

Feb 16, 2022

Ref: Communicating dynamic norms with visual cues

Dear Dr. Chambers,

Thank you for offering us the opportunity to revise and resubmit our manuscript entitled 'Communicating dynamic norms with visual cues'. We have amended the manuscript to address the issues raised, and provide the clarifications requested by you and the reviewers. Please find below our responses to each point that was raised and the corresponding amendments we have made to the manuscript.

### **Recommender feedback**

1. "The main issues to address in revision including clarification of key concepts and theoretical framing in the introduction, stronger justification of analysis decisions in the pilot study, consideration of the validity of the attitude measures and the attention check, and additional information about the manipulation check."

We have revised our manuscript and we have made several changes throughout. We reply in the letter below to the individual comments made by reviewers.

2. "I would like to see greater detail presented concerning the outlier exclusion methodology (including at what level of the data, and in what sub-conditions, outliers will be excluded -- note that this description should be as comprehensive as possible to minimise any ambiguity)"

We have added further information regarding our methodology in the manuscript. Specifically, we have included the following text:

"We will detect multivariate outliers in the data using a robust Mahalanobis distance based on the Minimum Covariance Determinant with a breakdown point of 0.25, and a chi-square at  $p = 0.001$  (Leys et al., 2018, 2019). Participants who are identified as multivariate outliers on measured meat consumption outcomes will be excluded from the sample at both time-points."

"The following will be excluded from the study sample in order: 1) participants who are vegan/vegetarian, 2) participants who spend three seconds or less on the reading task, 3) and participants who are identified as multivariate outliers."

3. "please also make clear the specific meat consumption measures that are referred to in the design table"

We have updated the design table to reference the specific constructs being tested. Following the first wave of data collection, the tested outcomes are: a) attitudes towards eating less meat, b) interest in eating less meat, c) intentions to eat less meat. In the second wave of data collection, we will test the same outcomes, in addition to the self-reported meat consumption.

### **Reviewer 1**

4. "I enjoyed very much reading about your research project, even more so because you seem to have put a lot of thought into conducting a methodologically sound piece of research; so I commend your efforts! I think it is an important topic and a very well planned study. You have provided us with a textbook in reproducible research methods!"

Thank you for your kind words. We sincerely appreciate your encouraging comments.

5. "I may have not made as many comments regarding the methods as might be expected from a Stage 1 review because they appeared sound to me. Instead, I focused more on the theoretical

background, because I think there are ways to improve the relevance of your research by working on the premises, including the literature you relied on. I have chosen to make comments directly on your document, because a) my mindset was more of a 'let's help improve the work' than a judgmental one, and b) it was just more feasible to comment / make suggestions on various sections directly on text, instead of wasting time with providing page & paragraph numbers and then my comments, in a more formal document. Lastly, I hope you will not take my direct communication tone as a sign of arrogance, because I really liked your work and I hope that you will succeed in conducting and publishing it. I tried to get to the point as quickly as possible, knowing that time is of essence for everyone involved in this. I wish you all the best with your work, and I hope you will find some useful suggestions among those I offered."

We are very grateful for your positive comments and your constructive approach. We certainly did not construe any comment negatively and we believe the manuscript has substantially improved thanks to your feedback. We have replied to your comments below, as well as directly on the word document for easier access. We hope this is clear.

6. Page 2: I think it would be more accurate to use the term 'mixed design' for this study, as the outcome measures (within-subject) are taken twice, one-week apart, while the manipulations of the two factors are between-subjects. Longitudinal design seems a bit too much.

Thank you for the sensible suggestion. We have now updated the text to note that it is a mixed design.

7. Page 3: I think it would be helpful if you specified what kind of resources are these (for teaching, for generating policy guidelines, something else?), otherwise 'educational and government resources' can mean many, many things.

We acknowledge the usefulness of this and so have clarified the text to explain that this is content created for members of the general public.

8. Page 3: I think the logical sequence would be better served here if you reversed the order of these 2 phrases (so start with habits, then continue with social context, then develop the social norms lit).

Agreed! Thank you for the suggestion.

9. Page 3: I think this paper would be essential to cite here, because it not only illustrates this theory, but also compares injunctive and descriptive norms – and an acknowledgment of that difference or comparison would be useful to substantiate your theoretical background: Jacobson, R. P., Mortensen, C. R., & Cialdini, R. B. (2011). Bodies obliged and unbound: Differentiated response tendencies for injunctive and descriptive social norms. *Journal of Personality and Social Psychology*, 100(3), 433–448. <https://doi.org/10.1037/a0021470>

Thank you for your suggestion. We have edited the text accordingly and agree that this paper helps strengthen the foundation of our study.

