Replication Study of "Conformity to the descriptive norms of people with opposing political or social beliefs" (Pryor et al., 2019)

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Abstract

The field of social psychology investigates the question of how other people's opinions affect our own decision-making. In this replication study, we examine the role of two theories that emerged from this line of research. One is the descriptive norm effect according to which people simply tend to make the decision that is most popular (Pryor et al., 2019). The other is the self-categorization theory which states that an individual's decisions are affected by conforming with a social group they identify with (ingroup) and segregation from other social groups they differ (outgroups). In particular, it states that an individual tends to make the same decision as the majority of its ingroup while avoiding making the decision the majority of the outgroup made (Pryor et al., 2019).

To investigate these two effects, we informed all participants about the behavior of their ingroup and half of the participants additionally with the behavior of their outgroup in order to find out if ingroup and outgroup behavior influences the decision of the participant in a dilemma situation.

Supporting the self-categorization theory, our results suggest that people tend to conform to the favored decision of their ingroup.

Keywords: descriptive norm effect, self-categorization theory, social norms, decision-making

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Our decisions on how we tend to act are inevitably influenced by the judgments and actions of other people in our social environment (Pryor et al., 2019). People will prefer a certain behavior if they think that other people would behave similarly. There are two social norm effects that try to explain this phenomenon. The first is the injunctive norm effect describing "what most others approve or disapprove" and the second is the descriptive norm effect describing "what most others do" (Cialdini et al. 1990). Meaning that these descriptive norms are standards that describe how most people behave (APA Dictionary of Psychology, 2020). In this study, we focus on descriptive norms. The self-categorization theory (SCT), firstly described by John Turner (Turner & Reynolds, 2012), is a possible explanation of the descriptive norm effect (Pryor et al., 2019). Important for the SCT is the individual identification with a social group. The social group someone identifies with is called his/her ingroup, whereas the social group someone doesn't identify with is called his/her outgroup. The SCT aims to explain the descriptive norm effect, by proposing the concept of ingroup conformity. The thrive of someone to maintain a personal sense of ingroup identity, will lead to the adoption of characteristics of his/her social ingroup (Pryor et al., 2019). Ingroup conformity would therefore predict that people would avoid characteristics of their outgroup, by adopting characteristics of their ingroup. From this follows that people should conform more strongly to an ingroup norm when an outgroup tends to behave in the opposite way (Pryor et al., 2019).
This study is a replication of "Conformity to the descriptive norms of people with opposing political or social beliefs" (Pryor et al., 2019), by students enrolled in the German bachelor program B.Sc. Cognitive Science in Osnabrück.

In this original study, Pryor et al. (2019) investigates two hypotheses representing the differing predictions of the self-categorization theory and the overall descriptive norm effect.

1. **Main hypothesis (self-categorization theory):** Participants will conform more to the ingroup descriptive norm when an opposing outgroup descriptive norm is shown.

2. **Alternative hypothesis (descriptive norm effect)**: People will conform to the overall descriptive norm, such that conformity with the ingroup descriptive norm will decrease when an opposing outgroup descriptive norm is presented.

Pryor et. al (2019) suggests that the descriptive norm effect, meaning a general desire to conform with others, may outpower the SCT.

To contribute to an open science approach, and to reduce the effects of the replication crisis, this study is pre-registered under the following GitHub repository (https://github.com/jumorisse/XPL_Replication_Project). The procedure of this study is described in great detail, to enable others to replicate our findings as well. The goal of this study is to investigate which hypothesis better predicts our data.

As the self-categorization theory builds upon the descriptive norm effect by including additional effects (Pryor et al., 2019) and therefore can be seen as going beyond the descriptive norm effect, we regard the hypothesis of the self-categorization theory as our main hypothesis while the hypothesis of the descriptive norm effect is the alternative hypothesis. We expect to find that our main hypothesis gives a better prediction of our data.

We had to modify the experiment to fit in the cultural context of Germany. We were interested if we are able to draw the same conclusions Pryor et al. (2019) did in this different cultural setting. We selected a set of eight social issues which are currently relevant in Germany, to give the participants the option to choose a topic they are interested in. We defined these by corresponding research and relevant articles (PMG Themenrennen, 2021; Bundestagswahl 2021, 2021) to account for the necessary ability to be polarising enough to split the participants in the corresponding ingroup and outgroup. When selecting the topics, we made sure that they do not only appeal to one gender. As a follow-up to the original study, we use two moral dilemmata, meaning situations for which the following action is hard to decide. We purposely chose two different types of dilemmata, the first is a rather daily situation, while the second is a typical philosophical dilemma (trolley dilemma). In our exploratory analysis, we will make use of having two different types of dilemmas to investigate possibly differing performances of the hypotheses with regards to the dilemma type and also a possible main effect of the dilemma type in predicting the participants' responses.

