Replication study - Conformity to the descriptive norms of people with opposing social or political beliefs

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Abstract

Introduction

   This study is designed to replicate the paper *Conformity to the descriptive norms of people with opposing political or social beliefs* by Campbell Pryor, Amy Perfors, and Piers D. L. Howe published in 2019. Although the authors conducted two single experiments in their paper, we are only replicating the first one here. In their study, they investigated the phenomenon of descriptive norms with respect to the self-categorization theory in form of the hypothesis: According to self-categorization theory, people behave opposite to outgroup norms; against the alternative hypothesis: People conform to the overall descriptive norm. Descriptive norms are understood as the tendency of individuals to conform to the behavior popular in a reference group under similar circumstances. That is to say, people choose or act a certain way when they observe other people doing the same. This effect has been observed in several studies using a variety of different selection scenarios, for instance anti-social behavior (Abbink, Freidin, Gangadharan, Moro, 2018; Köbis, Van Prooijen, Righetti, Van Lange, 2015) or ecological questions (Schultz, Nolan, Cialdini, Goldstein, Griskevicius, 2007).

The theory of self-categorization claims that people are not only influenced by other people's actions or choices, but actively position themselves to conform with the norms of groups they identify with (ingroup norm) while opposing to norms of groups they do not identify with (outgroup norm). Thus, this theory proposes a person's conviction is linked to the norms of social groups that person identifies with and will adjust to them appropriately (Turner, Hogg, Oakes, Reicher, Wetherell, 1987). The amount of coherence between the ingroup norm and the individual opinion is believed to depend on the degree a person identifies with the respective group (see Smith & Terry, 2003; Rimal, 2008).

   The findings that were reported by Pryor, Perfors and Howe (2019) we aim to replicate consist in a stronger tendency to conform to the behavior being more popular overall (alternative hypothesis) independent of the ingroup or outgroup norm than following the ingroup norm only. Since the issues in question were controversial political or social dilemmas (e.g. gun control, feminism, climate change etc.) chosen by the participants themselves, the authors are convinced the results of their study are strong evidence rather against than in favor of self-categorization theory, meaning that self-categorization theory is not false, but incomplete[1]. They proposed the theory in itself may be less general than earlier thought since it can not fully account for the results, as the participants' choices had shifted away from what they ought to select if that theory was true. This is to a large degree consistent with the findings of Rimal & Real (2003,2005) proposing a richer explanation to justify the effects of norm conformity. It could be as well the case that self-categorization

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[1] See https://doi.org/10.1371/journal.pone.0219464, p. 11f.

theory applies only under harsher restrictions, like an absolute ingroup-outgroup norm separation. More explanations and ideas are provided in the original paper, but shall not be revised here in detail. As a replication study, we attempted to keep the study design as close as possible to the original one, using the same stimuli with as few adjustments as possible.

Method

Participants

Participants were recruited over social media platforms (Facebook, Instagram) as well as a mailing list for cognitive students of the university of Osnabrück and from the university Virginia Tech in the United States. The total number of subjects participating was 99 (47 female, 39 male, 5 divers, μ_{age}= 27.9 years, age range: 13-84). No financial compensation or kind of reward was given to the participants. The experiment was carried out in a web browser using _magpie[2] and took between two and three minutes to complete when done creditably. The subjects were free to stop the experiment at any time. Besides age and gender, no data was collected.

Materials and Procedure

The materials for this study were adopted from Pryor, Perfors & Howe (2019) and adjusted such that the social and political issues were adequate and up-to-date. For a full description of the issued themes and statements, see A1.

At first, participants were asked to provide basic demographic information, including age and gender. After that, one out of nine social-political issues had to be chosen that the participant cared about the most. A controversial statement about that issue was then displayed (e.g. 'Feminism is important and beneficial to modern society' when feminism was chosen), to which the participants had to answer how much they agree or disagree on a scale rating from minus five (strongly disagree) to plus five (strongly agree). That rating was used to determine the ingroup and outgroup membership. Then the instructions for the critical trial were presented. The participants were told this experiment was following up a study investigating how people feel during moral dilemmata. This information was given to let the participants believe a reasonable story when presenting the descriptive norms. After providing these instructions, the following moral dilemma was presented:

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[2]

https://magpie-ea.github.io/magpie-site/

"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."

