unlike the self-coded model, Assertiveness was higher in the nation (*rate* $= 0.35$) than neighborhood (*rate* $= 0.12$) condition, $Z = 3.56$, $p < .001$. The nation versus neighborhood difference for Beliefs was not statistically significant (*rates* $= 0.41$ vs. 0.27; $Z = 1.91$, $p = .056$). Morality was not different between the nation and neighborhood conditions (*rates* $= 0.76$ vs. 0.56, $Z = 1.92$, $p = .055$), and neither was Status (*rates* $= 0.16$ vs. 0.15, $Z = 0.26$, $p = .794$).

   When combining the facets, we found, unlike the self-coded model, but like Study 1, no difference between conditions for Warmth. Competence was higher in the nation than neighborhood condition.
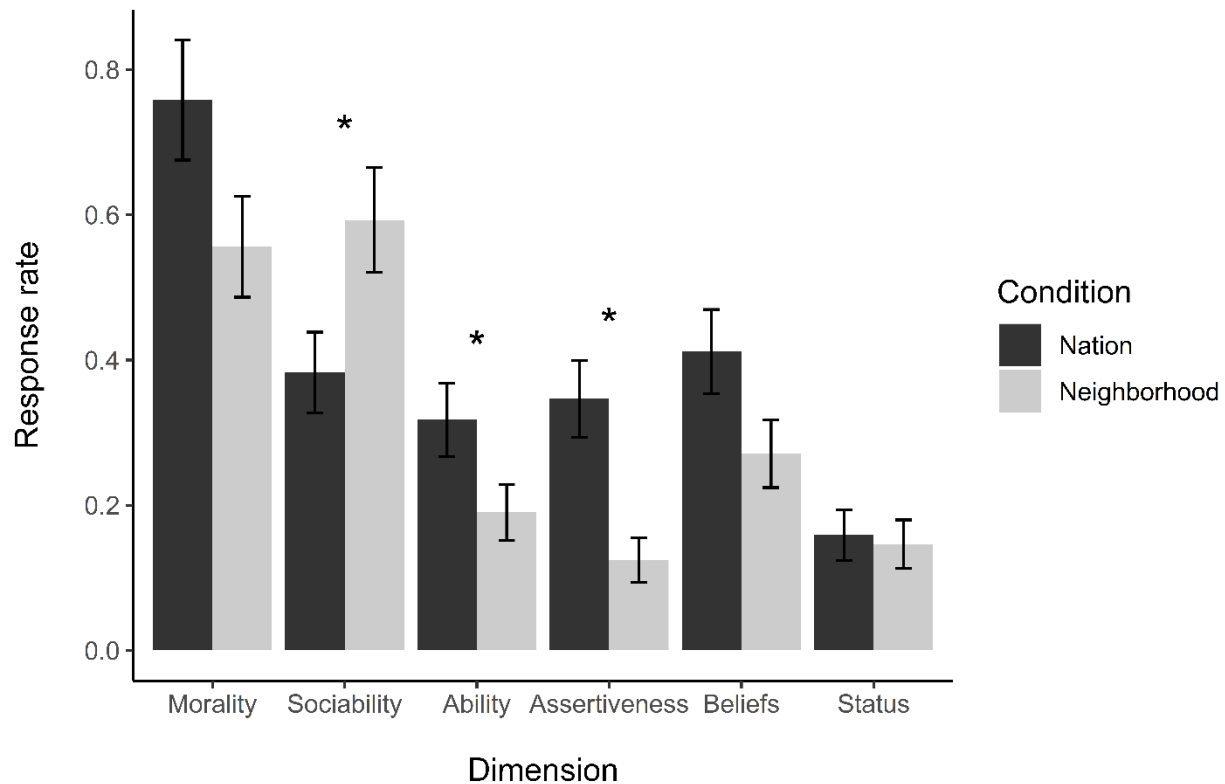
Figure 3. Effect of condition on the dictionary-coded facets/dimensions, Study 2. Nation and neighborhood conditions correspond to structural and relational goals, respectively. Error bars indicate standard errors. * p < .05 for pairwise comparison.

Discussion

Study 2 mostly replicated the results from Study 1: Warmth (Sociability and Morality) was the prevalent dimension, followed by Competence (Ability and Assertiveness) and Beliefs. Effects of the relational (neighborhood) and structural (nation) conditions again largely replicate the results from Study 1. Sociability was higher in the relational than in the structural condition, while Competence was higher in the structural than in the relational condition. In this study, however, the manipulation effect for Beliefs did not reach statistical significance.

Study 2 provided convergent evidence for the priority of the Warmth dimension in information gathering, and the moderating role of relational versus structural goals in participants' interest in the different dimensions. However, we wanted to tease out alternative explanations for the role of our manipulation. Mainly, a new group arriving to a country may suggests immigrants (although fewer than 15% of responses explicitly mentioned words related to nationality or geographical origin), but we did not intend to limit our findings to this (admittedly important) social group. Additionally, information about the context (a nation or a neighborhood) provides more information than straightforward instructions to seek relational or structural information, making it possible for participants to prefer dimensions to confirm expectations. Clarifying whether this is a necessary component of our results would shed light on possible links to previous information gathering literature about existing groups (e.g., Cameron & Trope, 2004).

For these reasons, the next study removes mentions of social groups moving to a new neighborhood or nation (see the Supplement for an alternative approach to this variation, using the nation/neighborhood manipulation, which provided generally congruent results). Instead, we sought to provide a more direct manipulation of structural versus relational goals in Study 3. Additionally, the dictionary used in Study 2 may underestimate the relevance of some dimensions, given the all-or-nothing approach employed to code the open-ended responses. In other words, given that each response either belonged or not in a dimension, some of the subtlety and inter-correlations between the different dimensions may have been lost. For example, both Competence and Beliefs might correlate with the Warmth dimension (Koch, Imhoff, et al., 2020), such that higher similarity to the self in those dimensions relates to higher Warmth (e.g., a conservative participant would consider other conservatives as warmer than others who are

liberal). We address this limitation in the following study by using more continuous coding approach that measures each response's degree of semantic similarity to each dimension. Finally, Study 3 incorporates both scaled and spontaneous responses for a more direct comparison.

Study 3: Relational or Structural Goals

Study 3 aimed to test dimension priority more directly as moderated by relational and structural goals. Study 3 removes mentions of social groups moving to a new neighborhood or nation, and instead directly asks participants to gather information about an unknown group, with goals either to interact with them (relational) or to understand them in a societal context (structural). We manipulated these goals directly to test generalizability, specify the moderator, and address potential alternative explanations.

In addition to these changes, Study 3 incorporated coding methods that allowed for more continuous measures of interest in the different dimensions when using open-ended data. Moreover, we also included the scales from Study 1 in order to provide a direct comparison of spontaneous and constrained responses in information gathering.

We hypothesized that participants would be most interested in the Warmth dimension, particularly in the relational condition, at least in terms of its Sociability facet. We expected Beliefs and Competence (Ability and Assertiveness) to be of more interest when participants had structural goals.

Methods

Participants. Participants were 200 workers recruited through Amazon Mechanical Turk. Participants' mean age was 35.6 years, 58% were male, and 75% were White (8% Asian, 6.5% Multiracial, 5.5% Black, 5% Hispanic). In terms of power, for Study 3 we decided to use an expected effect size for the pairwise comparisons of $d = .2$, which was smaller than Study 2's

smallest approximate effect sizes of $d \sim .35$ (when approximating from the odds ratios). Power analyses suggested 199 participants for an 80% power paired t-test, which we rounded to 200. Again, this is a simplification from the actual model we would be running, for which direct power calculations are complex.