Method

Participants

We collected 117 Participants (M_{age} = 25.8 years, age range: 16 – 61 years). Participants were recruited through a Link to the web-application. They did not earn any money for participation. Participants had to be at least 16 years old and they had to indicate that German is their native language. We decided to only include participants above 16, as 16 is the youngest possible voting age in Germany and the topics in our study are partially political. We therefore only included participants who would be eligible to participate in the current democratic system.

Materials

We collected a set of eight social issues, which are currently relevant in Germany, to give the participants the option to choose a topic they are interested in. We defined these by corresponding research and relevant articles (PMG Themenrennen, 2021; Bundestagswahl 2021, 2021).

A Likert scale with 11 points was used for the judgment of how much the participants agree or disagree with a specific statement corresponding to their chosen social issue.

We used two different moral dilemmata, meaning situations for which the following action is hard to decide. After confronting the participants with a moral dilemma we showed either only an ingroup descriptive norm or an ingroup and outgroup descriptive norm, which give information about how the ingroup/the outgroup decided in this dilemma situation. The dilemmata are presented below and the descriptive norms are explained in detail in the section "Procedure". Since the whole study was conducted in German, we used word-by-word translations to be as precise as possible, where word-by-word translations could change the meaning of the sentence we used semantic translations.

More daily dilemma:

Your friend tells you that they committed a crime. They explain that they have trouble sleeping at night and feel that you are the only one they can trust with their confession. A few days later, you read in the newspaper that someone innocent has been arrested for your friend's crime.

What do you do?

- *Go to the police and tell them what you know.*
- *Say nothing because you don't want to betray a friend's confidence.*

Philosophical dilemma:

There is a runaway trolley barreling down the railway tracks. Ahead, on the tracks, there are five people tied up and unable to move. The trolley is headed straight for them. You are standing some distance off in the train yard, next to a lever. If you pull this lever, the trolley will switch to a different set of tracks. However, you notice that there is one person on the side track. ("Trolley problem", 2021, para. 1)

There are two options:

- *Pull the lever, diverting the trolley onto the side track where it will kill one person.*
- *Do nothing and allow the trolley to kill the five people on the main track.*

What do you do?

A 6-point scale was used for evaluating the decision of the participant regarding the dilemma. This will be described in more detail in the section "Procedure".

Towards the end of the experiment, there was an understanding check as additional trials using sentences provided in the original research paper (Pryor et al., 2019, p. 4) as well as additional ones, to prove whether the participant has been attentively focused throughout the study.

Procedure

First, participants were welcomed to the study and after providing basic demographic information about age and sex, participants were presented with instructions for the current study. They got the information that this study was following on from a previous study that investigated how people feel during a moral dilemma. After that, participants were asked to select which out of eight social issues they cared about the most. Subsequently, participants were presented with a statement about their chosen issue and were asked to report to which extent they agreed or disagreed with the statement on an 11-point Likert scale. Based on their decision to which extent they (dis-)agree with that statement, the ingroup and the outgroup of the participant are defined. The specific ingroup of one participant are hereby people, who have the same opinion on the specific social issue, whereas the outgroup is defined by people, who disagree on this specific topic with the participant. The participants were then presented with two moral dilemmata. One dilemma is philosophical, while the other one describes a more daily situation. The order in which the dilemmata have been presented is randomly selected. After each moral dilemma, all participants were presented with an ingroup descriptive norm informing them that 60% of previous participants who had agreed with them about their chosen social issue (i.e. members of their political or social ingroup) chose to act in a certain way. Which of the two options their ingroup chose (f. e. philosophical dilemma: option A: pull the lever, option B: do nothing), was randomly selected (50%) for the between-subject design. Additionally, half of the participants were told that, in the previous study, 85% of participants that disagreed with them on that social issue chose the other option. Half of the participants were therefore only presented with their descriptive ingroup norm (condition 1), whereas the remaining participants were presented with the descriptive ingroup and outgroup norm (condition 2). A between-subject design was used since the participants were presented with one of the two conditions. After that, participants were told to indicate how they would respond to the moral dilemma on a 6-point Likert scale. To fit with the backstory presented in the instructions, participants were asked to also rate how good or bad they felt about their chosen action (rating choice), although these responses have not been analyzed.

