



Case Report

People take similarity of group markers to imply similarity of group members[☆]Pinar Aldan^{*}, Yarrow Dunham^{*}

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ABSTRACT

Group markers, such as the group's name, banner, or other symbols that are associated with a group oftentimes arbitrarily relate to group characteristics, and hence, they do not provide much information about the attributes of the group or its members. However, here we show that when reasoning about novel social groups people sometimes use such markers as cues to the characteristics of the groups that they are associated with, even in cases in which they know these markers were chosen arbitrarily. Across three studies (collected online; total $N = 485$) we show that: 1) people are more likely to think two novel social groups which have similar group markers (i.e., group names [Study 1] and identifying group colors [Study 2]) are more similar to each other than two groups which have more distinct markers, and 2) people not only take such markers as cues to group similarity, but they also expect others to intentionally pick group markers in ways that signal group distinctiveness (Study 3). Overall, these studies suggest that even though the effects of group markers are often dismissed in the intergroup cognition literature, they can affect how people perceive different groups in subtle ways.

1. Introduction

"With the Sweden vs. Switzerland FIFA world cup football match coming up, some may be (...) wondering how it's possible for one country to be facing itself" (Carlström, 2018). The joke, of course, is that while Sweden and Switzerland are completely independent and separate entities, people seem to confuse them or think these countries are very similar to each other. Why do people confuse these two countries more than other European countries? Could it be that these countries' names are similar? While the names of groups do not tell us much about the characteristics of those groups or the similarities between them, here we report three experiments which suggest that group markers, including names and identifying symbols, influence people's perceptions of how much two groups have in common. That is, people use the distinguishability of group *markers* as a tacit guide to the similarity of the *groups themselves*.

1.1. What are group markers for?

Starting from infancy, people tend to place individuals into different social categories (Hirschfeld, 1996; Kinzler, Dupoux, & Spelke, 2007; Shutts & Kalish, 2021). This is a core way humans make sense of the social world, as it enables people to make inductive inferences on the basis of category membership (Liberman, Woodward, & Kinzler, 2017; Rhodes & Baron, 2019), such as picking out ingroup members who might be more reliable cooperation partners or better informants (Brewer, 1999; Cosmides, Tooby, & Kurzban, 2003; Richerson & Boyd, 2008). Learning that a person is affiliated with a group can also shape perceptions about the person (Ratcliff, 2022), for example via stereotypes thought to apply to the group (Hamilton et al., 2015; Ratcliff & Nosek, 2011). While it is less frequently a topic of explicit discussion, it is worth noting that all these inferences depend on perceptual factors which allow us to tell one social category or group¹ from another, what we will here call *group markers*.

The way that social category or group markers work depends on the kind of group distinction that is of interest, and how the group marker

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¹ In this paper we define the term "social group" as collections of people who share an attribute which is less common than a category marker such as gender or race.

defines these groups in that context. Some markers, such as accent or language, might give cues about the group members, such as suggesting that outgroup members probably have had a different social history than one's ingroup members (e.g., Giles & Billings, 2004; Pietraszewski & Schwartz, 2014). However, group markers do not need to be deeply informative about the qualities of the social group members to delineate social category distinctions. As previous research suggests, even randomly assigned colors, symbols, or names that differentiate one group from the other, can be sufficient to create intergroup biases. For instance, a seminal experimental paradigm used in the lab focused on preferences for Klee versus Kandinsky paintings (Tajfel, 1970; Tajfel, Billig, Bundy, & Flament, 1971). The researchers thought that this would be a trivial group distinction that would create groups only minimally different from each other (hence, the paradigm was named the *minimal group* paradigm). Instead, the results indicated that even this minimal group distinction is sufficient to create ingroup biases (Tajfel, 1970; Tajfel et al., 1971). Follow-up work using even more minimal group distinctions such as explicit random assignment to novel groups based on names or colors is enough to create category distinctions and ingroup biases (Brewer & Silver, 1978; Pinter & Greenwald, 2011; Reynolds et al., 2007).

Although arbitrary symbols that are associated with social groups are sufficient to create intergroup identities, not all group markers do it to the same degree. One important characteristic that can affect the usefulness of a group marker is its distinctiveness. Markers that provide high discriminability between group members might allow people to discern members of a group more easily (Brase, 2001) and this could be instrumental in satisfying people's need for distinctiveness. This idea relates to Social Identity Theory, which suggests that people are motivated to gain an affirmative social identity by positively differentiating their ingroups from other groups (Tajfel & Turner, 2004; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). Relatedly, Optimal Distinctiveness Theory (Brewer, 1991) suggests that people use group membership to balance a need for differentiation (via emphasizing differences with outgroup members) with a need for connection (via emphasizing similarities with ingroup members; Abrams, 2009; Goldman, Chadwick, Funk, & Wocke, 2016; Reysen, Plante, Roberts, & Gerbasi, 2016). All these processes presuppose one's ability to differentiate social groups in the first place. But critically, the *extent* of differentiation, including that provided by group markers, might be an important piece of the psychological puzzle.