Materials and procedure. Study 3's design was within-subjects for both the structural vs. relational goal manipulation and the scale and open-ended measurements. The study consisted of three sequential blocks presenting vignettes and a series of questions. The first block consisted of two vignettes (relational vs. structural) presented to each participant in random order. The outcome was the open-ended measurement. Both of Study 3's first-block vignettes started by asking participants to imagine a group of people of a certain kind. Then, each condition asked them: "What would you like to learn about this kind of people in order to" either a) "personally interact with them?" (relational) or b) "understand them in a societal context?" (structural). This was followed by the instruction to "Please type 4 things you would like to know about them. Use single words. *I would like to know if they are:*" and the four response boxes.

The second block aimed to manipulate relational vs. structural goals in the same way as the first, but the outcome was the scale measures. Participants saw two vignettes (similar to the ones they saw in the first block) in random order. The vignettes asked: "Imagine a group of people of a certain kind. Of the following, which are most important to learn in order to" either a) "personally interact with this group?" (relational) or b) "understand this group in a societal context?" (structural). Each vignette was followed by the prompt "How important is it to know if they are:" and 6 items representing the dimensions of Sociability (*Friendly/Sociable*), Morality (*Trustworthy/Honest*), Ability (*Competent/Skilled*), Assertiveness (*Self-confident/Assertive*),

Beliefs (*Traditional/Conservative*), and Status (*Wealthy/High Status*). The items were measured

in a 7-point scale ranging from "*Extremely low importance*" to "*Extremely high importance*."

An additional block was included for exploratory purposes. Participants saw the same

vignettes as before but instead of the open-ended or scale measures, they were asked, for each

vignette, if they were thinking of a specific group of people from society. If the answer was yes,

they were asked to specify what group of people they were thinking about (see Supplement for

results). The purpose of this was to further rule out that the results could be driven by

participants thinking about specific groups (e.g., immigrants) in the different conditions. A final

block asked participants for demographics

Analysis strategy. Data and model structure were the same as in previous studies (except

for the within-subjects specification). To obtain a continuous measure of semantic meaning from

the participants' open-ended responses, we used word embeddings to quantify the pairwise

similarity between participants' responses and words included in our dictionaries. Word

embeddings identify other words that tend to co-occur close to the target word in the same text.

We used two word embedding models, specifically Word2Vec (Mikolov et al., 2013; model

trained on Google News, see https://code.google.com/archive/p/word2vec/) and Glove

(Pennington et al., 2014; model trained on the Common Crawl, see

https://nlp.stanford.edu/projects/glove/). To elaborate, these word embeddings obtain semantic

relatedness from large corpora of text based on word co-occurrences (i.e., how often two words

appear close to each other) by comparing the similarity of the context in which two words

appear. Put another way, words that tend to co-occur with the same set of words are more

semantically similar to each other. For example, both *republican* and *conservative*[3] often co-occur with words such as *politics* or *party*, and are thus highly semantically related, whereas *republican* and *extroverted* do not necessarily co-occur often and receive a lower semantic relatedness score.

To represent words, for every word in their vocabulary, the word embeddings used here provided us with 300-dimensional vectors, derived from their co-occurrences in all the training text (through algorithms not discussed in depth here, see Mikolov et al., 2013; Pennington et al., 2014). Given that the vectors encode the semantics of words in a Euclidean space, we can obtain a summary representation of several words by averaging their vectors. We did this for several words obtained from the literature, associated with each of the different facets/dimensions (see Nicolas et al., 2020), providing us with vector representations for each facet/dimension. We also obtained the vector representation for each response the participants provided. The word embedding score used for analyses was then the cosine similarity between the response vectors and each facet/dimension summary vector.

Word embeddings' cosine similarity theoretically provides a score that could range between -1 and 1 (although in practice the range is much more restricted). Here, higher scores indicate that the response is more closely associated with the semantic context of the words in a dictionary. To illustrate, in Word2vec, *republican* has a score of .54 in the Beliefs dictionary but a score of .15 in the Assertiveness dictionary, while *considerate* has a score of .66 in the

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[3] Antonyms such as republican and democrat may also co-occur with similar contexts and may thus have relatively high similarity scores in the approach used here. Thus, this method is not very sensitive to antonymy and mainly codes for similarity to a dimension, regardless of direction. This is similar to the scale and dictionary approaches used in all studies.

Sociability dictionary, but a score of .28 in the Beliefs dictionary. (See Nicolas et al., 2020, for more details on this method.)

We analyzed the data using linear mixed models with participants as random factors. We included random slopes when models converged.

Results

Scales. We found significant effects of condition, $F(1, 204.6) = 4.14$, $p = .043$, $\omega^2 = .02$, dimension, $F(3,5394.1) = 495.40$, $p < .001$, $\omega^2 = .31$, and their interaction, $F(3,5394.1) = 27.66$, $p < .001$, $\omega^2 = .02$.

Dimension use. Upon further inspection (controlling for a family of 6 estimates), we found that Sociability ($M = 5.98$) and Morality ($M = 5.91$) were the highest rated facets ($ps < .001$; not different from each other, $p = .825$). Ability ($M = 4.63$) followed, being higher than Beliefs ($M = 4.45$, $p = .045$) and Status ($M = 3.41$, $p < .001$), but not Assertiveness ($M = 4.53$, $p = .634$). Assertiveness was higher than Status ($p < .001$), but not Beliefs ($p = .761$). Beliefs was higher than Status ($p < .001$). If facets were combined, Warmth was the largest dimension, while Competence was larger than Status but not Beliefs.

Effect of structure vs. relational condition. When looking at the interaction (see Figure 4), we found that Sociability was significantly higher in the relational ($M = 6.19$) than structural condition ($M = 5.77$), $t(2389.12) = 4.53$, $p < .001$, $d = .27$. Morality was also higher in the relational condition ($Ms = 6.08$ vs 5.74), $t(2389.12) = 3.68$, $p < .001$, $d = .22$. On the other hand, Ability ($Ms = 4.81$ vs. 4.45), $t(2389.12) = 3.83$, $p < .001$, $d = .23$, Status ($Ms = 3.79$ vs. 3.01), $t(2389.12) = 8.43$, $p < .001$, $d = .50$, and Beliefs ($Ms = 4.59$ vs. 4.30), $t(2389.12) = 3.09$, $p = .002$, $d = .19$, were higher in the structural (vs. relational) condition. We found no difference in Assertiveness, $t(2389.12) = 1.0$, $p = .317$.