In order to ensure that participants were paying attention, an understanding check provided by three trials included asking participants which statements about the current study were true. (f. e, option A: “Du musstest immer so schnell wie möglich antworten.”- “*You always had to answer as soon as possible*.” (incorrect), option B: “Es ist irrelevant, wie lange du für deine Antworten benötigt hast.” - “*The time it took you to answer is irrelevant*.”(correct))

In the end, participants were asked to rate on a 6-point Likert scale to which extent they identify (or not identify) with their specific ingroup or outgroup (Identity Check: f. e. “Ich identifiziere mich als Tempolimit-Befürworter” - *“I identify myself as a speed limit advocate”* und “Ich identifiziere mich als Tempolimit-Gegner” - *“I identify myself as a speed limit opponent”*)

Design

Our experiment has a between subject design with 2 factors [2 (INGROUP DESCRIPTIVE NORM) x 2 (BOTH NORMS SHOWN) factorial design]. For this 2 x 2 factorial design, there are 2 * 2 = 4 different experimental conditions.

We decided to include two different dilemmata to make sure that the effect is not specific to the dilemma. The dilemma isn’t included as a factor, as this is only an exploratory investigation of a possible effect of “dilemma”. Each participant is presented with both dilemmata, resulting in a within-subjects design, turning the experiment including the exploratory investigation, into a mixed experimental design. The variable INGROUP DESCRIPTIVE NORM refers to which of the two decisions was apparently favored by the ingroup. For the philosophical dilemma, this would result in the INGROUP DESCRIPTIVE NORM either be to pull the lever (INGROUP DESCRIPTIVE NORM = -1) or doing nothing (INGROUP DESCRIPTIVE NORM = 1). For the daily dilemma, this would result in the INGROUP DESCRIPTIVE NORM to either go to the police (INGROUP DESCRIPTIVE NORM = -1) or say nothing (INGROUP DESCRIPTIVE NORM = 1). The independent variable BOTH NORMS SHOWN represents the distinction of whether only an ingroup descriptive norm was shown (BOTH NORMS SHOWN = 0) or both an ingroup descriptive norm and an outgroup descriptive norm were shown (BOTH NORMS SHOWN = 1).

Data Preparation

We decided to only include participants above 16, as 16 is the youngest possible voting age in Germany and the topics in our study are partially political. We therefore only want to include participants who would be eligible to participate in the current democratic system. As the contents of our study require the participant to be fluent in German, we are using the indicated native language as an exclusion measurement. In addition, we excluded any participants who reported being neutral on their chosen social issue as it was not possible to define the specific ingroup and outgroup of that participant (Pryor et al., 2019). Besides that, we decided to also exclude the data from participants who chose values between -2 and 2 on their social issue, as we interpreted these values as not strong enough for defining an ingroup and outgroup because the degree to which an individual will conform with the norms of an ingroup will be determined by how strongly they perceive themselves to be a member of that ingroup (Pryor et al., 2019). The cleaned data set has been used for statistical analysis.

Results

We collected data from 117 participants. For two participants the tracking of their response was erroneous which resulted in no recording of their dilemma decisions. Therefore, these two participants were excluded from the analysis. We also had to exclude three participants because they are not German native speakers. Furthermore, we excluded participants because they did not pass the understanding check (n = 14), were too indecisive with regards to the social issue statement (n = 14) or both (n = 2). Collectively, we excluded 35 participants which leave the data from 82 participants to be used in the analysis.

In order to determine the extent to which self-categorization theory provides a better or worse explanation of our data than the alternative hypothesis, we implemented two competing models that capture the two hypotheses and investigate which is better suited to explain our obtained data. Both models are instances of Bayesian ordinal logistic regression implemented in R by using the stan and brms packages.

Both models try to predict the responses in the dependent variable dilemma_rating. Specifically, they try to predict the natural log odds of responding with a higher rating which in our case represents a more passive action to solve the dilemma (e.g. not report your friend to the police).