1.2. The current study

Despite some conceptual attention to group distinctiveness, the literature on social categorization has given limited attention to the effects of group markers themselves on social perception. While social group markers are abundant, from the lapel pins of ideological groups² to the random names that researchers use for identifying novel groups, there is limited research on how different kinds of markers affect perceptions of social groups.

The closest work we are aware of is research showing that the level of

² While in this paper we will focus on cases where the group markers' relationships to the groups are arbitrary, it is helpful to note that in some cases group markers, such as group colors, flags or mascots, are not fully arbitrary, but rather were chosen by group members for a specific reason, such as to represent their group at a symbolic level (e.g., such as the hammer and the sickle symbols used by various communist parties). It is also possible that some group markers that were initially used for symbolic reasons endure and evolve such that the original symbolism is lost. In such cases the markers may currently function more arbitrarily as mere identifiers (e.g., the symbols of donkey and elephant that are used to represent democrats and republicans in the US [Arn, 2020]). While in this paper we do not focus on such cases, we will discuss potential manifestations of these studies' results on the symbolism behind different group symbols.

arbitrariness of the group markers affects people's inferences (Hong & Ratner, 2021). This study compared groups created using two different minimal group paradigms: the Klee-Kandinsky paradigm, which is explained above, and the overestimator-underestimator paradigm (Tajfel et al., 1971), where people did a numerical estimation task and then were divided into two groups depending on their putative tendency to over- or underestimate set sizes. The results found that a bias for one's ingroup was more pronounced in the Klee-Kandinsky paradigm than the overestimator-underestimator paradigm (Hong & Ratner, 2021). The authors explained that participants had fewer preconceived notions about people who prefer Klee versus Kandinsky as compared to over- versus underestimators, and these preconceptions affected their perceptions of the members (Hong & Ratner, 2021). While suggestive in implying that preconceptions about group labels can affect ingroup-outgroup identification effects, these results do not speak to cases where group markers are less easily associated with traits, such as when they are arbitrarily chosen. Indeed, many group markers, such as group names or flags, seem unlikely to carry meanings that are readily transferable to known traits, and it remains an open question whether such arbitrary group markers can affect people's perceptions of these groups.

Another related finding on the effects of group markers comes from a study which investigated whether different methods of signaling group identities for novel members changed the way people attended to the faces of these members (Hong, Mayes, Munasinghe, & Ratner, 2022). Results showed that the group-denoting colors (blue versus green) had an effect on how people perceived the group members: people showed a deeper recognition-related neural activity for faces from the green group as compared to the blue group. In this case the group color was indicated by superimposing the faces on a square patch of color (Hong et al., 2022). The explanation for this effect is unclear, though it is possible that different colors cue attention to different degrees (Hong et al., 2022). At the very least, this finding suggests that arbitrary group markers can unexpectedly affect some aspects of intergroup cognition.

Overall, while there is some evidence in the literature hinting that features of group markers can shape people's perceptions of novel groups, there remain open questions concerning these effects. In this paper we focus on this issue by asking whether people use group markers as cues to make inferences about group differences even when they know that the group distinctions are minimal and thus that group markers are not informative about group characteristics. We consider these basic questions of social categorization and inference that may also inform our understanding of people's reactions towards the many different social identities they encounter. The inquiry also offers practical benefit; the minimal group paradigm is still one of the most widely used paradigms in social psychology (for recent reviews, see Dunham, 2018; Otten, 2016), but researchers employ the paradigm in very different ways, marking the categories with names, colors, picture preferences, bogus personality tests, and so on. These procedural differences are rarely the focus of the research itself (Pinter & Greenwald, 2011), but the present inquiry suggests it is something researchers should carefully attend to, as our findings show that seemingly arbitrary choices concerning group markers may influence the impressions participants develop about novel groups, which could in turn influence the effect sizes observed in past and future findings.

In the present work we focus on the effects of group markers from a third-party perspective. That is, we investigate the assumptions observers bring to bear concerning the relationship between group markers and features of those groups. We specifically focus on the group markers' effects on group distinctiveness, an important feature of social groups (Brewer, 1991; Tajfel & Turner, 1979; Turner et al., 1987). Specifically, we asked whether the similarity of two social groups' markers affects the perceived similarity of the groups themselves (i.e., their distinctiveness). In addition, we also tested the potential effects of group markers' similarity on other aspects of intergroup perception. For this we looked at how group markers' similarity affects people's predictions concerning the levels of intergroup bias amongst members of

the groups. We considered this plausible based on past work suggesting that perceived similarity between groups increases ingroup biases in first-party contexts, especially when people highly identify with their ingroup (Jetten & Spears, 2003; Roccas & Schwartz, 1993) and when the grouping criteria is arbitrary (and hence may not provide a sufficient ground for a meaningful intergroup distinction, Moghaddam & Stringer, 1988). These effects could be related to the need for a positive differentiation from an outgroup (Brewer, 1991; Tajfel & Turner, 2004; Turner et al., 1987) because people might have to put in extra effort to differentiate themselves from a similar outgroup. However, there are also findings suggesting that perceived intergroup similarity can increase willingness for outgroup social contact (Roccas & Schwartz, 1993), actual and predicted intergroup cooperation (Koch, Dorrough, Glöckner, & Imhoff, 2020), and overall liking of the outgroup (Chambers & Melnyk, 2006). Given our focus on third-party perceptions of groups, participants should not have a motivation to positively differentiate themselves from either group. Nonetheless, they may anticipate that perceived similarity will create a more positive relationship between groups (Koch et al., 2020) and therefore they will expect less ingroup bias in resource allocation.