The choice had to be made on a scale reaching from minus 3 (Definitely call the police and report the robber) to plus 3 (Definitely do nothing and leave the robber alone). Furthermore, all participants were presented with an ingroup norm favoring one of these two options equally likely. For example, if feminism was the chosen social issue, the ingroup norm could look like so: *"approximately 60% of participants who agreed with you about Feminism chose to call the police and report the robber"* or the exact opposite choice. In addition, half of the participants were also presented with an outgroup norm contrasting the choice presented in the ingroup norm (both norms in a random order). Sticking to the example above, the outgroup norm presented would be: *"approximately 85% of participants who disagreed with you about Feminism chose to do nothing and leave the robber alone."*

   Thus, our study was maintained like in the original one, having a 2 (*INGROUP DESCRIPTIVE NORM*) x 2 (*BOTH NORMS SHOWN*) between-subjects design. The variable *INGROUP DESCRIPTIVE NORM* indicated the ingroup decision displayed during the trial (reporting the robber = -1, leaving the robber alone = 1) and the variable *BOTH NORMS SHOWN* represents whether only the ingroup norm or ingroup and outgroup norms were shown to the participants (ingroup norm = 0, both norms shown = 1). After answering the moral dilemma, the subjects were asked how they felt about their decision to prolong the idea of conducting a study focussing on moral dilemmata and their effects on a person's feelings. That question had to be answered with a scale ranking from minus 3 (I have a very bad feeling) to plus 3 (I have a very good feeling). Afterwards, an attentional trial was shown, having the participants checked whether they actually understood the preceding trials (see A1). Lastly, participants were questioned about their group identification to test whether they identified with their respective ingroup and did not do so with their respective outgroup. This was determined in two identification trials with the help of Postmes, Haslam and Jans' single-item social identification measure asking how strongly they agree or disagree with a statement of the form "I identify with [ingroup]" or "I identify with [outgroup]" (rating from minus 3 =strongly disagree to plus 3 =strongly agree)

where ingroup and outgroup was replaced accordingly (e.g. feminists vs. Anti-Feminism Advocates).

Data preparation

In order to retrieve a usable data format from the _magpie csv file, we applied a python script[3] on the raw data, yielding a cleaned data file.

Only data of subjects who selected the correct option in the attention trials and were not neutral (0 between -5 and 5) towards their chosen issue was used in the analysis. Of the 99 participants, 16 were excluded this way. Moreover, we did not exclude participants that spent a long time (ten minutes or more) completing the experiment, as we do not assume this utters the results drastically.

Results

Models

   Following the analysis plan of the study we are replicating, we instantiated two models reflecting the hypothesis of self-categorization theory being better suited in explaining the observed data. Thus, one of these models incorporates this assumption, while the other model employs the alternative descriptive norm hypothesis.

Both models are instances of a bayesian ordinal logistic model with priors which are compared using the Bayes Factor, yielding the probability of observing the data under the respective models. Both versions assume that the descriptive norm changes the odds of making higher (preferring to not report the robber) or lower responses (preferring to report the robber) on an ordinal scale. The ordinal logistic regression model predicts the distribution of these responses. The variables are parameterized with respect to the natural log odds in favor of a higher response like presented here:

log_e *(odds of responding higher) = b_{in}I + b_{both} B + b_{out} I x B*   Equation 1

The letter *I* is representing the parameter *INGROUP DESCRIPTIVE NORM* and *B* the parameter *BOTH NORMS SHOWN*. To account for the *OUTGROUP DESCRIPTIVE NORM* parameter, we represent it by the interaction of the two independent variables (*I x B*). Small letters are priors serving as effects of changing those parameters

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[3] The python script cleaner-script.ipynb to be found in our github repository in the analysis section

differing in both models, as stated below. In addition, the self-categorization model takes into account ingroup-agree and outgroup-disagree terms like shown here in Equation 2 :

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

The first one is defined as 1 when identifying with the ingroup and 0 otherwise. The same principle is done with the latter. These terms are to be understood as an identity term stating whether the subjects' positioning was in concordance with the essence of self-categorization theory. To rehearse, owing to that, an individual want to conform with an ingroup norm if identifying him - or herself with this group while opposing the outgroup norm. The main difference to the alternative model is given by ignoring these variables which heavily influence the outcome, since zero and one disregards or fully regards parts of the equation.