In the alternative model, the dependent variable dilemma_rating is regressed against the two independent variables ingroup_norm (I) and both_infos (B) as well as their interaction ($I{\cdot}B$) as can be seen in Equation 1. The interaction term represents the effect of the outgroup_norm as it contains information on its existence (given by B) as well as direction (given by I and the positivity/negativity of b_{out}). The effect of the ingroup norm and the influence of whether the participant is shown just the ingroup or also the outgroup are represented by $b_{in}I$ and $b_{both}B$ respectively.

Equation 1:

$$log_e(odds\ of\ deciding\ for\ the\ passive\ option) = b_{in}I + b_{both}B + b_{out}I{\cdot}B$$

The model for the self-categorization theory includes two additional independent variables ingroup_agree and outgroup_disagree that interact with the ingroup_norm and the interaction term respectively (see Equation 2). These two variables indicate whether the subject actually identifies with its assumed ingroup and not identifies with its outgroup. They are included in the self-categorization theory model to account for the expected contrary effects of ingroup and outgroup opinions on the subject's decision. The ingroup_agree and outgroup_disagree variables implement the assumptions of the self-categorization theory by acting as a control that can turn off both the effect of the ingroup_norm variable (if the subject does not identify with its supposed ingroup) or the effect of the interaction term (if the subject does actually identify with its supposed outgroup).

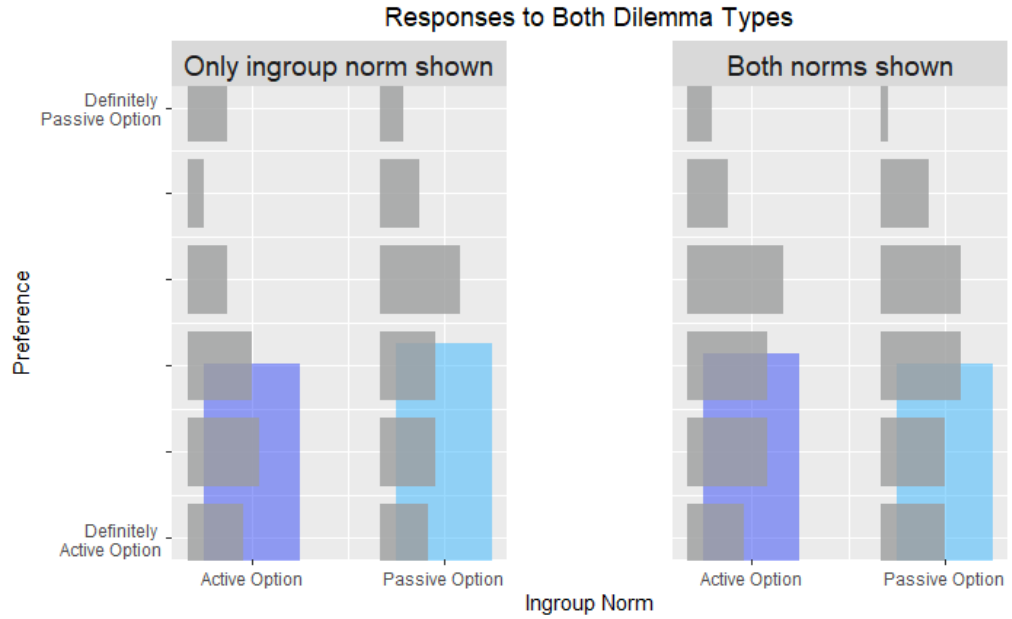

Fig1.Superimposed bar chart representing responses to both moral dilemmata in each condition of the Experiment. The horizontal grey bars represent the relative proportion of each response in each condition. The vertical blue bars represent the mean response in each condition in order to give a better sense of how the pattern of responses changed in each condition. The results of the experiment are consistent with the main hypothesis that people's preference will shift towards the norm of the ingroup.