In Experiment 1, we use group names as our group marker, and show that people think two groups which have more similar names are more similar to one another compared to two groups which have more distinct names. Experiment 2 replicates these findings using a different group marker, the color used to identify the group. Both studies also suggest, albeit less conclusively, that people expect more ingroup bias when the groups have more distinct markers. In Experiment 3 we show that people not only use such arbitrary symbols as cues to make inferences about social group differences, but they also intentionally pick group markers in ways that enhance distinctiveness, specifically when the groups have different characteristics. Overall, these studies suggest that arbitrary group markers are used as cues to the group's distinctiveness, and people can exploit this effect of group symbols to increase the distinctiveness of groups.

We report how we determined the sample sizes, all data inclusions, manipulations, and measures. Links for preregistrations³ and Supplementary file detailing data exclusions, all measures, and additional analyses are available via this OSF link: https://osf.io/89u4f/?view_only=45fcdcd88c6d45d6bacd488c71db5139. We report gender and age information for the final samples in this document, and detailed information on race and ethnicity can be found in the Supplementary file. For all experiments, participants resided in the USA and the majority of them were White, which should be kept in mind when judging the universality of the current findings.

Target sample size for all studies were calculated prior to data collection. For the first two studies target sample size ($N \approx 100$ per condition) was calculated based on small to medium effect sizes reported in studies which used perceptual stimuli to manipulate participants' perceptions of relationships between different entities (Matthews & Matlock, 2011; Williams & Bargh, 2008). Target sample size for the third study ($N \approx 50$ per condition) was calculated based on the large effect size that was observed in a pilot experiment conducted with 50 participants. Final sample sizes can detect effect sizes of $\eta_p^2 = 0.04$ for Experiment 1 and 2, and effect sizes of $\eta_p^2 = 0.07$ for Experiment 3 with a two-tailed $\alpha = 0.05$ and power = 0.80 for between group comparisons.⁴

2. Experiment 1

The final sample consisted of 193 participants (112 male, 79 female,

Mage = 37.08, $SD = 11.53$). We recruited all participants from the online data collection platform Amazon Mechanical Turk via CloudResearch.

2.1. Design and procedure

The experiment had one between-subjects condition with two levels, the similarity of group names (similar vs. different). In both conditions, the participants read a cover story about a made-up conference that introduced two novel social groups:

"The organizers of a workshop on sustainable development decided to divide the attendants into two groups during the orientation. For that purpose, they decided to use the attendants' aesthetic preferences as a group marker. To identify the attendants' aesthetic preferences, the organizers asked them to rate a number of Kandinsky and Klee paintings."

After this introduction, participants saw one painting from each artist, as an example of the paintings that the attendants rated. Then, participants read that the attendants of the workshop were divided into two groups based on their ratings for these pictures, and since the conference was being held in Scandinavia, the organizers decided to name the groups after Scandinavian cities. In the similar group names condition the groups' names were Alaborg and the Aalborg, and in different names condition they were Borrering and Skalunda.

Then the participants moved on to the dependent variable questions. First, constituting our primary dependent measure of intergroup similarity, participants answered these two questions on a 7-point Likert scale: "How similar is a member of Group A (depending on the experimental condition, this group was either *Alaborg* or *Aalborg* [similar labels condition] or *Borrering* or *Skalunda* [different labels condition]) to a typical member of Group A?" and "How similar is a member Group A group to a typical member of Group B?". We then computed a perceived group difference score by subtracting each participant's answer to the second question from their answer to the first question.

Next, participants saw our secondary dependent measure of intergroup attitudes, where they were presented with a resource allocation task: "(...) a member of Group A is responsible for preparing two dinner parties; one for Group A and one for Group B. This person has a \$300 budget in total for both dinners. How much money do you think this person would allocate for the dinner of each group?" Participants were required to allocate all the \$300. We then computed a resource allocation difference score by subtracting the amount of money that each participant guessed to be allocated to the outgroup from the amount of money allocated to the ingroup.

After these questions, participants answered demographic and attention check questions, and reported whether they recognized these city names (see supplementary material).

2.2. Results

The results indicated that the similarity of the group name had a small effect on the perceived similarity of the groups ($F(1, 190) = 5.28$, $p = .023$, $\eta_p^2 = 0.03$), as participants in the different names condition ($N = 92$, $M = 0.63$, $SD = 1.28$) thought these two groups were more different from one another than participants in the similar names condition ($N = 101$, $M = 0.22$, $SD = 1.19$) (Fig. 1). The two conditions did not differ from each other in terms of resource allocation difference scores (different names condition: $M = 17.28$, $SD = 54.47$, similar names condition: $M = 4.65$, $SD = 52.83$), $F(1, 191) = 2.67$, $p = .104$, $\eta_p^2 = 0.01$) (Fig. 1).