10. Page 3: Is there not a difference between injunctive vs. descriptive norms' influence on shifting behaviour? I think there is\* => the current sentence is a bit unclear and should make that distinction.

e.g., Vasiljevic, Pechey & Marteau (2015). Making food labels social: The impact of colour of nutritional labels and injunctive norms on perceptions and choice of snack foods. *Appetite*, 91, <https://doi.org/10.1016/j.appet.2015.03.034>.

Moon, C., Weick, M. & Uskul, A. K. (2018) Cultural variation in individuals' responses to incivility by perpetrators of different rank: The mediating role of descriptive and injunctive norms. *Eur. J. Soc. Psychol.*, 48: 472– 489. <https://doi.org/10.1002/ejsp.2344>.

Thank you for the suggested examples. We found the first example to be particularly helpful in supporting the latter part of the introduction when discussing the potential benefits of using visual cues to communicate norms. We have also modified the current text in line with your useful comments.

11. Page 4: Dynamic norms is THE core concept of your research, so it needs to be properly defined. So far, I found almost no definition of it and hardly any contrasting with other types of norms, and little evidence that would convince the reader this concept is a) real and b) necessary to advance knowledge regarding social norms. For example, I wonder what is the difference between a 'classic norm' (e.g., 'most people wear masks indoors during the pandemic') and what you call here a 'dynamic norm' (e.g., 'more people wear masks now than at the beginning of the pandemic'? I have a hard time seeing the latter as a 'norm' because it sounds like merely a different way of communicating about the norm, not an actual change in the norm's content – so if could clarify the defined and the content (substance) difference between dynamic and static (traditional?) norms, it would help the foundation of your research question very much.

We have updated the text to clarify what we mean by dynamic norms and how they are distinct from static descriptive norms.

12. Page 4: Detail needed

We have added more details about the studies within the paragraphs providing an overview of previous research in this area.

13. Page 4: Six messages about what?

The text has been updated.

14. Page 4: What aspects, specifically? And how are they related to the current analysis of dynamic vs. static social norms?

We have updated the text to include a brief description and example.

15. Page 4: If this effect was ns., then why write that 'including social norm aspects resulted in the highest intentions to reduce meat consumption'? ns means the diff between the intervention and the control group is... not there. Or at least that we can't know whether it really is not there, unless we have more info (as the Bayesian criteria you used for the pilot and the current research).

Thank you for pointing this out. We have amended the report to accurately represent the findings of the referenced study.

16. Page 4: What is a 'static' norm? How is it different from a 'dynamic' norm? I think that if you sort out the terminology and distinctions among these concepts on the previous page, the rest will be clearer.

We have defined the terms in the previous paragraph and added some clarifying examples.

17. Page 5: I think a transition to this paragraph would be helpful here – because you go from discussing dynamic norms to discussing other types of norms. Without a transition, it is unclear why you need to discuss the rest, why they're relevant.

We've restructured the paragraphs covering dynamic norm research. Initially, they were organized to cover: a) review of dynamic norm research showing effects on interest in reducing meat, then b) evidence from unsuccessful dynamic norm interventions. Instead, the paragraphs are organized to

cover: a) dynamic norm research measuring outcomes immediately after intervention, then b) longer term/longitudinal studies.

18. Page 5: How are these different than the dynamic social norms or the static social norms?

They are the same as dynamic social norms. We have modified the phrasing to decrease ambiguity about this.

19. Page 5: What were the components of this intervention, aside from the emerging social norms?

Text has been updated.

20. Page 5: This paper looks like it could bring some nice substance to your theoretical review of the literature:

Rhodes, N., Shulman, H.C. & McClaran, N. (2020). Changing Norms: A Meta-Analytic Integration of Research on Social Norms Appeals, *Human Communication Research*, Volume 46, Issue 2-3, pp. 161–191, <https://doi.org/10.1093/hcr/hqz023>.

This is an excellent resource. Thank you for sharing. We have found it useful in supplementing our literature review in several parts of the report.

21. Page 5: It could add some substance if you reviewed the literature on how 'traditional' (or static?) norms are typically communicated, and which approaches are best – then to identify the gap that your project aims to fill.

