

**Conformity to the Descriptive Norms of People with Opposing Political or Social  
Beliefs - Replication**

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## Abstract

According to the descriptive norm effect, individuals tend to choose an action that the majority of a group of people have chosen before them. It is still not known whether the descriptive norm effect also applies if the individual does not identify with the group (e.g. due to opposing political opinions). The self-categorization theory predicts that individuals will seek to deliberately not conform with a group of people they do not identify with (called the “outgroup”). Pryor et al. (2019) tested this hypothesis in “Conformity to Descriptive Norms of people with opposing political or social beliefs” by presenting some participants with information about how the majority of people with whom they identify, (their “ingroup”) decided to act when faced with a certain moral dilemma and some participants with information about ingroup and outgroup decisions. We replicated this experiment and added exploratory questions to test whether the understanding of the information or the amount of antipathy for the outgroup are important factors on how much people conform with the outgroup.

Contrary to our hypothesis, that the self-categorization theory will predict the participants’ shift away from the popular choice of an outgroup, we found results that suggest the opposite. Our findings point to the descriptive norm effect being more influential in participants’ choices than the self-categorization theory predicted, which overall results in participants conforming to the norms and actions of the majority.

# Introduction

The influence of group dynamics on the decision-making of an individual is a complex process that is still an object of current research. An influential and frequently measured effect on individual decision-making is the descriptive norm effect (Asch S.E. 1951; Sherif M. 1936) which states that individuals, in general, tend to conform with the decisions made by the majority of the group. The term “descriptive norm” refers to “any of various consensual standards that describe how people typically act, feel, and think in a given situation”(APA *Dictionary of Psychology*, 2020).

Given the broad range of situations in which the descriptive norm effect is observable and its supposedly strong impact on our decision making (Rollin & Bamberg, 2021; Rudert & Janke, 2021; Ryoo et al., 2017; Staunton et al., 2014), understanding the circumstances under which we conform with the opinion and decisions of others is an important and worthwhile research endeavor.

In this paper, we will try to replicate the first experiment from the original paper “Conformity to the descriptive norms of people with opposing political or social beliefs” by Pryor et al. (2019). In the original study, the descriptive norm effect and another theory about the influence of group affiliation on decision making, called “self-categorization theory” (Turner et al. 1987) were analyzed.

The self-categorization theory (SCT) predicts two things. First, individuals will choose the same answer to a question as people who are in their ingroup. Ingroup in this case refers to the social group identity of a person, meaning they will see themselves as part of a group with a certain view on social or political topics. According to the theory, their personal identity is partly linked to that of a group they share common beliefs with. As a consequence, they will not only be more likely to agree with answers their ingroup gave, but also be more likely to actively avoid agreeing with answers their outgroup gave, which is also the second thing self-categorization theory predicts.

The purpose of this experimental setup is to test the hypothesis that according to the SCT people will shift away from actions the outgroup favored, in contrast to the alternative hypothesis that people will shift towards the overall descriptive norm. To this end, we measured how information about the other’s responses has influenced the individual’s decisions about a moral dilemma. Half of the participants received information that the majority of their ingroup chose an act and their outgroup predominantly chose the opposite act. The other half of the participants were only presented with information about their ingroup. SCT predicts that participants who receive information about both ingroup and outgroup behavior would try to actively avoid conforming with their outgroup and therefore conform more strongly with their ingroup than the participants who were only presented with information about their ingroup.

Counter to SCT prediction, our findings suggest that our participants' choice in the moral dilemma shifted towards the descriptive norm of the outgroup, rather than away from it. These results give stronger evidence for the alternative hypothesis that supports the

descriptive norm effect more than the self-categorization theory and may suggest a simpler strategy at work when people conform to other people's norms than the self-categorization theory advocates, as Pryor et al. (2019) promote as well.