One sample t -tests suggested that while in the different names condition the perceived group difference scores differed from 0, suggesting that the participants thought the two groups differed from each other ($t(91) = 4.72$, $p < .001$, 95% $CI = 0.37, 0.90$), in the similar names condition this score did not differ from 0 ($t(99) = 1.84$, $p = .068$, 95% $CI = -0.02, 0.46$). Similarly, while the resource allocation difference

³ Experiment 1 and 3 were preregistered prior to data collection. Experiment 2 was not preregistered in time as a result of experimenter error, but the sampling criteria and the analysis plan followed Experiment 1.

⁴ We calculated a priori sample sizes and sensitivity analyses in G*Power 3.1 (Faul et al., 2009).

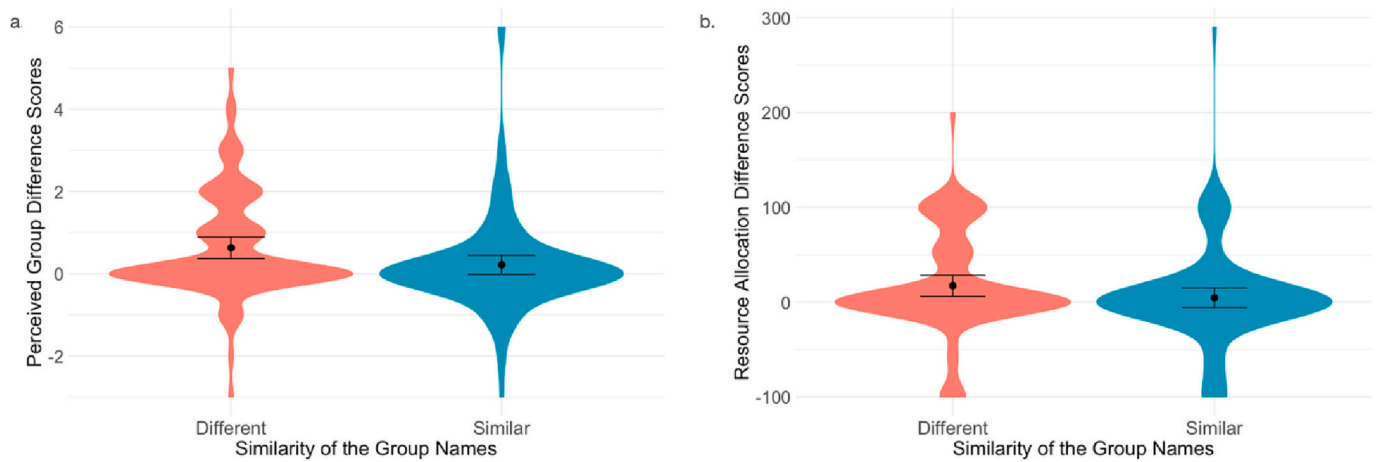


Fig. 1. Similarity and Resource Allocation Difference Scores in Experiment 1.

Note. Plots showing (a) perceived group difference scores and (b) resource allocation scores in the different and similar group names conditions in Experiment 1.

scores differed from 0 in the different names condition, suggesting that the participants guessed that the group members would allocate more resources to their ingroup than the outgroup, ($t(91) = 3.04$, $p = .003$, 95% $CI = 6.00, 28.57$), this score did not differ from 0 in the similar names condition ($t(100) = 0.89$, $p = .378$, 95% $CI = -5.78, 15.08$).

2.3. Discussion

These results suggest that people can use the similarity of social groups' names as a cue to gauge the how similar these groups are to each other. Here the participants knew that these names were not causally related to these groups, and the group allocation criteria was not related to group names. Nonetheless, the similarity of these group names still affected the way the participants perceived these groups, in line with our primary hypothesis. However, contrary to our hypothesis, there were no effects of group name similarity on how much money people thought the members of these groups would allocate to their own versus the other group. Despite the lack of condition effect here, however, participants only expected robust ingroup favoritism in the different names condition.

After seeing that the effect of group names' similarity on participants' perception of social groups, we conducted the second experiment to test whether this effect is specific to group names or whether other group markers, such as the colors associated with social groups, can also affect people's perceptions of these groups.

3. Experiment 2

The final sample included 185 participants (109 male, 75 female, $Mage = 36.35$, $SD = 14.26$).

3.1. Design and procedure

Design of Experiment 2 followed Experiment 1 and had one between-subjects condition with two levels, but this time the group marker we manipulated was the groups' identifying colors (instead of their names). We used the same script as in Experiment 1 to introduce the groups, but this time for both the similar and different color conditions, the groups were referred to as the Klee and the Kandinsky groups. To manipulate group colors, we told participants that the attendants of the meeting wore different t-shirts to indicate their group membership. In the similar colors condition the members of the two groups wore *lighter blue* versus *darker blue* t-shirts, and the different colors condition these colors were *blue* versus *orange* (Fig. 2).