Figure 1 shows the proportions of the responses for each condition under both models. The blue bars represent the mean response, and the gray bars on the side the relative proportions of each response. The means are fairly at the same level, however the relative proportions express unevenly distributed amounts of responses, which may be caused by the small number of participants.
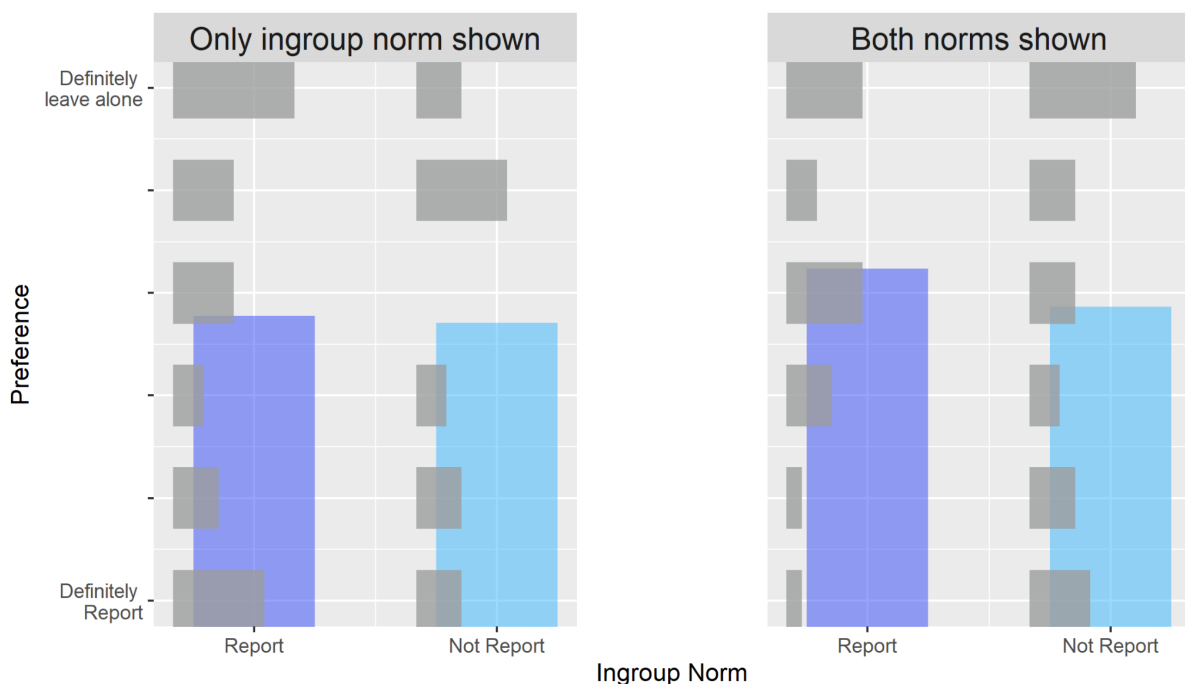
Figure 1. Responses for moral dilemma shown for both conditions. Blue bars represent mean response and gray bars relative proportion of responses. No significant effect is visible.

Prior assumptions

We took over all priors from the paper and therefore skim to rehearse every detail. The prior b_{in} we defined to be a folded normal distribution with a mean of 0.816 and a standard deviation of 0.5 for both models. It is strictly greater than 0, since both models assume the effect of the ingroup descriptive norm will be in a positive direction.

The prior b_{both} expresses the effect of presenting both group norms, allowing an outgroup norm to be more effective in one direction than in another. Both models share the normal distribution with a mean of 0 and a standard deviation of 0.5. Lastly, the prior b_{out} shows the amount to which an outgroup norm presented shifts away preferences from the option favored by the ingroup norm. The self-categorization model resembles this by having a half-normally distributed prior with a mean of 0 and a standard deviation of 0.5 restricted to be greater than 0 (increasing conformity with the ingroup norm). The alternative model was given a prior distribution in form of the transformed b_{in}. Precisely, with respect to the provided percentages during the trials, we applied the multiplication like so: *- 0.85/0.6 b_{in}* (Ingroup and outgroup norms are expected to influence the participants' preferences equivalently except for their strengths).