The preregistration for this experiment is available at Darius et al. (2021)

## Method

### Participants

56 participants ( $M_{\text{age}} = 30$  years, 50% male, 40% female, 10% other options) were recruited by the experimenters via social circles and the mailing list of the University of Osnabrueck, Germany. As another replication of the same original study by Pryor et al. (2019) was also being conducted simultaneously with this study, to avoid confounding we asked the readers of the invitation email to not take part in this experiment, provided that they had already taken part in the parallel one.

The experiment took about 5 minutes to complete and could be completed via web browser as well as mobile devices. Participation was voluntary and participants were told that quitting the experiment was possible at any time. Participation could not be rewarded with money or other incentives.

Data collection was started on the 15th of august and stopped 7 days later, on the 22nd of August.

### Materials

The materials used in this replication study include only text and no pictures or auditory stimuli.

### Procedure

After the participants were welcomed, they were given some general information. This included that this study is a follow up to another study and some general information about this study i.e. that there are political questions, a moral dilemma, that participation is completely voluntary, and that their data is stored anonymously. After they had consented to these conditions and begun the experiment, they were asked to choose from eight topics about social issues the topic they have the strongest opinion on. In the following they were presented with a statement concerning their topic, which they could agree or disagree with, using an 11-point Likert scale. This was done to assign the participants to their ingroup, depending on the rating of the chosen social issue. Some of the topics of the original study had to be altered since they were only relevant to American politics. When changing a topic our goal was to find a similar and equally controversial topic relevant to Germany. We kept in

mind that the questions are supposed to make participants strongly agree with one side. When a topic was altered we will explain why it was altered and what the original topic was. The topics in our experiment were:

- **Gun control:** "Adults should have the right to carry a concealed handgun"
- **Feminism:** "Feminism is important and beneficial to modern society"
- **AfD:** "AfD winning the next federal election will be good for Germany"
  - Changed from: Donald Trump: "Donald Trump being president is good for the United States at this time"
  - Reason: Donald Trump is a very controversial American politician, but not everybody in Germany is interested in American politics and has a strong opinion of him, so we changed the question to what we think is the equally controversial German equivalent, the AfD.
- **Refugees:** "Germany should open its borders for all refugees"
  - Changed from: Immigration and Dreamers: "Dreamers (undocumented immigrants who came to the US as children) should be allowed to stay in the United States"
  - Reason: The term "Dreamers" does not exist in Germany, but for the past years there were a lot of controversial discussions around the topic of refugees, which is similar to the topic of immigration and Dreamers.
- **Transgender rights:** "Transgender people should be allowed to use the bathrooms of the gender they identify as"
- **Drug legalization:** "Possession of drugs should be legalized"
- **Buying and wearing fur:** "Buying and wearing fur is wrong"
- **Taxing religious organizations:** "Religious organizations should be taxed"

**Removed entirely:**

- **Colin Kaepernick kneeling during the national anthem:** "Colin Kaepernick was wrong to kneel during the national anthem"
  - Reason: None of our group members had heard the name Colin Kaepernick before this, so we decided to not include it in our experiment, since we don't think most of the German population is familiar with this incident and it could cause unnecessary confusion.

Next, participants were presented with instructions. After they were told that a moral dilemma will be proposed to them, they were told that this study is following a previous study where data on that moral dilemma had been collected. This was done to justify the descriptive norms the participants are presented with.

After the instructions, participants were presented with the following moral dilemma:

"Imagine you have witnessed a man rob a bank. However, you then saw him do something unexpected with the money. He donated it all to a run-down orphanage that would benefit greatly from the money. You must decide whether to call the police and report the robber or do nothing and leave the robber alone."

Beneath the dilemma, we displayed the descriptive norms which are supposed to influence the participants' answers. Each participant was only presented with one of four possible descriptive norms, depending on the experimental group they had been randomly assigned to. One-half of the participants were shown only what the majority of their ingroup chose. We had to include both possibilities A and B so that our results were not influenced by which act the ingroup chose but only by the fact that the ingroup chose that act. The other half were shown the ingroup as well as the outgroup descriptive norm. Again we had to give two different versions, one where the ingroup chose act A and the outgroup chose act B and another where the ingroup chose act B and the outgroup chose act A. The order in which ingroup and outgroup norms were shown was also randomized.