3.2. Results

The results indicated that the similarity of the group color had a small effect on the perceived difference between these two groups ($F(1, 183) = 4.02$, $p = .047$, $\eta_p^2 = 0.02$). Participants in the different labels condition ($N = 93$, $M = 0.45$, $SD = 1.53$) perceived the members of these two groups to be more different from each other than participants in the similar labels condition ($N = 92$, $M = 0.07$, $SD = 1.05$) (Fig. 3). These two groups did not differ from each other in their resource allocation difference scores, (different labels condition: $M = 28.80$, $SD = 63.09$; similar labels condition ($M = 14.35$, $SD = 39.93$), $F(1, 183) = 3.46$, $p = .065$, $\eta_p^2 = 0.02$) (Fig. 3).

One sample t -tests suggested that while in the different labels condition the perceived group difference score differed from 0, suggesting that the participants thought the two groups differed from each other ($t(92) = 2.85$, $p = .005$, 95% $CI = 0.14, 0.77$), in the similar labels condition the similarity difference score did not differ from 0 ($t(91) = 0.60$, $p = .551$, 95% $CI = -0.15, 0.28$). Conversely, the resource allocation difference scores differed from 0 both in the different labels ($t(92) = 4.40$, $p < .001$, 95% $CI = 15.80, 41.79$) and the similar labels ($t(91) = 3.45$, $p < .001$, 95% $CI = 6.08, 22.62$) conditions, suggesting that the participants guessed that the group members would allocate more resources to their ingroup than the outgroup but the effect of condition was not significant.

3.3. Discussion

As in Experiment 1, in Experiment 2 we observed that people's perceptions of social groups can be affected by the characteristics of arbitrary group markers, which, in this case, was group-identifying colors. These results also suggest that the results of Experiment 1 are not purely a result of a sound-shape mapping (i.e., the phenomenon in which people's expectancies about novel objects are shaped by the acoustic qualities of their labels [Ramachandran & Hubbard, 2001]) but rather a result of group marker similarity in general, as non-verbal group markers also affect participants' perception of novel groups. Overall, these two experiments provide supporting evidence for our hypothesis that when two social groups have similar identifying markers people take this similarity as a cue to the similarity of these groups.

3.4. Aggregating results across two studies: A combined analysis

To explore the effects of group marker similarity across experiments, we fit a generalized linear model predicting perceived group differences from group marker similarity (similar vs. different), with a random

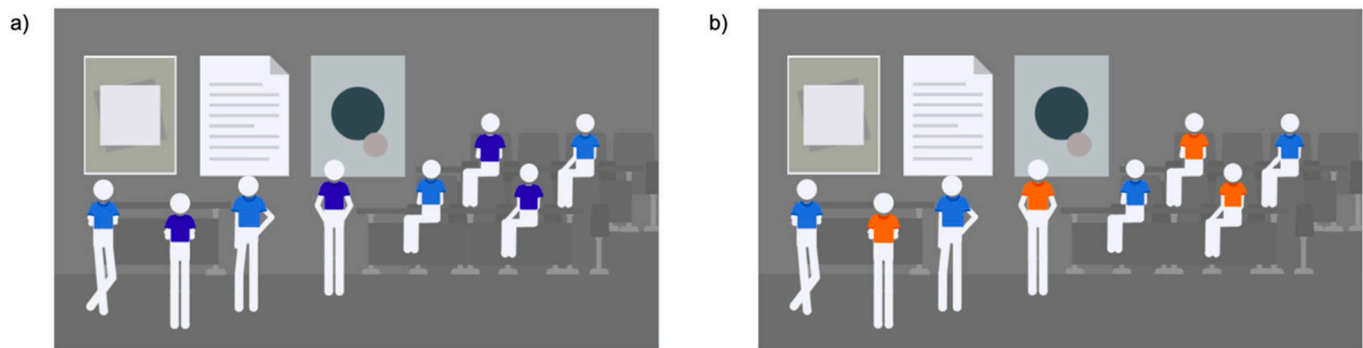


Fig. 2. Visuals from Experiment 2.

Note. Diagrams shown to participants to display the identifying group colors in Experiment 2. Participants saw image a in the similar colors condition and image b in the different colors condition. © 2019 GoAnimate, Inc. Images are copyrighted by and used by permission of VYOND™. VYOND is a trademark of GoAnimate, Inc., registered in Australia, Brazil, the European Union, Norway, the Philippines, Singapore, Switzerland and the United Kingdom.