When combining the facets, Warmth was higher in the relational than structural condition, but there was no difference for Competence.
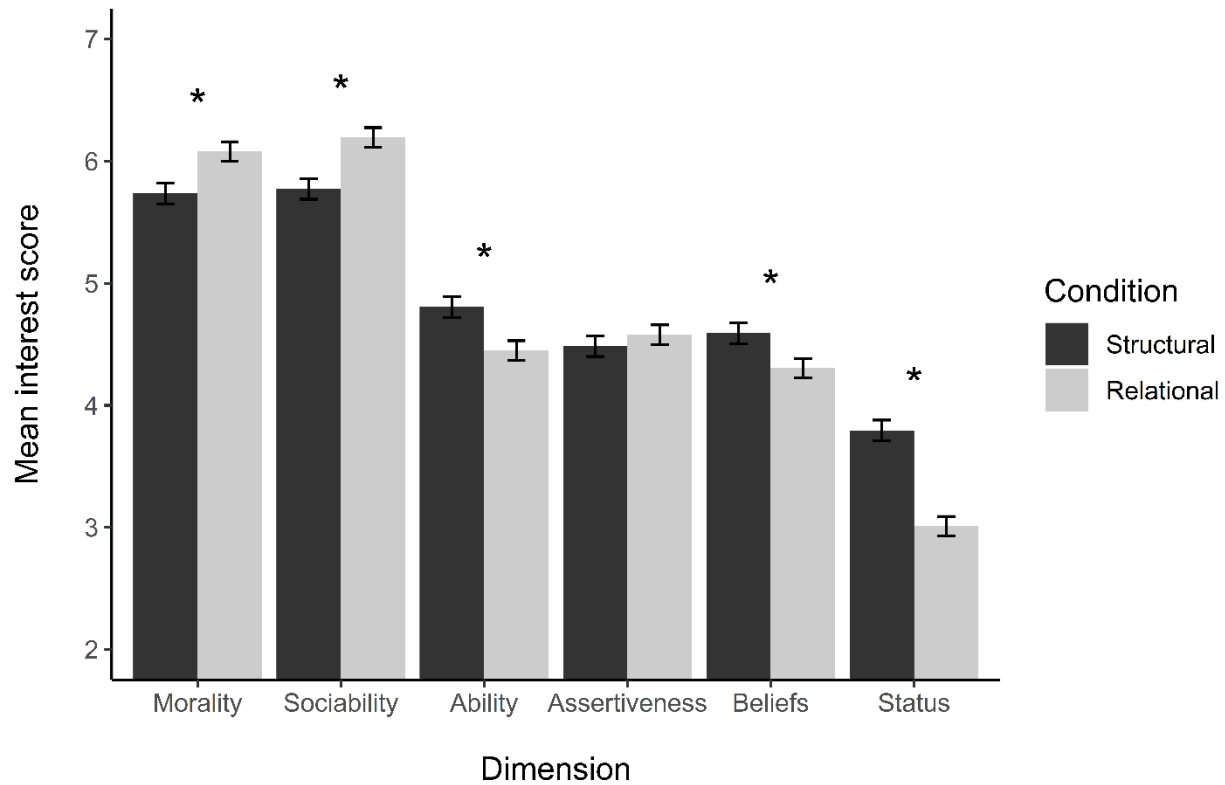

Figure 4. Effect of condition on the scale facets/dimensions, Study 3. Error bars indicate standard errors.
* p < .05 for pairwise comparison.

Word embeddings. When looking at the word embedding facets, we found a non-significant effect of condition, $F(1, 182.9) < .01$, $p = .996$, $\omega^2 = .01$, a significant effect of dimension, $F(5, 5233.8) = 107.05$, $p < .001$, $\omega^2 = .09$, and a significant interaction, $F(5, 5233.8) = 32.82$, $p < .001$, $\omega^2 = .03$.

Dimension use. When broken down, the dimension main effect revealed that Sociability ($M = .35$) was higher than all other dimensions ($ps < .001$). Morality ($M = .34$) was larger than the remaining dimensions ($ps < .001$), except Ability ($M = .33$, $p = .683$), which in turn was

larger than the other remaining dimensions ($ps < .001$). Beliefs ($M = .32$) followed, larger than

Assertiveness ($M = .31$, $p < .001$) but not Status ($M = .32$, $p = .144$). Assertiveness and Status

were not significantly different ($p = .279$). In the grouped analysis, Warmth was the highest

dimension, followed by Competence, which was higher than Status but not Beliefs.

     Effect of structure vs. relational condition. Further analyses (see Figure 5) show that

Sociability was significantly larger in the relational ($M = .37$) than structural ($M = .34$) condition,

$t(283.85) = 4.20$, $p < .001$, $d = .28$. The difference for relational vs structural was not significant,

ds $< .07$, for Morality (Ms $= .34$ vs. .34), $t(283.85) = -0.09$, $p = .927$, Ability (Ms $= .34$ vs. .33),

$t(283.85) = 1.04$, $p = .299$, and Assertiveness (Ms $= .32$ vs. .31), $t(283.85) = 1.07$, $p = .287$.

Beliefs (Ms $= .33$ vs. .32), $t(283.85) = -2.95$, $p = .004$, $d = .20$, and Status (Ms $= .33$ vs. .31),

$t(283.85) = -3.24$, $p = .001$, $d = .22$, were higher in the structural than relational condition. In the

grouped condition, Warmth was higher in the relational than the structural condition, but there
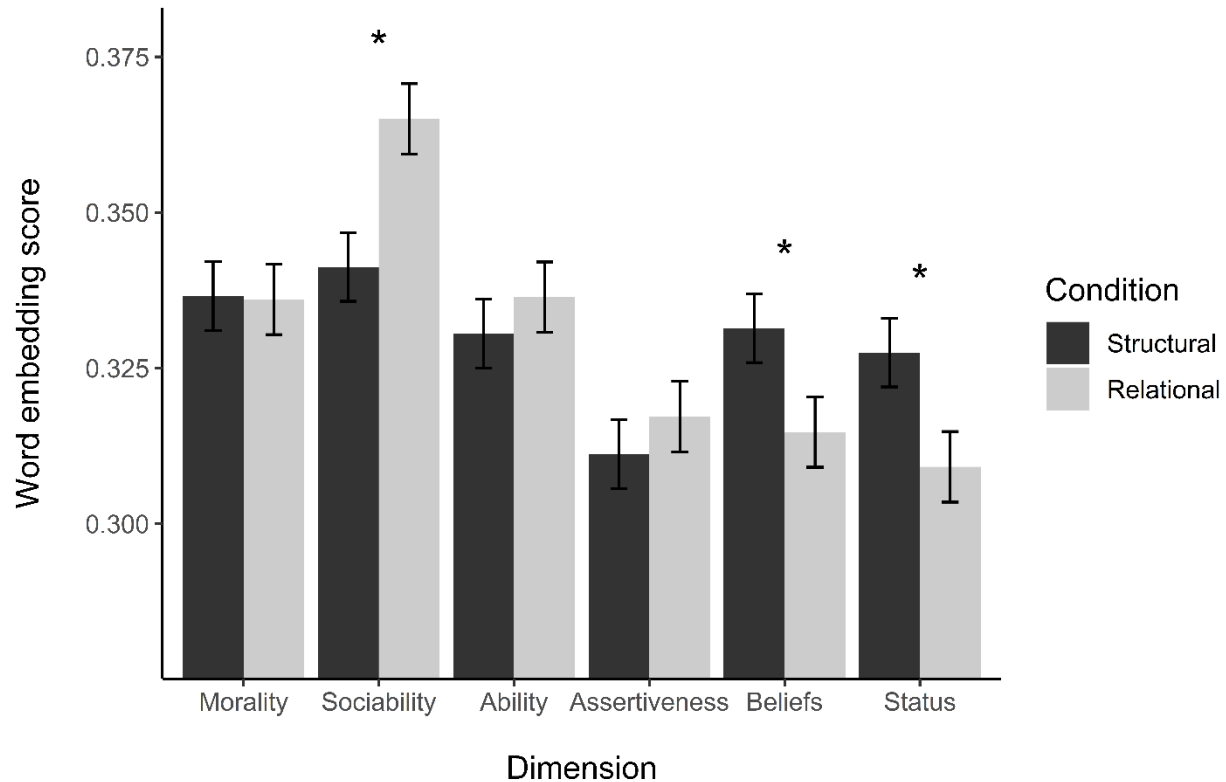
was no difference for Competence.

Figure 5. Effect of condition on the word embedding coded facets/dimensions, Study 3. Error bars indicate standard errors. * p < .05 for pairwise comparison.

Discussion

Study 3 sought to provide a more direct test of the role of relational vs. structural goals as moderators of which dimensions participants prioritize in information gathering. To achieve this, we modified the vignette by replacing information about moving into a neighborhood or nation with a direct relational or structural information goal. Specifically, we asked participants to indicate what is important to know about the targets in order to either interact with them or understand them in the societal context. In addition to modifying the vignette, we changed the analysis strategy for open-ended responses, allowing us to obtain continuous measures of semantic similarity to the dimensions. This strategy allows coding independently from our

dictionaries (see Supplement for a dictionary analysis of the same data). Additionally, although the dictionary coding provides a less noisy estimate, the word embeddings method is more sensitive to each response's semantic relatedness to all dimensions, allowing for more dimension intercorrelations. Thus, our results are robust to various coding methods of differing strengths and weaknesses. Besides open-ended responses, we included more traditional scale measures of the dimensions, allowing a more direct comparison of scaled and spontaneous responses.