The following table shows the four possible stimuli:

[Moral Dilemma] 60% of ingroup chose act A	[Moral Dilemma] 60% of ingroup chose act B
[Moral Dilemma] 60% of ingroup chose act A 85% of outgroup chose act B	[Moral Dilemma] 60% of ingroup chose act B 85% of outgroup chose act A

Next, participants rated with which certainty they would report or not report the robber using a 6-point Likert scale. Afterward, the participants were asked to rate how they feel about their answer, but this was only done to stay consistent with the fictitious earlier study, and the resulting data were not analyzed.

Participants also had to pass an understanding check including four questions about the previous study, to make sure they paid attention:

1. Participants chose which action they preferred (correct)
2. Due to a computer error, participants were not allocated equally to imagine performing the different actions (incorrect)
3. No data was saved during the experiment. (incorrect)
4. The participants completed the experiment with their eyes closed. (incorrect)

The last question the participants were presented with was a single-item social identification measure (Postmes et al., 2012), investigating to which degree they identify with their ingroup and outgroup on a scale ranging from one to seven. It consisted of two questions:

- "I Identify with [ingroup]"
- "I identify with [outgroup]"

The formulations of [ingroup] and [outgroup] were not given in the materials of the original study by Pryor et al. (2019). We generated the following values to replace the [ingroup] and [outgroup] with the appropriate terms corresponding to the participant's chosen political topic:

**Ingroup**

- Pro-gun enthusiasts
- Pro-feminist advocates
- AfD supporters
- Pro Immigration proponents
- Transgender rights activists
- Pro legalization advocates
- Pro fur-wearing advocates
- Advocates of taxing religious institutions

**Outgroup**

- Anti-gun advocates
- Feminism critics
- Anti-AfD advocates
- Anti-Immigration advocates
- Transgender critics
- Anti legalization advocates
- Animal rights advocates
- Adversaries of taxing religious institutions

Following the identity check, we did another understanding check that was exploratory and was more directed towards the perception of the responses from the experimental trial. We asked the participant “Which of the following statements is true?” and presented two options:

- The majority of people who agreed with you on [topic] chose to leave the robber alone.
- The majority of people who agreed with you on [topic] chose to call the police.

The correct answer depended on the condition the participant was in.

Next, the participant was presented with another exploratory question where they had to rate on a Likert scale from 1 to 7 how much they agree with the following statement:

- I would prefer the company of someone who agrees with me on [topic] over the company of someone who disagrees with me on [topic].