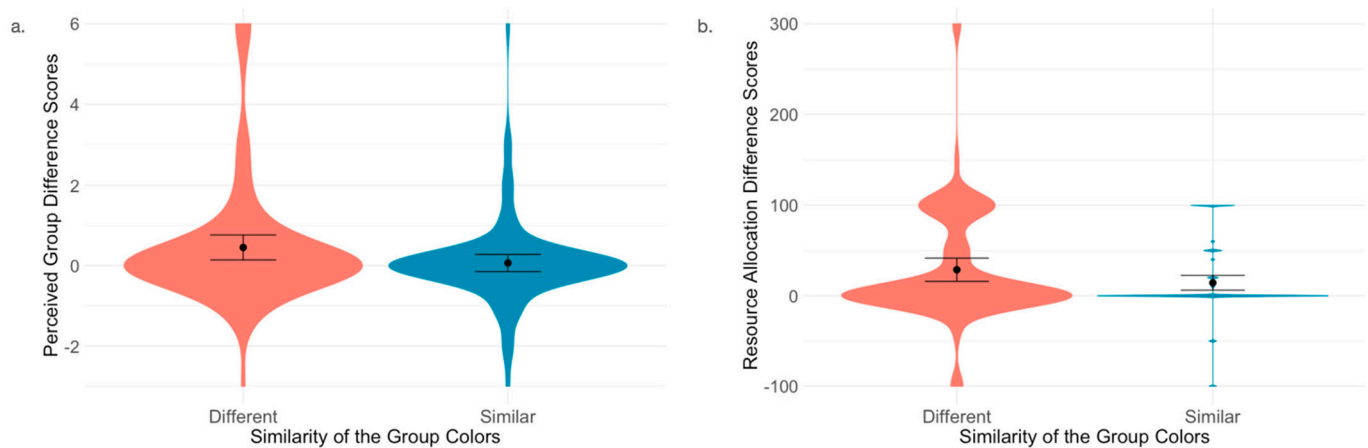


Fig. 3. Similarity and Resource Allocation Difference Scores in Experiment 2.

Note. Plots showing (a) perceived group difference scores and (b) resource allocation scores in the different and similar group colors conditions in Experiment 2.

intercept for experiment⁵ (Experiment 1 or 2). This analysis showed that across two experiments participants perceived the groups to be more different when the markers were more different ($N = 185$, $M = 0.54$, $SD = 1.41$) than when the markers were similar ($N = 193$, $M = 0.15$, $SD = 1.13$), $Estimate = 0.40$, $t(2.54, 374.24) = 3.02$, $p = .003$, $\eta_p^2 = 0.02$.

We repeated this analysis with resource allocation difference score as the dependent variable. Across two experiments there was an effect of group marker similarity, as in the different group markers condition ($M = 23.07$, $SD = 59.09$) participants were more likely to guess that group members would allocate more money for their ingroups than the out-group compared to the similar group marker conditions ($M = 9.27$, $SD = 47.25$), $Estimate = 13.59$, $t(1.58, 375.13) = 2.48$, $p = .013$, $\eta_p^2 = 0.02$.

Next, we fit a general linear model predicting the resource allocation scores from the perceived similarity scores with a random intercept for experiment. This analysis showed that there was a relationship between these two measures as participants who thought the groups were more different from each other were more likely to predict that the group members would favor their own group more in the resource allocation task, $Estimate = 7.40$, $t(1.02, 374.37) = 3.63$, $p < .001$, 95% CI [3.35,

11.36], Cohen's $f^2 = 0.04$.

4. Experiment 3

The first two experiments suggest that the similarity of group markers affects how observers perceive the relationship between groups. In the next experiment, we tested whether people also expect social groups to use this feature of group markers when deciding on their group identifiers.⁶ More specifically, we asked whether participants would expect a group to choose a marker that is more distinct from another group's marker if the groups have different characteristics compared to when the groups have similar characteristics. For this experiment we used novel groups which differed from each other in terms of their ideologies. This shift from the more "minimal" approach in the prior two studies allowed us to manipulate the degree of similarity between groups to test whether this feature related to the group markers observers would expect to be selected.

The final sample for Experiment 3 included 107 participants (42 female, 64 male, 1 other, $Age = 39.40$, $SD = 10.10$).

⁵ We also performed the analyses described in this section with experiment added as a fixed effect; since the interaction between experiment and similarity was not significant, suggesting that the effect of the group similarity worked the same for all experiments, we do not report these results here. However, code to reproduce them and a report of this analysis is provided in the Supplementary file.

⁶ This study replaces a previous study reported an earlier version of this paper (and now presented in Supplementary Materials) in which we tested whether participants would expect groups to choose different labels as opposed to similar labels. However, an anonymous reviewer pointed out this finding was difficult to interpret because there was no manipulation of group similarity. In response we designed and ran the study reported here as Experiment 3.

4.1. Design and procedure

The study had one between-subjects condition, similarity of groups' ideologies (similar vs. different). In both conditions participants read a cover story about an unidentified college where newly admitted students form groups which come together to discuss various topics, such as political issues and university policies. In the *different groups* condition participants read that the two groups had very different opinions from one another on most subjects including school policies, politics in general, societal issues, and ongoing current events, and that the two groups usually find themselves in strong disagreement when they discuss these topics. In the *similar groups* condition the participants learned that these two groups had very similar opinions on these issues, and that they usually find themselves in strong agreement. After this introduction, we told participants that each year these groups choose a color for their group t-shirts and that their job is to predict the choice made by one of the groups. Participants were informed as to the choice of one group (which was either blue or green, counterbalanced between-subjects), and were asked what color they thought the second group chose. They provided their choice by selecting from a visual depiction of 10 shirts which gradually varied in equal steps from blue to green (or vice versa; see Fig. 4).