First, we replicated the previous studies' general interest in learning about a novel group's Sociability and Morality (Warmth), regardless of condition. Warmth was followed by Ability, Assertiveness, and Beliefs, with smaller interest in Status. Furthermore, as in the previous studies, this effect was moderated by the relational versus structural goal. Specifically, interest in Sociability was again larger in the relational than in the structural condition, for both scaled and spontaneous responses. For scales, Morality was also larger in this condition.

On the other hand, and in line with previous studies, Beliefs, for both the scaled and spontaneous responses, replicated Study 1 (as well as the trend from Study 2), being higher in the structural than in the relational condition. Competence, unlike previous studies, was not significantly different between conditions (except when using scales, where Ability was higher in the structural condition). However, in this case the effect of condition was significant for the highly correlated dimension of Status, higher interest in the structural condition for both the scale and spontaneous responses. Potentially, the more direct activation of the structural goal led participants to focus on the more structurally relevant dimension of Status rather than Ability or Assertiveness in this study. Alternatively, associations with immigrants' stereotypes about Ability might have affected responses in our previous studies.

Scaled and spontaneous indicators largely agreed in terms of dimension importance and moderation by condition. However, some differences arose, such as Ability and Morality being significantly moderated when measured using scales, but not when using open-ended responses. Additionally, the effect sizes tended to be smaller for the spontaneous responses. These results may reflect differences in the dimensions that are relevant to participants even when unprompted by the experimenter but may also reflect the higher noise in open-ended responses.

In general, this study found congruent results with the previous studies, showing participants' greater interest in Warmth as a dimension, and a moderating role of relational versus structural goals. In particular, this study provides more direct evidence that goals related to personally interacting with others prompt more relative interest in Sociability, while goals related to understanding the social context prompt more relative interest in Competence-related dimensions (Ability, Assertiveness, or Status) and Beliefs. We clarify that this effect is not unique to vignettes that manipulate impressions of novel groups in the environment, but that it generalizes to information seeking about unknown groups. Therefore, we rule out that the results were driven by expectations about specific groups being more common in the neighborhood vs. nation (e.g., immigrants in the nation). These results also make it less likely that a bias to seek confirmatory information based on stereotypes explained the results (in this study, participants had no information about the target; c.f., Skov & Sherman, 1986).

Study 4: Relational or Structural Goals Compared to a Baseline Condition

Study 4 replicates Study 3's interest metric, using the direct goal manipulation, while incorporating a baseline condition where no goal is provided. The inclusion of such a baseline disambiguates the effect of structural goals from the effect of relational goals. This design also allows an examination of baseline dimension priorities in information gathering. To be sure, we

expected to replicate the priority of Warmth regardless of condition. Moreover, we expected to find that both the relational and structural goals would move perceivers away from their baseline, at least for some dimensions, in line with the previous studies where relational goals revealed a preference for Sociability, while structural goals had participants favor information on Competence/Status and Beliefs dimensions.

Methods

     Participants. Participants were 1016 Amazon Mechanical Turk workers whose mean age was 36.2 years, 60% were male, and 67% were White (18% Black, 6% Multiracial, 5% Asian, 4% Hispanic). A power analysis using the values for Beliefs from Study 3 (condition effect: $d =$ .19, smallest significant effect) revealed that a sample of 1000 participants provided 98% power in this simplified simulation.

     Materials and procedure. Study 4 had a repeated measures design in which participants completed the dimension priority rating measures under a baseline (i.e., no goal), relational goal, and structural goal condition. Participants always saw the baseline condition first: "Imagine a group of people of a certain kind. Of the following, which are most important to learn about this group?" followed by the different dimensions (Sociability: *Friendly/Sociable*; Morality: *Trustworthy/Honest*; Ability: *Competent/Skilled*; Assertiveness: *Self-confident/Assertive*; Beliefs: *Traditional/Conservative*; Status: *Wealthy/High Status*) measured in a 7-point scale (from Extremely low importance to Extremely high importance). This block was followed by the relational and structural conditions blocks, in random order, which used the same DV as the baseline condition, and the same manipulation as Study 3 (relational: goal to "personally interact with this group?"; structural: goal to "understand this group in a societal context?"). After these blocks, participants completed demographics questions.

Analysis strategy. We analyzed the data using linear mixed models with participants as random factors. We included random slopes when models converged.

Results

We found effects for all three predictors of facets, $F(5, 17255) = 1303.60$, $p = <.001$, $\omega^2 = .27$, condition, $F(2, 17255) = 44.17$, $p < .001$, $\omega^2 = .01$, and the interaction, $F(10, 17255) = 84.46$, $p < .001$, $\omega^2 = .05$. We follow up with the effects of interest.

Dimension use. After a Tukey adjustment for 6 estimates, the facet main effect indicates that, averaging across conditions, Morality received the highest interest ($M = 6.02$), followed by Sociability ($M = 5.82$), followed by Ability ($M = 5.12$), then Assertiveness ($M = 4.75$), then Beliefs ($M = 4.34$), and finally Status ($M = 3.76$), with all pairwise comparisons ps < .001. When facets were combined a similar pattern emerged, with Warmth being higher than all other dimensions, followed by Competence, then Status, and finally Beliefs.

Effect of structure vs. relational vs. baseline condition. Breaking down the interaction (see Figure 6), with adjustments for a family of 3 estimates within each dimension, we find the following: For Sociability, the relational condition elicited the highest interest in the facet ($M = 6.13$), the baseline condition was intermediate ($M = 5.79$), and the structural condition elicited the lowest interest ($M = 5.53$), ts(17255) > 4.33, ps < .001, d range = [.17, .39].

Morality received similar interest in the relational ($M = 6.09$) and baseline ($M = 6.21$) conditions, $t(17255) = 2.1$, $p = .090$; however, the structural condition ($M = 5.77$) elicited lower interest in Morality than both relational and baseline, ts(17255) > 5.44, ps < .001, d range for Morality = [.08, .29].

Interest in Ability peaked in the baseline condition ($M = 5.42$), followed by the structural ($M = 5.20$) and then the relational ($M = 4.74$) condition, ts(17255) > 3.72, ps < .001, d range =

[.14, .45]. For Assertiveness, there were no condition effects, ts(17255) < 1.57, ps > .258. In

terms of Beliefs, we found that the structural goals elicited the highest interest (M = 4.78),

ts(17255) > 10.64, ps < .001; interest in Beliefs was similar for the relational (M = 4.10) and

baseline (M = 4.15) conditions, t(17255) = 0.79, p = .712, d range for Beliefs = [.03, .44].