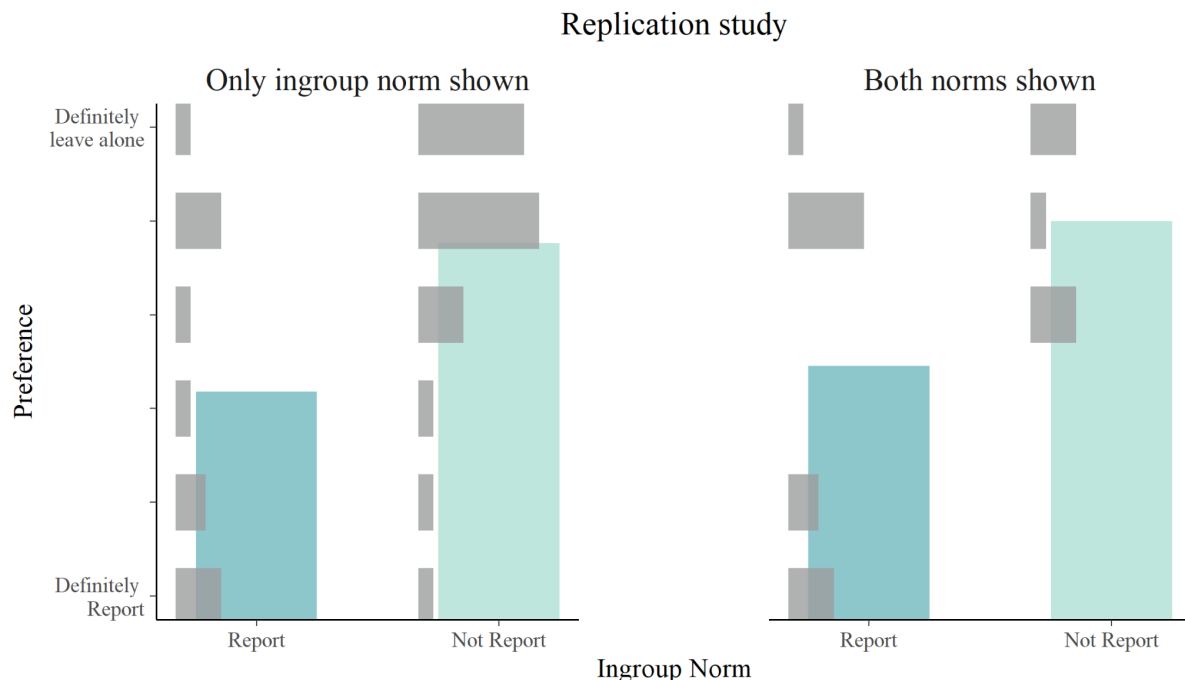
Then the participant reached the last page on which they were asked to provide demographic information about themselves, including only age and gender since other demographic details were necessary and were not analyzed anyway. In the end, participants were thanked for their participation.

The materials from this section can be also found in the supplementary materials of this study's repository. (Darius et al., 2021)

## Results

6 participants in total were excluded from the analysis for failing the understanding check and none were excluded based on their rating attitude towards their chosen social issue as neutral. One of the participants put 420 years as their age, so we substituted that (all age > 100 were excluded) with the same method used for replacing NAs found in the column *age*. The method was to substitute the missing or highly unlikely values with the mean of age over all entries, except NAs and ages above 100. The NA handling behavior for the gender was also to replace the missing values with the option *prefer\_not\_to\_say*. Gender and age were neither used in the main analysis nor for the exploration of the data.

The distribution of responses for the remaining 50 participants is shown in Fig1.



**Fig1. Representation of responses to the moral dilemma in each condition of this replication study.** The relative proportion of each response in each condition is shown by the horizontal grey bars. The vertical blue bars depict the mean response in each condition “in order to give a better sense of how the pattern of responses changed in each condition” Pryor et al. (2019).

## Analysis

Since we are aiming for a direct replication of the study by Pryor et al. (2019), we decided to stay as close as possible with the original analysis to achieve comparable results. This is why we also used ordinal logistic regression and Bayes factor to test our hypothesis. Hence, the scripts used for the analysis and plotting of the replication study’s analysis are taken from the OSF repository of Pryor et al. (2019), Outgroup Descriptive Norms, and contain



small modifications and adjustments which can be found on the GitHub repository of this replication study. (Darius et al., 2021)

## Models.

Both of the following models are taken from the original experiment by Pryor et al. (2019) and are Bayesian versions of ordinal logistic regressions. Both models assume that the response to the moral dilemma can be predicted through the parameters of the descriptive norm conditions. Alongside these parameters, there are the priors  $b_{in}$ ,  $b_{both}$ , and  $b_{out}$  which were created through a previous experiment of Pryor et al. (2019) that are defined below in the section Prior Assumptions.