Model comparison

To determine the better explaining model for the observed data, we made use of the Bayes Factor calculated with the 'Bridge Sampling' package in R, giving us the Bayes Factor (likelihood of observing the data under the alternative model divided by the likelihood of observing the data under the self-categorization model) of 6.06522. Compared to the BF of 34.97 in the original paper, our results show a less significant discrepancy between the two models, decreasing the evidence for the alternative model previously observed. To test how variations of the prior parameter b_{out} affect the outcome, we ran the same analysis with different values for the mean (0, 0.5, 1) and the standard deviation (0.25, 0.5, 1, 2) yielding values in the range of ### X to Y

==favoring the Z model ###== . (This interval is a lot smaller than reported in the original study, which is coherent with our primary finding of the models being less divers). We also plotted the prior and posterior distribution for each parameter (b_{in}, b_{both}, b_{out}) to look for major deviations. The light blue dashed lines represents the prior and the solid black lines the posterior distribution, see Figure 2 below:
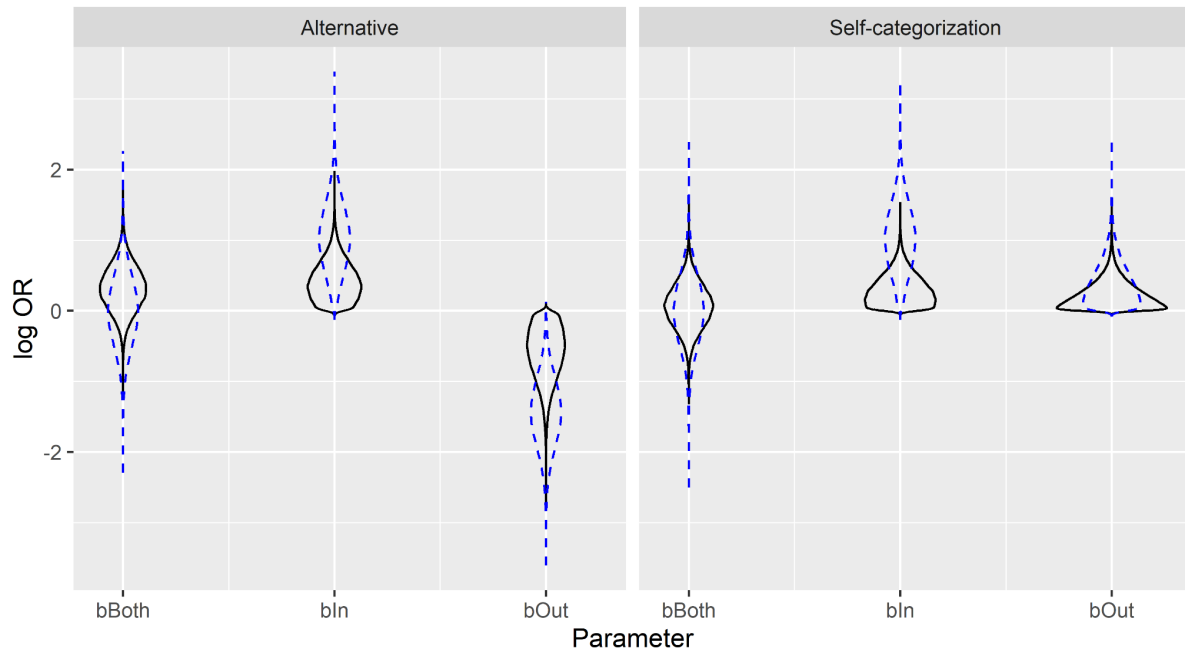

Figure 2. Prior and posterior density for all three parameters of the equation (both models). The Y-axis gives the values on a logarithmic scale.

The results here favor the alternative model instead of the self-categorization model. That is for us to say, we could not find clear evidence that is supporting the hypothesis of self-categorization playing a major role in the decisions made by our participants. Overall, our analysis provides a weak supportive claim to the findings of the Pryor, Perfors and Howe (2019) that self-categorization can not account for the results as well as the descriptive norm effect does, since our results point in the same direction to a much lesser degree.

Effect sizes

Despite the Bayes Factor, we did a frequentest ordinal regression to investigate effect sizes of the parameters in Equation 1. ==### frequentist ###==

Conclusion

The authors of the original article reported findings across two experiments supporting the alternative hypothesis that descriptive norms having an effect on people's opinions in moral judgments can not be purely explained by self-categorization theory. Surprisingly, this was found in social and political controversial situations, for which the participants had reported to seriously care about. That a person's decision-making is only influenced by the group norm this person identifies with could not be confirmed, since compared with ingroup *and* outgroup norms presented, the bigger number of participants shifted their opinion towards following the overall consensus. To question this finding by replicating the first of these experiments was our intention. By doing so, we observed smaller differences between the conditions *INGROUP DESCRIPTIVE NORM* and *BOTH NORMS SHOWN* having us believe the self categorization effect (following the decision being more popular in the ingroup) did not affect the subject's decisions as weakly as previously reported when competing with an outgroup norm.