Finally, interest in Status was also highest in the structural condition (M = 4.48), and it was

slightly higher in the baseline (M = 3.47) than the relational (M = 3.31) conditions, ts(17255) >
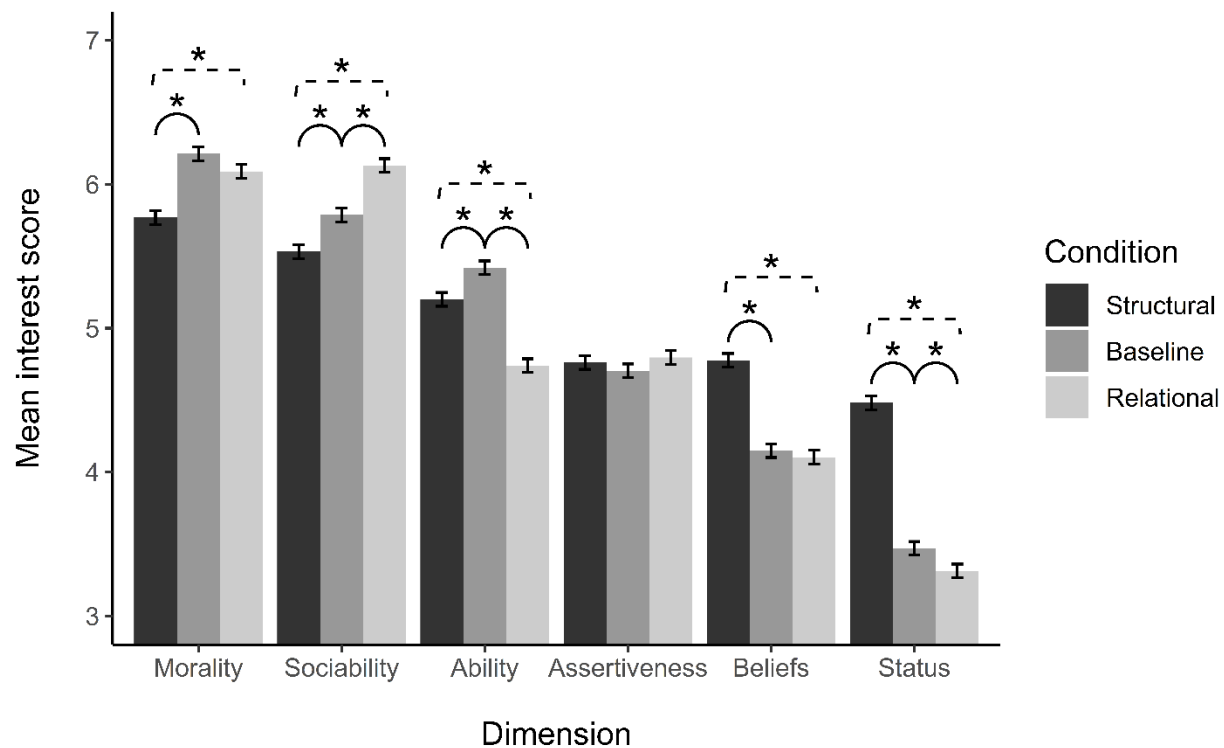
2.67, ps < .02, d range = [.10, .77].

Figure 6. Effect of condition on the facets/dimensions, Study 4. Error bars indicate standard errors.

* p < .05 for pairwise comparison.

Discussion

Study 4 expanded on the current series by demonstrating that both relational and structural goals exert an effect on dimension priority, as compared to baseline interest. In particular, relational goals increased interest in Sociability and structural goals decreased it. For other dimensions, structural goals were the main drivers of previous effects, such as for Beliefs and Status. We also found condition differences for Morality, which garnered less interest under structural goals, and Ability, which received the most interest in the baseline condition, while relational goals elicited the least interest. These findings replicate previous differences between structural and relational goals, while further clarifying their independent effects.

This study also further established the priorities of the different dimensions across conditions, with Morality being the most prioritized facet, followed by Sociability (which together compose the Warmth dimension). Ability followed by Assertiveness, both of which comprise the Competence dimension, also received high interest in the baseline conditions, as when collapsing across goals. Finally, Beliefs, and then Status, the more structural dimensions highlighted by the ABC model also received substantial, albeit smaller, interest in baseline or when collapsing across condition.

Across all previous studies we have found congruent evidence for the role of structural and relational goals in the priority of dimensions during information gathering. This evidence was corroborated using a variety of measures, from traditional scales to open-ended responses coded using novel methods. However, the underlying process examined relied on self-report. In the final study we explore actual information gathering behavior in a cognitive task.

Study 5: Relational or Structural Goals and Information-gathering Behavior

In Study 5, we used a more direct measure of information gathering by introducing a timed task that instructed participants to select the information most relevant to them, as a measure of priority. This study aimed to move away from self-reported information-seeking preferences to measure the behavior directly, further establishing the robustness of the effect across methods and operationalizations. We preregistered our methods and predictions for this study (available in the online repository).

We again hypothesized that participants would seek to learn more about the target groups' Sociability when the goal was to relate to the group but would seek to learn more about the target groups' Status and Beliefs when the goal was to understand the group in a societal context.

Methods

Participants. Participants were 605 workers recruited through Amazon Mechanical Turk. Participants' mean age was 38.7 years, 52% were female, and 69% were White (10% Black, 10% Asian, 5% Hispanic, 4% Multiracial). In terms of power, for Study 5 we used a pre-test to obtain a range of effect sizes for power analyses. Using simulation, we estimated the sample size and power required for effect sizes as large or larger as the effect of Ability (which was marginally significant), which was smaller than the effects for Sociability, Beliefs, and Status, the dimensions of interest. The power analysis indicated that samples of 400-600 would have 80-90% power to detect an effect size of 0.11 in a model with the planned analysis specifications.

Materials and procedure. Study 5's design was within participants for the structural vs. relational goal manipulation. The study asked participants to imagine a novel group of people

they would be learning about. They were told their goal would be to either "personally interact with the group" (relational) or to "understand the group in a societal context" (structural), and so they should prioritize gathering information about dimensions helpful to this goal.

The task consisted of two blocks, instructing participants to prioritize either the relational or the structural goals, in random order. Instructions between each block indicated that the group in the second block is different from the group in the first block. Each block consisted of 12 trials presenting participants with 6 boxes representing information about a group member's Sociability, Morality, Ability, Assertiveness, Status, and Beliefs. The boxes for each dimension were randomly ordered vertically on the screen, and included a dimension label (e.g., "Competent vs. Incompetent" for the Ability box), and, in smaller font, a reminder of the current block's goal (e.g., "goal: understand the group in a societal context" for the structural condition). Participants were instructed to click on the boxes of the dimensions they were interested in learning about, which caused the box to expand, revealing whether the group member was high or low on the dimension (e.g., "This group member is Incompetent/Unskilled"). There was an equal number of high and low members for each dimension, and this information was mostly irrelevant to the hypothesis of which boxes participants *selected* (including various variables to account for order effects did not change results; see Supplement). Each trial lasted 7 seconds, including time spent when a box was selected and expanded, so participants were forced to prioritize dimensions of interest under the time constraint. The task was designed using the Dynamic Process Tracing Environment (DPTE, accessible at

https://dpte.polisci.uiowa.edu/dpte/) and its dynamic process tracing approach, which has been extensively used in information search studies (see Andersen et al., 2019; Lau & Redlawsk, 1997).

Analysis strategy. We analyzed the data using Poisson mixed models with participants as random factors. The outcome variable consisted of the sum of dimension selections in the block.

Results

For Study 5, we found a non-significant effect of condition, $\chi 2(1) = 0.84$, $p = .361$, but significant effects of dimension, $\chi 2(5) = 575.25$, $p < .001$, and their interaction, $\chi 2(5) = 66.22$, $p < .001$.

Dimension use. Upon further inspection (controlling for a family of 6 estimates), we found that Morality (*rate* = 3.24), Beliefs (*rate* = 3.09), and Sociability (*rate* = 3.05) were the most selected facets (*ps* < .001; not different from each other, *ps* > .063). Status (*rate* = 2.71) followed, then Ability (*rate* = 2.30), and finally Assertiveness (*rate* = 2.02), all ps < .001. Combining facets, Warmth was the most selected dimension, while participants selected Competence more than Status and Beliefs[4].