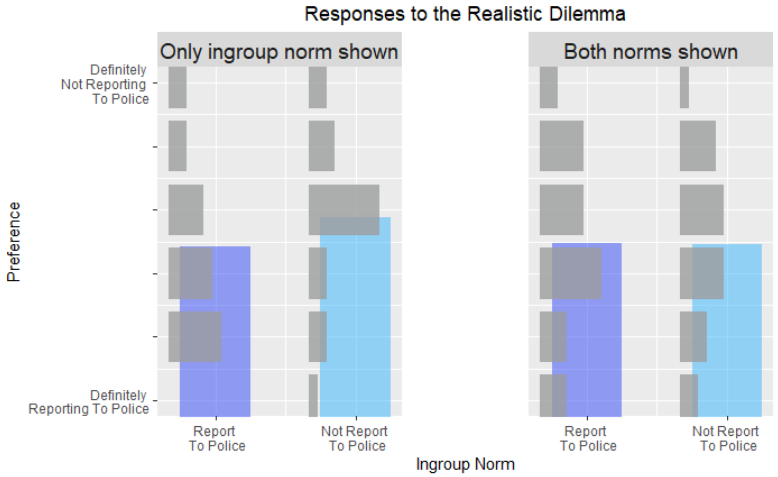

Fig 2. Superimposed bar chart representing responses to the realistic dilemma in each condition of the Experiment. The horizontal grey bars represent the relative proportion of each response in each condition. The vertical blue bars represent the mean response in each condition in order to give a better sense of how the pattern of responses changed in each condition. The results of the experiment are consistent with the main hypothesis that people's preference will shift towards the norm of the ingroup.

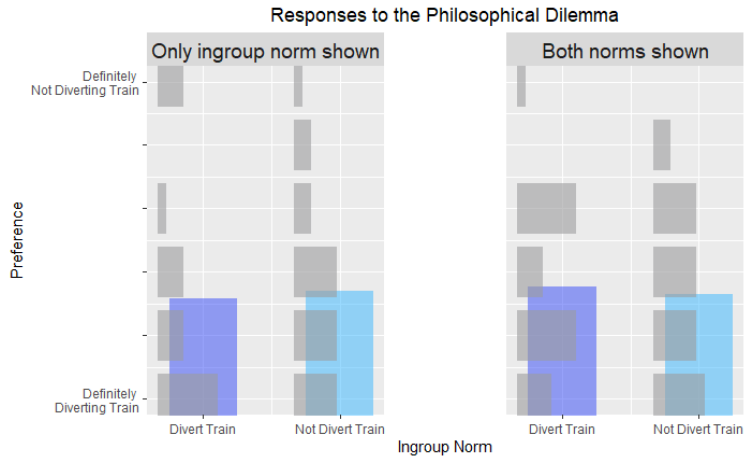

Fig 3. Superimposed bar chart representing responses to the philosophical dilemma in each condition of the Experiment. The horizontal grey bars represent the relative proportion of each response in each condition. The vertical blue bars represent the mean response in each condition in order to give a better sense of how the pattern of responses changed in each condition. The results of the experiment are consistent with the main hypothesis that people's preference will shift towards the norm of the ingroup.

Equation 2:

$$log_e(odds\ of\ deciding\ for\ the\ passive\ option) = b_{in}I{\cdot}Ingroup\_Agree + b_{both}B + b_{out}I{\cdot}B{\cdot}Outgroup\_Disagree$$

For both models, we used three priors drawn from the same distributions as Pryor et al. (2019) did.

To investigate which hypothesis is stronger supported by our data, we compare how well their respective models explain the obtained data. We did this by computing the Bayes Factor in favor of our self-categorization model as seen in Equation 3.

Equation 3:

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

We found a Bayes Factor of 198.61, meaning that the observed data is 198.61 times more likely under the SCT model than under the alternative model. According to Jeffreys' scale (Jeffreys, 1961), these results provide decisive evidence for the self-categorization model and thus, support the self-categorization theory, that people tend to conform more to the ingroup descriptive norm when an opposing outgroup descriptive norm is shown.

Beyond this analysis of our main and alternative hypotheses, we perform two exploratory analyses with regard to the two different kinds of dilemmas we used.

In the first exploratory analysis, we investigated how well the models explain data of only one type of dilemma. Therefore, we split the total dataset into two datasets each of which contains data of only one dilemma type (realistic or philosophical). Then we performed the same analysis we did for the whole dataset on these two subsets.

For the data of the realistic dilemmas, we obtained a Bayes Factor of 5846602.38 in favor of the self-categorization model over the alternative model. This constitutes decisive evidence for the self-categorization model being better at predicting a participants' response when just looking at realistic dilemmas.