Nevertheless, it is reasonable to support the finding of self-categorization not being sufficiently evident for explaining the observed outcome, since our results provide an objection to self-categorization theory and go in the same direction as the original paper; that is the alternative model is more likely to has generated the outcome. The degree to which descriptive norm effects are ruled by ingroup norms was under specified in this experiment and remains except for speculations uncertain. It could be a plausible scenario that a sort of association between the groups and the norms needs to be established, which would mean to exhibit one or more latent variables in our equations. Assuming one descriptive norm behavior was stereotypical for a group, such a relation would be easily found. Not having a separating fact like this can harm group identities and lead to a worse suited prior configuration of groups. It is open to future research to investigate to which extent self-categorization theory are coherent with descriptive norms and what is missing. What we do claim is that the hypothesis we tested is very unlikely to be true, as there are better quantitative reasons to reject than to maintain it. Therefore, we go along with Pryor, Perfors and Howe and suggest a richer version of self-categorization theory is needed when establishing it as being the source of descriptive norm effects.

We should emphasize once more the possible arising of prejudice mediated through our younger and less numerous participant ship. Since most of the subjects were recruited either over social media or universities and these institutions are overly crowded by young people, the representing effect on the general population is decreasingly low. Keeping this discrepancy in mind, it is arguable that the ingroup norms get to take on a more influencing role compared to the general descriptive norm for the matter of young adults (μ_{age}= 27 years in our study) having a stronger tendency to conform with their respective ingroup than older aged adults (μ_{age} = 60 years in original study) do ().

References

Abbink K, Freidin E, Gangadharan L, Moro R. The effect of social norms on bribe offers. The Journal of Law, Economics, and Organization. 2018; 34(3): 457–74

Gronau QF, Sarafoglou A, Matzke D, Ly A, Boehm U, Marsman M, et al. A tutorial on bridge sampling. Journal of mathematical psychology. 2017; 81: 80–97. https://doi.org/10.1016/j.jmp.2017.09.005 PMID: 29200501

Köbis NC, Van Prooijen J-W, Righetti F, Van Lange PA. "Who doesn't?"—The impact of descriptive norms on corruption. PloS one. 2015; 10(6): e0131830. https://doi.org/10.1371/journal.pone.0131830 PMID: 26121127

Postmes, T., Haslam, S. A., & Jans, L. (2012). A single-item measure of social identification: Reliability, validity, and utility. *British Journal of Social Psychology*, *52*(4), 597–617. https://doi.org/10.1111/bjso.12006

Pryor C, Perfors A, Howe PDL (2019) Conformity to the descriptive norms of people with opposing political or social beliefs. PLoS ONE 14(7): e0219464. https://doi.org/10.1371/journal.pone.0219464

Rimal RN. Modeling the relationship between descriptive norms and behaviors: A test and extension of the theory of normative social behavior (TNSB). Health Communication. 2008; 23(2): 103–16. https://doi.org/10.1080/10410230801967791 PMID: 18443998

Rimal RN, Real K. How behaviors are influenced by perceived norms: A test of the theory of normative social behavior. Communication Research. 2005; 32(3): 389–414

Rimal RN, Real K. Understanding the influence of perceived norms on behaviors. Communication Theory. 2003; 13(2): 184–203

Schultz PW, Nolan JM, Cialdini RB, Goldstein NJ, Griskevicius V. The constructive, destructive, and reconstructive power of social norms. Psychological science. 2007; 18(5): 429–34. https://doi.org/10. 1111/j.1467-9280.2007.01917.x PMID: 17576283

Smith JR, Terry DJ. Attitude-behaviour consistency: The role of group norms, attitude accessibility, and
mode of behavioural decision-making. European Journal of Social Psychology. 2003; 33(5): 591–608

Turner JC, Hogg MA, Oakes PJ, Reicher SD, Wetherell MS. Rediscovering the social group: A self-categorization theory. Oxford, UK: Basil Blackwell; 1987

Footnotes