4.2. Results and discussion

We coded the option that was the most different from the color that the first group chose as 9 (e.g., if the first group chose blue this color would be the greenest color option), and the option that was the same as what the first group chose as 0, so the values for our DV ranged between 0 and 9. Participants expected the second group chose a more distinct color in the different groups condition ($N = 55, M = 8.42, SD = 1.93$) compared to the similar groups condition ($N = 52, M = 4.40, SD = 3.34$) ($F(1, 105) = 58.59, p < .001, \eta_p^2 = 0.36$). (Fig. 5).

These results suggest that the similarity of markers not only works as

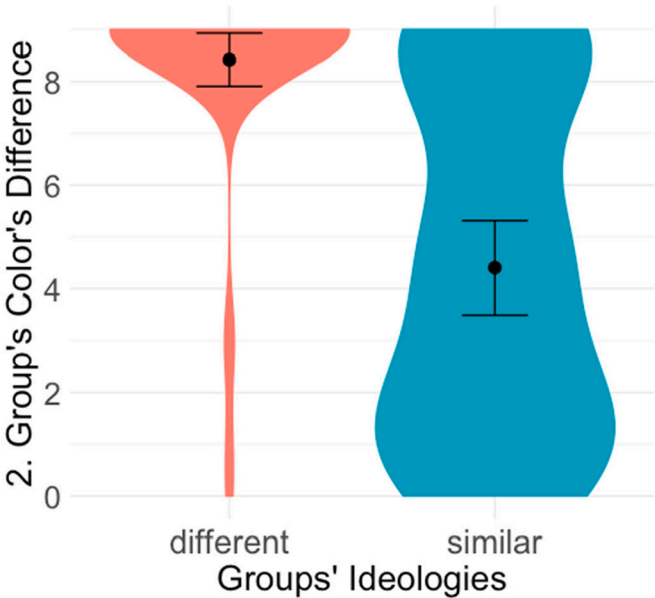


Fig. 5. The difference of the colors that were chosen for groups that have different versus similar ideologies.
Note. Plot showing the similarity of the first group's color to the color that participants guessed the second group chose in different and similar groups conditions in Experiment 3. Higher values indicate that participants thought the second group chose a more distinct color from the first group's color.

a cue that shapes perception of novel social groups, but people also expect groups to choose markers to signal the extent of distinctiveness between groups.

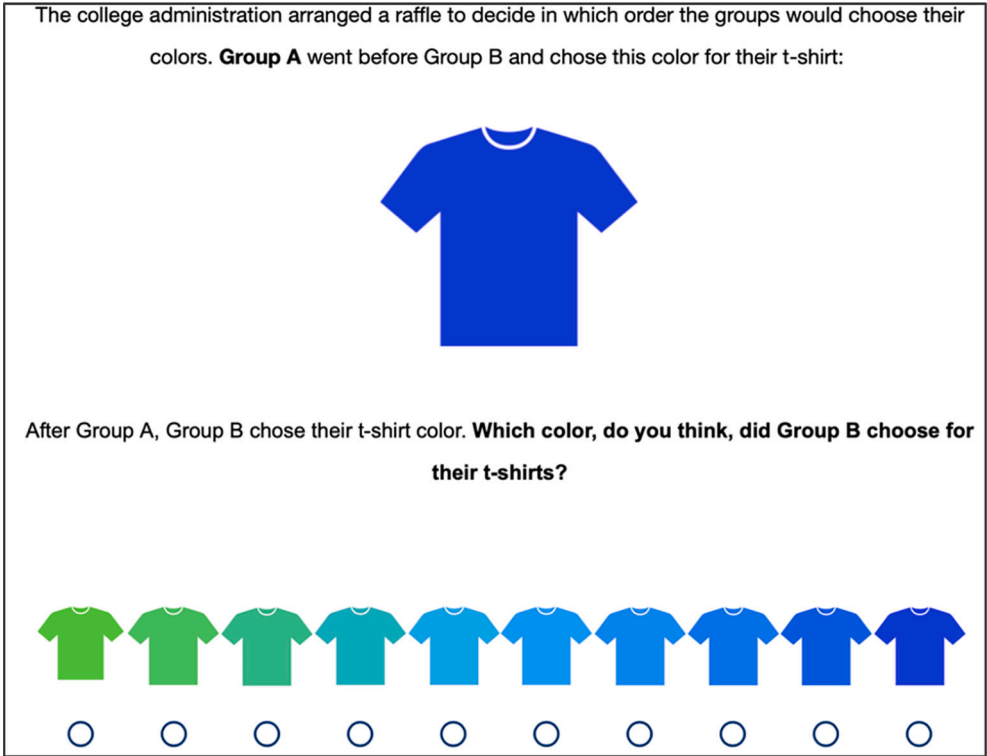


Fig. 4. An Example Dependent Variable Question from Experiment 3.
Note. Image showing an example question from Experiment 3 asked to test how different participants think the color that the second group chose would be from the first group's color.