In case of the philosophical dilemma we found a Bayes Factor of 2649.92 in favor of the self-categorization over the alternative model, which also is decisive evidence for the self-categorization model. Therefore, for both subsets containing only one dilemma type the self-categorization model performs better at predicting participants' responses than the alternative model. While the Bayes Factors differ in strength, they all are decisive evidence in favor of the self-categorization model according to Jeffreys' scale (Jeffreys, 1961). This does not give any indication that there might be differing performance of the two competing models with regards to the dilemma type. However, further research that focuses on this question would be needed to ascertain whether this is actually the case.

For the second exploratory analysis, we extended the Bayesian ordinal logistic regression models that were used earlier with a dilemma type term. The resulting new regression formulas can be seen in Equation 4 (for the exploratory alternative model) and Equation 5 (for the exploratory sct-model) with *T*representing the dilemma_type variable.

Equation 4:

$$log_e(odds\ of\ deciding\ for\ the\ passive\ option) = b_{in}I + b_{both}B + b_{out}I{\cdot}B + b_{typ}T$$

Equation 5:

$$log_e(odds\ of\ deciding\ for\ the\ passive\ option) = b_{in}I{\cdot}Ingroup\_Agree + b_{both}B + b_{out}I{\cdot}B{\cdot}Outgroup\_Disagree + b_{typ}T$$

These exploratory models can be understood as versions of the initial models for which we assume a main effect of the dilemma_type variable. We fitted these exploratory models the same way as the initial models and then investigated whether the exploratory models explain the data better than the initial models. We did this by computing the Bayes Factor in favor of the exploratory over the initial model. For the self-categorization model, we found a Bayes factor of 1523.02 in favor of the exploratory model over the initial model. Comparing the exploratory and initial model of the alternative hypothesis we found a Bayes factor of 1189.24 in favor of the exploratory model over the initial model and therefore also decisive evidence for the exploratory model.
These results provide decisive evidence for the exploratory models (Jeffreys, 1961) and therefore it can be concluded that the dilemma type has a main effect on the participants' decision.

Before having a look at the direction of this possible dilemma type main effect, it is necessary to point out that the variable dilemma_type can be either -1 (real dilemma) or 1 (philosophical dilemma). With this in mind, we can take a look at the estimate of the dilemma type coefficient in both exploratory models. For the exploratory alternative model we found an estimate of -0.58 with a 95% confidence interval ranging from -0.87 to -0.29 and for the exploratory self-categorization model we found an estimate of -0.6 with a 95% confidence interval from -0.9 to -0.31. For both models, the estimates and 95% confidence intervals of the dilemma type coefficient are completely negative. With regards to our formula this indicates that the dilemma type has an effect on the participants decision as in that participants are more likely to give a higher response (in our case meaning favoring a more passive decision) when presented with a realistic dilemma. Conversely, being confronted with a philosophical dilemma causes participants to less likely favor a higher response.