Effect of structure vs. relational condition. When looking at the interaction (see Figure 7), we found that Sociability was selected significantly more in the relational (*M* = 3.27) than structural condition (*M* = 2.85), *Z* = 4.19, *p* < .001. On the other hand, participants selected Beliefs (*M*s = 3.26 vs. 2.93), *Z* = -3.19, *p* = .001, and Status (*M*s = 2.98 vs. 2.46), *Z* = -5.47, *p* < .001, more in the structural (vs. relational) condition. We found no difference in any of the other dimensions, *ps* > .143.

When combining the facets, participants selected Warmth more in the relational than structural condition, but there was no difference for Competence.

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[4] We note that for this task, Warmth and Competence scores are computed as the sum of their corresponding facets. However, this may inflate their response rate estimates to the extent noise or response bias systematically led to higher scores for summed scores.
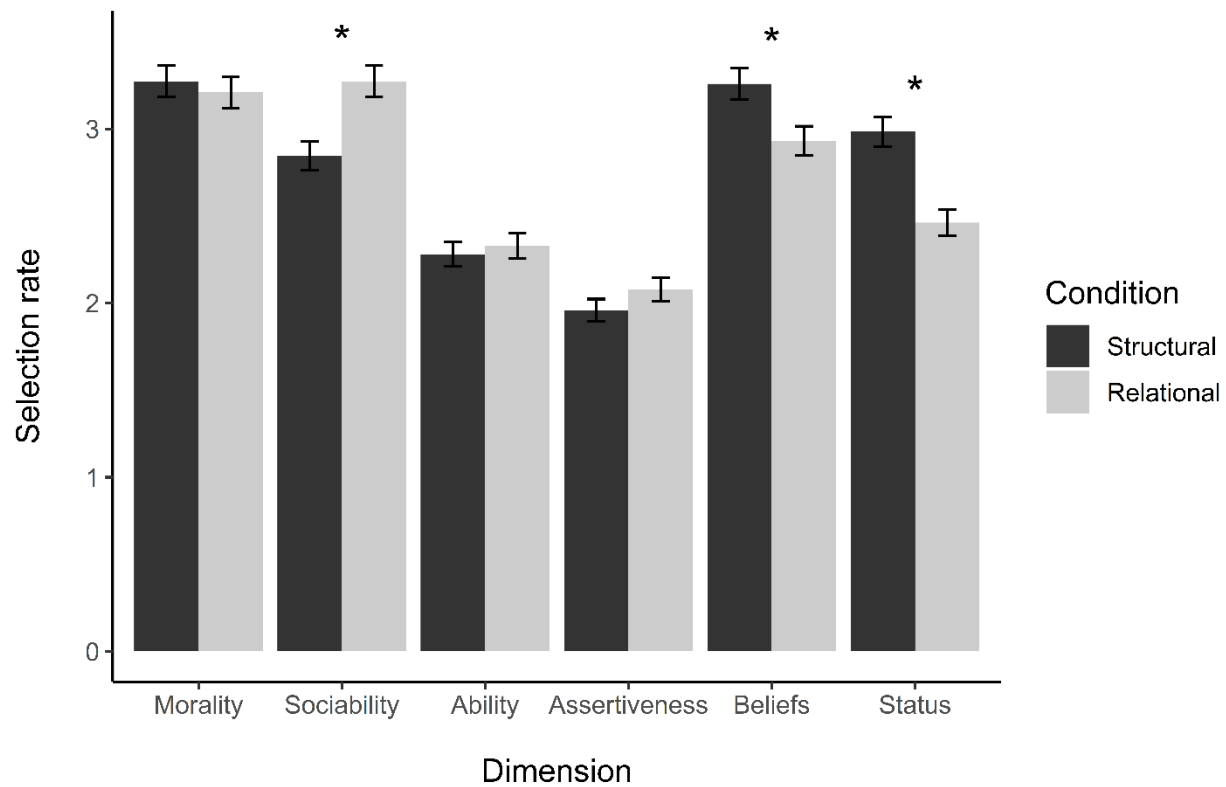
Figure 7. Effect of condition on dimension selection in an information gathering task, Study 5. Error bars indicate standard errors. * p < .05 for pairwise comparison.

Discussion

  Study 5 tested whether previous studies' self-reported information-gathering interest replicated using direct measurements of information gathering. A timed task required participants to select information based on their goals, manipulated to be either relational or structural, using the manipulation from Studies 3 and 4.

  This approach replicated the pattern of results from previous studies. First, we replicated the interest in gathering information about groups' Warmth across structural and relational goals. Furthermore, we replicated the effect of relational vs. structural goals: an explicit goal of relating

to groups led to higher interest in Sociability, while a goal to understand a group in a societal context led to higher interest in Beliefs and Status. Effects on Competence's facets were not significant, following a pattern of inconsistent results across studies (albeit with a strong tendency for higher scores in the structural condition for the Ability facet).

An unexpected pattern arose in this study, showing information gathering rates for Beliefs and Status that were higher than rates for Ability and Assertiveness. Because this study, unlike previous ones, measured information gathering behavior rather than self-report, it is possible that differences are due to impression management or social desirability norms. For example, it may be that explicitly self-reporting interest in a target's Beliefs or Status seems less appropriate than inquiring whether a target is smart or assertive. Given the dynamic and indirect nature of Study 5, self-presentation concerns may have been less salient to participants. Of course, alternative explanations are possible, and should be addressed in the future.

This final study establishes the robustness and generalizability of the general pattern we set out to study: a general interest in learning about groups' Warmth, but a more general pattern of moderation by goal of the various dimensions of stereotype content. This effect goes beyond self-report into information gathering behaviors in a cognitive task.

General Discussion

People want information about others along a few fundamental dimensions; consistent with a pragmatic viewpoint, their current goals determine what they need to know. Here, we sought to study the dimensions that perceivers spontaneously prioritize when gathering information about unknown social groups. Because priorities depend on functions, we explored whether having relational (e.g., deciding whether and how to interact with a group) vs. structural (e.g., getting an overview of society) goals moderates dimensional priorities.

Specifically, we investigated the stereotype dimensions that people spontaneously use to evaluate social groups. Guided by the differences between the SCM and the ABC model of stereotype content, as collaborating adversaries, we hypothesized and empirically substantiated that the typical method of the ABC model relatively prompts structural goals in the social perceiver (i.e., understanding groups in their larger societal context), while the typical SCM method relatively prompts relational goals (i.e., understanding one's relation to proximal groups). We hypothesized that these differential goals moderate the dimensions that people prioritize when they gather stereotype content about groups, thereby reconciling the difference between the models. In five studies, we used people's information gathering priorities to measure their spontaneously used dimensions of social perceptions. Table 3 summarizes the studies' main effects and Table 4 summarizes studies' simple effects of interest.

Table 3. Dimension main effects - Effect sizes.

Dimension 1		Dimension 2	S1	S2 – SC	S2 – Dict.	S3 - Scale	S3 - WE	S4 - Scale	S5 - IG
Ability	-	Assertiveness	0.74*	0.39*	0.04	0.06	0.23*	0.24*	0.29*
Ability	-	Beliefs	0.65*	0.01	-0.09	0.12*	0.12*	0.51*	-0.79*
Ability	-	Morality	-0.87*	-0.13	-0.40*	-0.82*	-0.03	-0.59*	-0.94*
Ability	-	Sociability	-0.37*	-0.30*	-0.23*	-0.87*	-0.23*	-0.46*	-0.75*
Ability	-	Status	1.11*	0.13	0.09	0.79*	0.18*	0.89*	-0.41*
Assertiveness	-	Beliefs	-0.09	-0.38*	-0.13	0.05	-0.11*	0.27*	-1.07*
Assertiveness	-	Morality	-1.61*	-0.52*	-0.44*	-0.89*	-0.26*	-0.83*	-1.22*
Assertiveness	-	Sociability	-1.11*	-0.69*	-0.27*	-0.93*	-0.46*	-0.7*	-1.03*
Assertiveness	-	Status	0.37*	-0.26*	0.06	0.73*	-0.05	0.65*	-0.69*
Beliefs	-	Morality	-1.52*	-0.14	-0.32*	-0.94*	-0.16*	-1.1*	-0.15
Beliefs	-	Sociability	-1.01*	-0.31*	-0.14	-0.99*	-0.36*	-0.97*	0.04
Beliefs	-	Status	0.46*	0.12	0.18*	0.67*	0.06	0.39*	0.38*
Morality	-	Sociability	0.51*	-0.17	0.17	-0.05	-0.2*	0.14*	0.19
Morality	-	Status	1.98*	0.27*	0.50*	1.61*	0.21*	1.49*	0.53*
Sociability	-	Status	1.47*	0.43*	0.32*	1.66*	0.42*	1.35*	0.34*