We have used Rhodes et al.'s (2020) findings to supplement our introduction with more information on this in the second paragraph of this section.

22. Page 5: From the info in these two paragraphs, I am unclear about what the focus of the current research is: to shed light on 'factors affecting the strength of dynamic norm messaging' or the 'most effective ways of making dynamic norms salient'? They are both important issues regarding norms, but signalling both here creates the expectation that the current research will address them, when in fact it won't – at least not both of them. In fact, in the next para, you state that 'to test the effectiveness of dynamic norms' is a central problem; so there's a bit of a confusion here as to what the focus is.

We have altered the wording to clarify the direct focus of the research in the text.

23. Page 6: Why is it beneficial to use control groups? Elaborate on this idea, it seems important.

We have modified the manuscript to further elaborate on the utility of control groups in our design.

24. Page 8: What was the purpose for conducting this pilot study? – to test the materials, to gauge the validity of the outcome measures, etc.? This would help understand why it is needed here, and what one should do with the information from it.

The pilot was conducted for several reasons, including – but not limited to – the reasons you have mentioned. We have updated the text now to reflect this.

25. Page 8: What was the duration of the study and what was the hourly pay rate? I understand that resources for paying participants are limited (I have that problem myself, very often!), but I believe that we (researchers) have a big responsibility to pay participants fairly and to not encourage hourly rates that are precarious\*. To my knowledge, Prolific Academic encourages researchers to pay participants to the level of living wage. Doing so would increase transparency and it would be example of good practice for online testing; if you cannot afford to and are under constraints for getting a large data sample, then please state so. I believe it's

important to have such conversations in psychological science, especially in light of last years' publications that tend to rely on larger and larger sample – but who can afford testing such larger samples?

\*<https://www.theatlantic.com/business/archive/2018/01/amazon-mechanical-turk/551192/>

We have updated the text to add details on payment and we appreciate you bringing this to our attention.

26. Page 8: Did you use any pre-screening criteria?

Yes, we did. We have now added details of this.

27. Page 9: Why were these two measures averaged and analysed as such? No justification for this was provided. I find it hard to see why these two are put together, because intentions are personal or individual, concerning one's plans (realistic or not) for own behaviour; while expectations concerned the actual social norm of behaviour – what one expects other people to do. Theories of behaviour change don't usually find these two dimensions equivalent – it's rather the expectations about others' behaviour that are an antecedent of one's own intentions (see TPB for example).

We have added an explanation for this in the procedure section of the pilot study. We have added an explanation of expectations to clarify that they measure expectations regarding own behaviour, rather than others' behaviour. We understand that the earlier phrasing was confusing, and we hope the revision is clearer.

28. Page 9: This is not quite an accurate conclusion, since dynamic norms had an effect only on the averaged index of intentions + expectations.

We have reworded the conclusion to reflect the results accurately. Thank you!

29. Page 10: The design is, in fact, mixed – because you write here, in the same para, that participants will complete the outcome measures again after one week (so that variable is measures within-participants).

Noted and updated!

30. Page 10: Will you ask participants, at any point, whether – and how much – they believe these norms? I understand that you consider this information as 'normative', but just the fact of using actual estimates – as you do – doesn't ensure that participants actually know or think that THAT is the normative behaviour. What if they simply don't believe these numbers?

We have considered your suggestion, but we have concerns over raising doubts in participants' minds about the veracity of the information they are given. We view this as a study about providing information about dynamic descriptive norms, rather than about descriptive norms per se. We acknowledge the limitation that people may not believe or understand the information presented.

31. Page 11: What is the increase intended and how was it decided?

We have improved our description of the increase in the text. We judged this rate of increase as reasonable and believable to the participants.

32. Page 11: Will any of these measures be indexed into one – as you've done in the pilot?

We do not intend to do so in this study. Expectations and intentions were combined in the previous pilot because they are similar in the way that they are measured. We believe the measured outcomes in the main study are conceptually distinct, so we do not believe we will combine them.

33. Page 12: I don't quite see how this is an attention check and not a memory test, as you're asking for the percentage presented in your manipulation. Moreover, attention checks are controversial, e.g., see this blog post: When using attention checks may harm data quality: <https://www.qualtrics.com/blog/using-attention-checks-in-your-surveys-may-harm-data-quality/>

We have reflected on your comment and we decided to exclude the attention check from the survey to avoid possible harm to the data.