5. General discussion

With these 3 experiments, we show that 1) people's perceptions of novel social groups can be affected by the markers associated with these groups, even in cases where these markers are arbitrarily chosen and therefore do not reflect these groups' characteristics in a meaningful way; 2) this effect can be created by different types of group markers, such as names or colors that mark group membership; 3) people expect social groups to actively choose markers in ways that signal the extent of group distinctiveness. In addition, our mini metaanalysis with data from Experiment 1 and 2 suggests that the effect of group marker similarity may also affect the extent to which people think the members of these groups will show ingroup biases: people seem to think the group members would allocate more resources to their ingroups when the group markers are different rather than similar. Further, when people perceive the groups as more different than each other they are more likely to think there will be ingroup favoritism. However, the group marker similarity's effects on the resource allocation measure seems to be less strong than its effects on similarity perception, not appearing clearly in either study considered separately, so we interpret it cautiously here.

Our effect sizes are small for the first two studies, which suggest that we should not overstate the importance of these results. That said, even though our effect sizes are modest, our manipulation is a subtle one and our design is between-subjects. We believe it remains noteworthy that people's perceptions of novel groups are affected by subtle characteristics of the group markers. This is especially striking in the present case, in which the markers were arbitrarily assigned and could not have been closely linked to group characteristics. Given this, should we consider these effects part of an irrational bias in social perception? That conclusion would be premature. After all, there is evidence that distinct markers, at least in some cases, allows groups to more effectively adopt cooperative strategies that facilitate within-group cooperation (i.e., the easier it is to distinguish ingroups from outgroups the easier it is to condition one's behavior on group membership; [Popa-Wyatt & Muehlenbernd, 2022](#)). In fact, Experiment 3 provides evidence supporting this idea by showing that people expect group markers to be used as a tool to signal groups' positions relative to each other. Hence, it may not be unreasonable to assume that distinct group markers reflect the groups' desire to be perceived as distinct from rivals. In that case, more distinctive group markers can be employed as a heuristic that suggests more distinctive groups, a heuristic that might then be overextended to cases such as those explored here in which the link between distinctiveness of markers and distinctiveness of the groups was deliberately broken.

Despite the possibility that people may deliberately leverage group markers as legitimate cues to group distinctiveness, it remains possible that these effects may sometimes bias social judgments in less reasonable ways. That is, the distinctiveness of arbitrarily assigned group markers may well affect perceptions of social groups. An interesting outstanding question is whether these effects would extend to real-world and culturally salient social groups. Going back to the example we began with, it would likely be a mistake to think that Switzerland is more similar to Sweden than to Austria, or Germany. Future work could explore whether such effects emerge.

Another question that follows from these considerations is whether it might be possible to use this effect to our advantage when we are introducing new social groups about which people might have less preconceived notions. Perhaps similar arbitrary markers could lead people to generalize their positive beliefs about one group to a neutral group, or even to a group that is negatively stereotyped. On the other hand, these results also hint at the possibility that two groups having similar group markers might cause people to project their negative beliefs about one group to the other group.

Although in this study we only tested the effects of group marker similarity from a third-party perspective, the results point out to some

potential effects of such markers in first-party settings. One such affect that future research could test is about whether using similar markers or highlighting marker similarities might help to create a sense of closeness between groups, or alternatively, choosing markers that are distinct from each other might help the groups be perceived as more unique and different from the other groups. For example, could a manipulation of the markers of distinct ideological groups induce people to notice more similarities between these groups and potentially reduce animosity?

Another related question is the potential boundary conditions for the effects of group markers. An additional study reported in full in Supplementary Materials suggests that this effect is not limited to human social groups, as people also thought colonies of butterflies with more similar names were more similar to each other as compared to colonies of butterflies with more different names. Hence, we have initial evidence suggesting that the group markers affect our perception of groups not because they have a specific signaling capacity for human social groups but because markers affect our perception of groups or categories in general. Whether this effect extends to inanimate objects such as consumer products is another open question.

Our work has implications for researchers who use novel group paradigms in their studies. Although studies using novel social groups to examine intergroup biases, such as the minimal group paradigm, suggest that such paradigms create robust intergroup biases ([Dunham, 2018](#); [Otten, 2016](#)), our results suggest that the inferences that the participants make about the relationships between social groups might be impacted by the group markers. We caution researchers to carefully consider how the different markers they use might affect participants' perceptions and responses on dependent measures relating to inter- and intragroup behavior. But this could also be a potential tool to subtly affect participants' perceptions of these novel social groups in certain ways (e.g., it could be possible to increase or decrease the perceived social distance between these groups depending on the research question).

In conclusion, the results of these three studies suggest that people's perceptions of social groups are affected by the arbitrary group markers that are associated with these groups. We hope that these results are helpful in understanding how seemingly irrelevant, arbitrary features of groups might affect our social perception and intergroup biases.

Open science practices

Two out of three studies (Experiment 1 and 3) reported here were preregistered prior to data collection. Links for these preregistrations, all the materials used in all four studies, as well as information on data exclusions, and the data and the analysis files can be found at: https://osf.io/89u4f/?view_only=45fcdcd88c6d45d6bacd488c71db5139

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Declaration of Competing Interest

The authors declare no conflict of interest.

Data availability

The link for the repository where the dataset and analysis code are stored is provided in the article.

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