Note. S1 – S5 are Studies 1-5. SC = Self-coded, WE = Word embeddings, Dict. = Dictionary-coded, IG = Information gathering selection sum. Results for Study 2 and for Study 5 are Incidence Rate differences (note that the models in text are based on rate ratios or differences in the log scale, differences are presented for ease of comparison), the rest of the results are Cohen's ds. Positive numbers indicate higher scores for Dimension 1 over Dimension 2.

* $p < .05$

Table 4. Effect of structural vs. relational goal on interest in dimension, per dimension - Effect sizes.

Goals	Dimension	S1	S2 – SC	S2 – Dict.	S3 - Scale	S3 - WE	S4 - Scale	S5 - IG
Structural - Relational	Ability	0.73*	0.26*	0.13*	0.23*	-0.07	0.30*	-0.05
Structural - Relational	Assertiveness	0.39*	0.05	0.22*	-0.06	-0.07	-0.02	-0.12
Structural - Relational	Beliefs	0.36*	0.18	0.14	0.18*	0.2*	0.44*	0.33*
Structural - Relational	Morality	-0.05	-0.04	0.20	-0.22*	0.01	-0.21*	0.06
Structural - Relational	Sociability	-0.33*	-0.28*	-0.21*	-0.27*	-0.28*	-0.39*	-0.42*
Structural - Relational	Status	0.07	-0.13	0.01	0.5*	0.22*	0.77*	0.52*

Note. S1 – S5 are Studies 1–5. SC = Self-coded, WE = Word embeddings, Dict. = Dictionary-coded, IG = Information gathering selection sum. Results for Study 2 and for Study 5 are Incidence Rate differences (note that the models in text are based on rate ratios or differences in the log scale, differences are presented for ease of comparison), the rest of the results are Cohen's ds. Positive numbers indicate higher scores for the Structural over the Relational condition.

* $p < .05$

Studies 1 and 2 prompted participants to indicate what they would like to learn about an unknown social group in either a neighborhood or national context, which respectively prompted more relational vs. structural goals. Studies 3 and 4 manipulated participants' relational and structural goals more directly when learning about an unknown group, with and without a baseline condition of no explicit goal. Finally, Study 5 measured information gathering behavior directly in a cognitive task.

Implications for Main Aims

With these data, we may answer the research questions formulated under our main aims. First, people prioritize information about groups' warmth when they gather information about novel groups. As shown in Table 3, on average across the conditions, all studies supported a priority of Warmth, such that people self-reported interest in and gathered more information about new groups' Sociability and Morality than about other dimensions.

Second, the proposed relational versus structural goals moderated the overall priorities. Specifically, emphasizing relational goals made participants even more interested in Sociability. Emphasizing structural goals made participants relatively more interested in Competence-related facets (Ability, Assertiveness, and Status) and Beliefs. Beyond the evidence from the specific experiments, this conclusion is supported by an internal meta-analysis of the studies presented here: Averaging across conditions, participants showed most interest in learning about Morality and Sociability, and this interest was significantly higher under relational (vs. structural) goals for both facets. On the other hand, interest in Ability, Status, and Beliefs increased under structural goals (more information in Supplement). Moreover, these insights held whether we used traditional self-report measures (such as scales), more spontaneous, open-ended measures

(coded by participants, judges, or natural language analysis), or behavior in an information-gathering task.

Our research thereby provides several novel insights. In line with our goals, our research focused on a stereotype-formation process—gathering information about an unknown group—rather than the most common methods that explore existing stereotypes. Extrapolating these approaches to individual impression formation would be feasible and useful. Using the fundamental socio-cognitive dimensions of Warmth/Communion, Competence/Agency, and the newly introduced Beliefs, information gathering about groups follows similar trends to information gathering about individuals from previous studies (but future research could manipulate this experimentally).

In particular, as multiple models and previous results on interpersonal information gathering suggest, Warmth/Communion (i.e., Sociability and Morality) took priority regardless of our goal manipulation. The ABC model dimensions of Beliefs and Status (as well as the SCM overlapping facets of Competence) also received attention across conditions, suggesting their relevance to participants' group impressions and, by extrapolation, to individual impressions.

Beyond overall priorities of different dimensions, we find evidence for the moderating role of relational versus structural goals, which characterize two competing models. Below, we discuss the implications for the SCM and ABC model, as well as the broader implications for relational vs. structural goals in social perception.

Model Integration

The structural-relational contrast is theoretically relevant. Longstanding impression-formation models, from Asch (1946) to the SCM have prioritized Warmth. But the most recent model of stereotype content (the ABC model) both proposed a completely novel dimension (i.e.,

Beliefs), a variant on earlier dimensions (i.e., Status/Competence), and failed to find a priority of

Warmth using their similarity-based approach to group impressions.

However, several explanations for the discrepancy between models are plausible:

Particularly relevant to this paper is the insight that the ABC model's dimensions seem to reflect

a greater focus on societal-structural dimensions than the SCM dimensions. For example, the

SCM has long considered Status a structural antecedent to Competence, while the ABC model

incorporates Status into its Agency dimension. Beliefs can also refer to traits that describe the

structure of a society (e.g., its politics, religion), and shared Beliefs predict Warmth in both

models (Kervyn et al., 2015; Koch, Imhoff, et al., 2020). Warmth, thus, may be more related to

relational concerns – figuring out who is a friend or a foe by having shared or competing values.

Here we confirmed that the Warmth dimension (in particular the Sociability facet) was more

relational; the dimension distinct to the ABC model (Beliefs) and the ABC model's

interpretation of another (Competence/Status) were more related to structural concerns. Our

findings thus help clarify discrepancies between the two models. Moreover, our initial

motivation study found that the SCM and ABC model's respective tasks respectively prompted

relational and structural cognitions, in line with the rest of our data from the information

gathering perspective.

Our findings also speak to other differences between current stereotype content models.

In particular, we used both traditional (i.e., scales) and more spontaneous (i.e., open-ended)

measures, as well as measures of information gathering behavior. The ABC model has framed

their dimensions as being more spontaneous than the SCM's, so it was important to directly test

whether measures differing in spontaneity emphasized different dimensions. We introduced

novel methods, adapted from the field of natural language processing, in order to study open-

ended responses. Our results suggested that the distinction between traditional and spontaneous methods did not much affect differential dimension use. That is, regardless of whether we used constrained or spontaneous measures, participants showed the same interest in the dimensions, primarily Warmth, and the relational-structural manipulation had similar complementary effects. Furthermore, regardless of the manipulations used throughout these studies, all the dimensions proposed by the SCM and ABC model were used by participants, providing support for both models and their corresponding dimensions. Impression formation research might profit equally from going beyond its traditional Warmth and Competence to consider Beliefs and Status.