Eq 1. Self-Categorization Theory Model:

$$\log_e(odd) = b_{in} I \times INGROUP\ AGREE + b_{both} B + b_{out} I \times B \times OUTGROUP\ DISAGREE$$

Eq 2. Descriptive Norm Model:

$$\log_e(odds\ of\ responding\ higher) = b_{in} I + b_{both} B + b_{out} I \times B$$

Ingroup Agree and Outgroup Disagree are variables that either take the value 1 or 0 and in this regard act as switches for the SCT model that assumes through which descriptive norm the participant will be influenced by. The variables  $I$  and  $B$  are referring to *Ingroup Descriptive Norm* and *Both Norms Shown* respectively, which are the conditions the participants were part of and were encoded like the following:

	Reporting Robber Favoured	Leaving Robber Alone Favoured
<b>Only Ingroup Descriptive Norm shown</b>	Both Shown = 0 Ingroup Descriptive Norm = -1	Both Shown = 0 Ingroup Descriptive Norm = 1
<b>Both In - and Outgroup Norm shown</b>	Both Shown = 1 Ingroup Descriptive Norm = -1	Both Shown = 1 Ingroup Descriptive Norm = 1

This encoding constitutes a 2x2 experimental design with the independent variables *Ingroup Descriptive Norm* and *Both Norm Shown*, and the dependent variable is the participant's response to the moral dilemma.

According to the results of our social identification measure, 26 (52%) of the 50 participants identified with the ingroup of their chosen political topic, and 32 (64%) did identify with the

outgroup of their chosen political topic. The results on each variable did not assign any participant to a certain model, since both the SCT and alternative model analyzed all participants.

**Prior assumptions:**  $b_{in}$ ,  $b_{both}$ ,  $b_{out}$

The priors used in this study are the prior assumptions used by Pryor et al. (2019). The priors  $b_{in}$  and  $b_{both}$  stay the same for both models.

#### Self-categorization theory

$$b_{out} \sim \text{half} - \text{normal}(0, 0.5)$$

$$b_{in} \sim \text{normal}\left(\frac{0.6}{0.75} \times 1.02, 0.5\right)$$

$$b_{both} \sim \text{normal}(0, 0.5)$$

#### The alternative theory

$$b_{out} = -\frac{0.85}{0.6} \times b_{in}$$

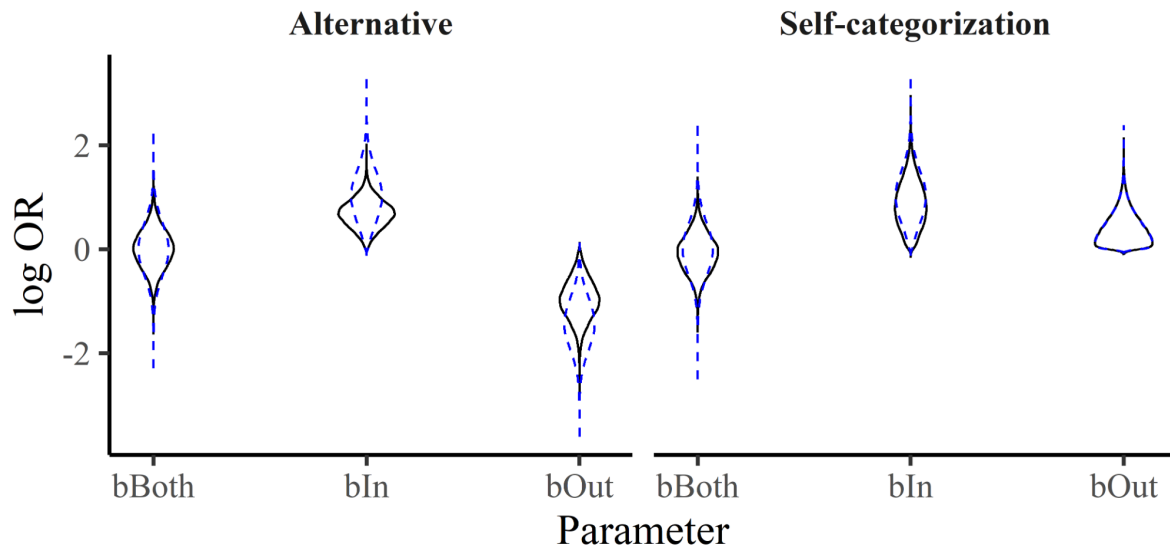
#### Model comparison.