34. Page 12: I am not sure this successfully eliminates participants who are careless – there is some debate regarding the use of such items and their potential to induce distrust in experimenters, among participants. In my experience, I have eliminated participants who gave incoherent open-ended answers, as per this paper:

Chmielewski, M., & Kucker, S. C. (2020). An MTurk crisis? Shifts in data quality and the impact on study results. *Social Psychological and Personality Science*, 11(4), 464-473. <https://doi.org/10.1177/1948550619875149>

We thank you for sharing this with us. We have carefully reviewed the available indicators of low quality responding, and we have opted for response time in seconds per item (SPI). We have updated the text to include a brief description of our approach.

35. Page 12: How is 'success' at this question quantified? What will happen with those who fail the manipulation checks? – will they be eliminated from analyses? Will you look at results with and without those who fail and report both? See this paper for an argument against manipulation checks:

Fayant, M. P., Sigall, H., Lemonnier, A., Retsin, E., & Alexopoulos, T. (2017). On the Limitation of Manipulation Checks: An Obstacle Toward Cumulative Science. *International Review of Social Psychology*, 30(1), 125–130. <http://doi.org/10.1177/1745691613514450>

And this for other types of manip checks:

Oppenheimer, D. M., Meyvis, T., & Davidenko, N. (2009). Instructional manipulation checks: Detecting satisficing to increase statistical power. *Journal of Experimental Social Psychology*, 45(4), 867– 872. <http://doi.org/10.1016/j.jesp.2009.03.009>

We have amended the manipulation check section to include a more comprehensive description, and we have noted that results will be reported without participants who fail the manipulation check in the supplementary materials. We acknowledge the potential limitations of excluding participants based on manipulation checks, and we have decided to report both streams of analyses as described.

36. Page 12: This is a bit confusing, because you have that 5th (control) condition. Wouldn't it be clearer to call the conditions 'dynamic norm conditions (text vs. visual cue)' vs. 'static norm conditions (text vs. visual cue)' vs. control condition (no normative information & no cue provided)?

We have adjusted the wording of the hypotheses to clarify the intended meaning.

37. Page 12: According to this hypothesis, visual cue is meant to be a moderator of the effect of dynamic norms on outcome measures. Why are you not testing for an interaction term, then?

That is correct! We have clarified our description of analyses to clarify that we will be using an interaction term summarizing the hypothesized differences.

## Reviewer 2

38. "It was a pleasure to read about this necessary study on how dynamic norms can help to change attitudes and behaviours regarding meat consumption. In general, I find the planned study well elaborated and have only few remarks (mostly regarding the measurements)."

Thank you for your positive comments, and we are happy you enjoyed reading about our study.

39. "p3, when referring to " the UK meat consumption is declining and the proportions of vegans and vegetarians have doubled in the last 20 years (Baker et al., 2002)." It would be stronger to use a recent reference..."

We have updated our reference to declining meat consumption in the UK and we included the following text: "In 2016, a third of British survey respondents reported eating less meat than a year before data collection (Lee & Simpson, 2016)."

40. "Small but important mistake in abstract: This longitudinal study utilizes a 2x2 between-subjects design (type of norm [dynamic/visual à static?] x visual cue [present/absent], and a no-task control)"

Thank you for bringing this mistake to our attention. We have corrected the mistake in the manuscript.

41. "Could you made use of stronger measures for interest in, attitudes, intentions instead of one item. How valid/reliable are these measures? Same for the actual meat consumption – how strong is this measure compared to what has been used before?"

In a previous study that we conducted examining the influence of dynamic norms on meat consumption outcomes, we used validated 3-item measures adapted from Fishbein and Ajzen (2010). We found the items to be highly correlated, with Cronbach's alpha values above 0.90, which may indicate redundancy of the items used to measure these constructs (Panayides, 2013). Additionally, recent tests evaluating the Theory of Planned Behaviour (TPB) as a model for predicting behaviour used single-item measures of constructs, and found that all TPB constructs measured predicted intentions and behaviour (Çoker & van der Linden, 2020). Thus, we have selected one item from these measures and used them in the current study. We also adapted the same measure for interest which has been used in past research in the same domain (see Sparkman & Walton, 2017).

42. "Is it not static versus dynamic? "The study uses a 2x2 between-subjects design (type of norm [dynamic/visual] x visual cue [present/absent]) and includes an additional control group with no normative information provided". This is also included in the abstract like this."

Thank you once more! We have corrected the mistake in both parts of the manuscript.