Together with other recent papers from our adversarial collaboration, we have illuminated some ways to reconcile current models of stereotype content. In previous studies, we have shown that the disappearance of Warmth from the ABC model can be partially explained by the model's previous reliance on aggregate ratings (Koch, Imhoff, et al., 2020; see also Imhoff & Koch, 2017; Koch & Imhoff, 2018). We found that Beliefs and Competence (and Status) stereotypes were more consensually shared between participants, making Warmth more idiosyncratic (Koch, Imhoff, et al., 2020). This resulted in the ABC model averaging out the effect of Warmth due to its definition of priority in terms of shared variance explained. In this paper, we examined a further difference between the models' approaches that sheds additional light on the discrepancies. In particular, we showed that relational versus structural goals, which are implicit in the methods of the SCM (more relational) and ABC model (more structural), influence the extent to which participants turn to certain dimensions in information gathering in line with the dimensions promoted by each model.

Finally, although our findings speak mainly to the discrepancies between the SCM and ABC model, they are also relevant to other models of social cognition previously reviewed. For

example, distinct patterns for the facets of the different dimensions and the focus on Warmth is in line with the Dual Perspectives Model and others (e.g., Abele et al., 2016; Carrier et al., 2014). We also found evidence for a priority of Morality (as proposed by the Behavioral Regulation Model and others; e.g., Ellemers, 2017; Goodwin, 2015) under most contexts, which was sometimes surpassed by interest in Sociability given the explicit manipulation of relational goals. Finally, our studies are relevant to many other models that explore patterns of dimension priority in person perception (e.g., the Dimensional Compensation Model; Judd et al., 2005; Yzerbyt, 2018; Yzerbyt et al., 2005).

Structural vs. Relational Goals in Society

Distinguishing between relational and structural goals may have relevance to multiple topics in social psychology and society. For example, individuals view the roots of intergroup conflict as relatively interpersonal vs. systemic (e.g., Roberts & Rizzo, in press). And different media may show different biases depending on their focus (e.g., the Neighbors app, see Simon, 2018, vs. a national newspaper). Further, the priority of the dimensions in different decision-making situations may depend on relational goals (e.g., Warmth/intent in a shooting decision or policing interpersonal interactions, e.g., Correll et al., 2007) or on structural goals (e.g., Status and Beliefs in determining institutional diversity policies based on the society's structure, e.g., Dobbin, 2009).

To elaborate on a potential implication, the distinction between relational and structural goals, and their corresponding dimensions, is relevant how people understand social change and intergroup conflict. By proposing structural and relational goals as distinct and predictive of unique information-gathering priorities, our studies may speak to the maintenance of systemic inequality. For example, ignorance of historical structural differences between racial groups

predicts denial of current systemic racism (Nelson, et al., 2013). Furthermore, this ignorance is motivated, with members higher in group identification being more likely to ignore information about groups' historical position in society relative to other groups (Kurtis et al., 2010; Sahdra & Ross, 2007). Our findings suggest that denial of systemic oppression (and thus, inaction to change it) may be understood beyond knowledge of history, in terms of lower structural goals, resulting in a general lack of information seeking about systemic dimensions such as groups' Status. Instead, denial of systemic racism may relate to relational goals, which may result in seeking out information about interpersonal traits (e.g., individual racism or lack of Morality) to explain inequality (see Bonam et al., 2019). Further individual differences (e.g., affiliative motivation) and situational cues (e.g., social distance norms) may shed additional light on how variations of relational vs. structural goals, through differences in information seeking, knowledge, and stereotyping, affects social change behavior.

As another example, structural vs. relational goals may help explain patterns of political polarization based on Beliefs information about social groups (see Finkel et al., 2020). Following our results, this may be understood in line with a goal to understand the social system and the political implications of behaviors such as voting, but less frequently directly seek out relational contact and direct information about groups' Sociability. A deeper understanding of relational vs. structural goals may inform interventions to bring perceivers to prioritize learning about others' Warmth, thus reducing affective political polarization (c.f., Wilson, Parker, & Feinberg, 2020) and other kinds of interpersonal and intergroup conflict.

Limitations and Future Directions

The current studies, nonetheless, have some limitations. For example, although we consistently show a tendency for Warmth to be more relational and for Competence, Status, and

Beliefs to be more structural, there were some discrepancies across our studies. As shown in Table 4 despite large agreement, some dimensions were significantly moderated in some studies/measures but not others. For example, while Warmth's Sociability facet was reliably related to relational goals, interest in Morality only increased when measured through scales and when relational goals were explicit (Studies 3 and 4). Additionally, interest in Competence-related dimensions (Ability, Assertiveness, Status) sometimes shifted, such that structural goals elicited information gathering interest about different facets across some studies. The minor differences that emerged should be addressed in future research, for example comparing scales to open-ended responses in more depth, or between coding methods of open-ended responses.

However, the general pattern across studies provides strong support for our proposed model-reconciling moderator of relational vs. structural goals, as the relational (vs. structural) condition increased information gathering of SCM-derived dimensions, while the structural (vs. relational) condition increased information gathering of dimensions that are highlighted by the ABC model. Future research may explore more distinctions, such as possible differences in how inferential dimensions are (e.g., are stereotypes about conservatives' Sociability more inferential than stereotypes about their Beliefs?), or consider other moderators, such as ingroup versus outgroup status of the target group or whether the target group is known or novel to the participants could be related to differences in dimensional prioritization.

Additionally, as indicated in the introduction, alternative theoretical frameworks are viable. For example, supplementary analyses found that our nation vignettes were perceived as more psychologically distant than the neighborhood vignettes. However, we also found that a vignette that manipulated psychologically distance, but not goals, failed to replicate the main results from Studies 1 and 2 (see Supplement), suggesting that our findings cannot be fully

explained by construal level. Nonetheless, construal level is likely to play a moderating role in dimension priority, a possibility that we expect future research to explore further.

Similarly, a larger focus on information seeking frameworks (e.g., Cameron & Trope, 2004; Skov & Sherman, 1986) suggests additional questions. For example: what kinds of questions would participants ask of novel and existing groups depending on goals? Is information processing about different dimensions, beyond gathering, also moderated by relational vs. structural goals? Is the effect of relational vs. structural goals in interpersonal information gathering different from what we found in an intergroup context? And what further roles does confirmation bias play as a component of information gathering under these goals?

Another limitation of the current studies is that we conducted them entirely with Mturk workers in the U.S., limiting the generalizability claims of the paper. The dimension priorities predicted by the different models could depend on context or culture (although we note that both the SCM and ABC have been explored in multiple cultures, with some differences, but stable conclusions regarding priority using their respective methods; e.g., see Bai, Ramos, & Fiske, 2020; Koch et al., 2016). For example, different nations have more and less variation in ideological beliefs as measured here (i.e., in conservative-liberal beliefs; c.f., Caprara & Vecchione, 2018). Future research should further test the generalizability of our findings across contexts and cultures, and test for potential moderators that have been identified in the literature, such as socioeconomic inequality and conflict (e.g., Durante et al., 2017).

Conclusion

In sum, we have shown that, as in the broader social cognition literature, participants prioritized Warmth, in this case, when seeking information about an unknown social group. Competence and Beliefs followed (with Competence being prioritized sometimes more than

Beliefs), and Status garnered the least interest. Also, a relational-structural manipulation moderated interest in the dimensions: Participants paid more attention to Warmth (particularly its Sociability facet) given relational goals, and to Competence-related dimensions (including Status) and Beliefs given structural goals. Further, these insights held regardless of whether we presented participants with predetermined dimensions or allowed them to spontaneously choose the dimensions, in either self-report measures or behavioral measures in a cognitive task.

These findings suggest that perceivers will tend to prioritize learning about other people's intentions (Warmth), but that other dimensions become more important under different goals. Thus, our findings clarify some of the factors that may have led to discrepancies between current stereotype content models and suggest future direction for impression formation research. Studying moderators of social cognitive content will be vital to furthering our understanding of how people navigate their social world and the broader society.

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