Using the “Bridge Sampling” package in R (Gronau et al., 2017) we calculated the Bayes Factor (BF) to see which model predicts the observed data better. The following formula represents the divided probabilities for each model given the obtained data resulting in the BF.

$$BF = \frac{P(\text{data}|\text{alternative})}{p(\text{data}|\text{self-categorization})}$$

The result of our calculations yielded a Bayes Factor of 6.399. This implies that the alternative model is 6.399 times more likely to predict the observed data than the self-categorization model. This result is not as strongly in favor of the alternative model as the results obtained by Pryor et al. (2019), a Bayes Factor of 34.97. Nonetheless, this result also represents substantial evidence in favor of the descriptive norm effect represented as the alternative model over the self-categorization model. The prior and posterior distributions are visualized in Fig 2.

## Priors and posteriors of the replication study



**Fig 2.** The density of the prior (dashed blue lines) and posterior (solid black lines) for the coefficients of both the self-categorization and the alternative model in the replication study. (the plots are made with the original script by Pryor et al. (2019)) The results favor the alternative model over the self-categorization model, as in the results of the main study, but with a smaller BF (6.399)

### Effect sizes.

To measure the effect sizes for the parameters reported in Eq 2, the alternative model, a frequentist ordinal logistic regression analysis was done by Pryor et al. (2019) and is also repeated for this replication. The regression analysis produced an Odds Ratio (OR) of 2.28 for the INGROUP DESCRIPTIVE NORM which is significant given the 95% Confidence Interval ( $N = 50$ ,  $OR = 2.28$ ,  $95\%CI[1.16, 4.61]$ ). This outcome suggests that the participants preferred the option that was favored by their ingroup descriptive norm. We also found out that the BOTH NORMS SHOWN ( $N = 50$ ,  $OR = 1.25$ ,  $95\%CI[0.421, 3.81]$ ) and OUTGROUP DESCRIPTIVE NORM ( $N = 50$ ,  $OR = 0.897$ ,  $95\%CI[0.299, 2.72]$ ) were not significant based on the Confidence Intervals including 1. Our results support the results found by Pryor et al. (2019).

### Data exploration.

After piloting the experiment we noticed that some participants mentioned that they could not understand the moral dilemma question clearly. Moreover, they stated that the percentages shown for the statements from their ingroup (60%) and their outgroup (85%) were confusing. For that reason, we looked at the results of the second understanding check that was implemented for the replication study. Taking those results into consideration alongside the first understanding check, we excluded another 13 participants. No participant failed both

understanding checks. (6 failed understanding check of the original study, 13 failed the second checkpoint.  $\text{total}_{\text{excluded}} = 19$ ,  $N_{\text{valid}} = 37$ )

We ran the model comparison with the Bayes factor analysis on this data as well. It resulted in a BF of 71.64 in favor of the alternative model over the self-categorization model.

This result could suggest that participants that read the descriptive norms more thoroughly and thus passing the second understanding check, were more likely influenced by these norms than the participants who did not read them consciously, resulting in their data being excluded in this analysis. This effect was not anticipated and might be arbitrary, but implies interesting prospects in possible future research.

## Conclusion

In this study, we examined the influence of descriptive norms of an outgroup on the decision-making of an individual. The experiment was conducted via an online questionnaire with 56 participants. We did not find any evidence for the main hypothesis that according to self-categorization theory participants would actively avoid conforming with the outgroup descriptive norm. On the contrary, our data slightly support the alternative hypothesis that the participant will adjust their behavior according to the behavior of the overall majority.