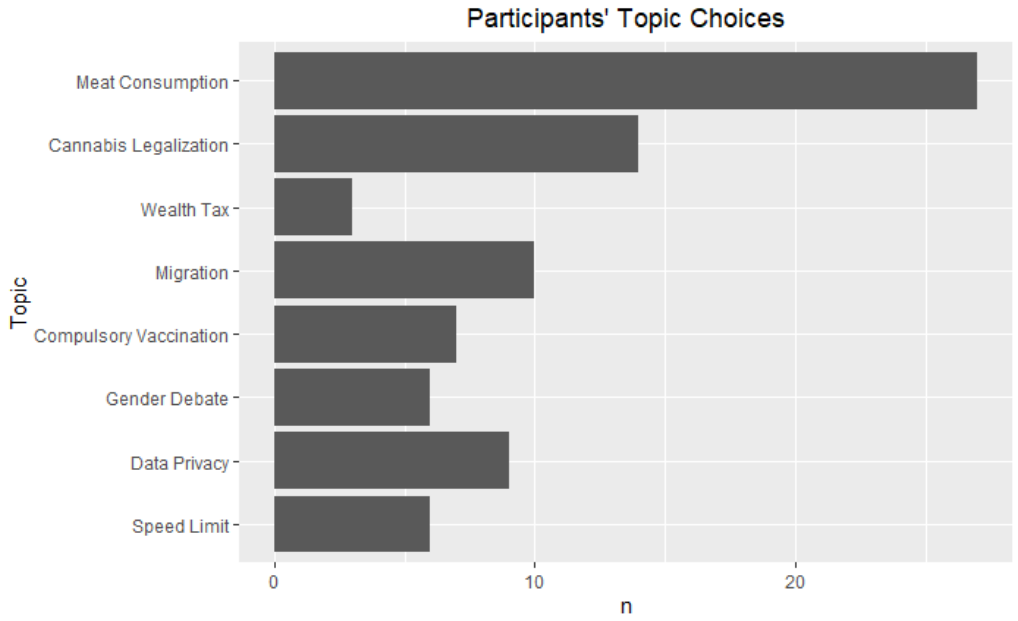

Fig 4. Bar chart representing the chosen topics of the participants.
The horizontal grey bars represent the proportion of how often the respective social topic was selected. The results show that the topic "Meat consumption" was chosen by the most participants, followed by "Cannabis Legalization" and "Migration".

Discussion

Following up on our results we can state that our study favors the main hypothesis (self-categorization theory). The participants conformed more to the ingroup descriptive norm when an opposing outgroup descriptive norm is shown, meaning that they favored the decision of their ingroup, no matter if this was a smaller percentage of people.

Our results are contrary to the results of the original study. Pryor et. al (2019) suggests that the descriptive norm effect, meaning a general desire to conform with others, may outpower the SCT. There are multiple possibilities responsible for this contrary result. The first important factor with a direct influence on our result is our number of participants. Our results are solely based on 82 participants. This number will probably be too small to gain statistical significance. Pryor et. al could base their results on 301 participants and are therefore able to draw a more conclusive proposal. Further research should incorporate a power analysis to determine an optimal number of participants to increase the reliability of the results. The original study further improved its reliability by computing the Bayes Factor with different means and standard deviations in their priors, resulting in a Bayes Factor ranging from 30.04 to 522.62. In this range, the conclusion remains the same and therefore demonstrates that the prior assumptions are not influencing the general conclusion. Our

results are only based on one prior set for each model, the missing range of likely Bayes Factors could reduce the decisiveness of our results.

Another possible influence is the strength of the descriptive norms. Neither the original nor our study tested what influence the percentage, displayed in the descriptive norm, could have on the behavior of the participants. Both studies used 60% for the ingroup and 85% for the outgroup descriptive norm. A further investigation of stronger or weaker ingroup and outgroup descriptive norms would be appropriate. The used percentage as an indication of group size (for ingroup and outgroup) could also influence the effect of the displayed descriptive norms. A participant informed about the rough group size of his/her ingroup might (subconsciously) know that even if a high percentage of his/her ingroup favors a certain behavior and only a small percentage of the outgroup favors an opposing behavior, that this outgroup still outnumbers the ingroup and therefore built the overall descriptive norm. Even though we are only interested in the shift of behavior and could therefore argue that the actual group sizes are neglectable, a further investigation of actual ingroup and outgroup sizes to determine the strength of the descriptive norm effect would be appropriate.

A possible preexisting opinion on the dilemma decision is not investigated in our study, both of our hypotheses presuppose a change in behavior due to the displayed descriptive norm. There might be participants, which were simply not influenced by the behavior of others. Further research should be done to investigate the question if descriptive norms have a direct influence on behavior (Rimal et al., 2007).

A further possible influence can be underlined by our data analysis, which shows that participants favor a passive decision when presented with a realistic dilemma. One reason might be that people do not want to take personal responsibility in dilemma situations.

Since participants were not paid for their participation, most participants were friends or relatives. This could induce that the participants wanted to help and cooperate and therefore changed their behavior accordingly. This unconscious effect is called demand characteristics by Orne. “[He] suggested that [...] participants are influenced by the totality of the situation [during the experiment] which provides cues that essentially convey a hypothesis for the situation and perhaps indications of how they should behave. In many ways, the concept of demand characteristics cannot be separated from the notion of helpful and cooperative participants.” (Cramer, D., 2011).

Our results strongly support that the dilemma situation influences the participants' decision. However, to find significant results on that topic and to make sure which dilemma version has a stronger effect on the decision further research with a broader range of dilemma situations and a precise focus on that would be needed.

This study shows that people’s preferred behavior is shifted towards the one that was chosen by their ingroup, even when the other option was popular amongst more people (85% outgroup). This overlaps with the self-categorization theory that people will rather conform to their ingroup and try to differentiate themselves as much as possible from their outgroup.

The fact that our findings contradict the results of the original study leads to the consideration that both theories - the self-categorization and the overall descriptive norm theory - are not mutually exclusive. Further research on the possible reasons as described above will be promising.

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