Given the relatively small sample size of our study and some points of critique regarding the general experiment design, more research about the relation of self-categorization and the descriptive norm effect has to be conducted before clear conclusions can be drawn.

## Discussion

The result of the BF (71.64), by excluding the participants who failed the second (exploratory) understanding check is noticeable. It could have the potential to be used and replicated again. One point that we would have liked to investigate, but were not able to, was the effect of this exclusion while having a bigger sample size than 37 at the end.

As reported, there was no intersection between the participants who failed the first understanding check and the ones who failed the second. This brings up the question, how participants could pass one understanding check but not the other.

We formulated some thoughts about this question. The first understanding check contained keywords that might be far from the context of the study e.g., “The participants completed the experiment with their **eyes closed**”. This option might be easy to detect as incorrect. So it would be reasonable to look deeper to see whether elimination of options can result in choosing the correct answer even without paying full attention to the study. The first understanding check also aims at paying attention to the previous study (the backstory) and

not the actual experimental task that its data is what is being predicted in the analysis. It could be the case, and maybe a good question to investigate, that on the contrary to what is mentioned in the Pryor et al. (2019) about including the first understanding check, “In order to ensure that participants were paying attention”, the correct answer to the understanding check might not imply that the participants paid attention to or even understood the most crucial question being asked in the study, namely the rating of the moral dilemma. The idea behind the second understanding check was to target the understanding of the main experimental question specifically. There are, however, a couple of points in the second understanding check that could be implemented for further studies. First of all the current implementation only asks about the statement of the ingroup, instead of the outgroup as well. Another improvement would be to offer more answer possibilities since we only used two answers, which could explain how 6 participants failed the first understanding check and then passed our questions through guessing with a chance of 50% to be correct. Therefore we believe that adding questions about the statement shown for the outgroup, for the BOTH NORM SHOWN conditions, with proper randomization to avoid order effect, as well as adding more answer possibilities, could improve the results of that understanding check.

Additionally, we noticed a consistency error in the paper and the actual analysis in R. In the paper by Pryor et al. (2019) they wrote that “[t]he variable INGROUPE DESCRIPTIVE NORM refers to whether the ingroup descriptive norm favored reporting the robber (INGROUPE DESCRIPTIVE NORM = -1) or leaving the robber alone (INGROUPE DESCRIPTIVE NORM = 1).” In the analysis script/experiment they then encoded INGROUPE NORM as either 0 or 1. We only found a slight difference in the Bayes Factor (BF = 5.74 in contrast to our result of BF = 6.399) for the encoding with 0 and 1. The Odds Ratio for the 0 or 1 encoding also delivers results in the same direction, but still differs in numbers:

Encoding of Norms	-1 and 1	0 and 1
INGROUPE DESCRIPTIVE NORM	OR = 2.28, 95%CI[1.16, 4.61]	OR = 5.2, 95%CI[1.35, 21.23]
BOTH NORMS SHOWN	OR = 1.25, 95%CI[0.421, 3.81]	OR = 1.4, 95%CI[0.3, 6.58]
OUTGROUP DESCRIPTIVE NORM	OR = 0.897, 95%CI[0.299, 2.72]	OR = 0.8, 95%CI[0.09, 7.42]

Furthermore, the self-identification rates according to the social identification measure are surprisingly low (52% identified with their ingroup). This could be due to the naming of the ingroup. For instance, people who agreed with the statement “Germany should open its borders for all refugees” might not feel like a “Pro Immigration proponent” since immigration includes more than refugees. On the other hand, the problem could also lie on a deeper conceptual level. It is unclear whether an opinion on a political topic is relevant enough to constitute their own social identity as needed for proper categorization of ingroup and outgroup (Trepte & Loy, 2017; Turner & Reynolds, 2011). It might be the case that a considerable proportion of participants was not emotionally entangled enough with their political topic to have the impression of people agreeing with them being their ingroup and people disagreeing being their outgroup.

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