**Peer review and correspondence history**

# Ms Title: An investigation of plant-based dietary motives among vegetarians and omnivores

# Corr. Au Name: Christopher J Hopwood

# Submitted: Aug 28, 2020

# Editor first decision—Revise & Resubmit

# Jan 11, 2021

Dear Christopher J Hopwood,

I have now received all reviews of your Stage 1 Registered Report submission, “An investigation of plant-based dietary motives among vegetarians and omnivores”, from researchers with relevant expertise. I also independently read the manuscript before consulting these reviews. The reviewers had mostly positive reactions to your manuscript. I agree that your manuscript has important strengths and also that there are some issues that need to be addressed. I therefore encourage you to submit a revised version for further consideration at Collabra: Psychology.

Please note that in-principle acceptance (IPA) and progression to Stage 2 is not guaranteed. You should, therefore, include a document with a point-by-point response to the reviewers’ comments, outlining each change made in your manuscript or providing a suitable rebuttal.

The reviewers did an outstanding job in their reviews. I will highlight issues I think are particularly salient here.

One concern raised by both reviewers (that I share) is that the introduction is quite brief and more could be done to explain the rationale for the study beyond filling a gap. While Collabra does not accept/reject papers based on novelty, I do think it will still help readers understand the paper and its value better to more explicit about this.

One additional question I had which is somewhat out of the scope of the current article given that the measure has been established, but could maybe still be addressed is how to think about the health motives and the lack of difference between groups in mean levels on the health subscale. This strikes me as somewhat odd. Why would omnivores not differ from vegetarians in their motives to eat less meat for health reasons? I appreciate the discussion of this in the general discussion, which did make sense to me, except that the omnivore’s health motives did seem relatively high in an absolute sense. One thing that I couldn’t help but wonder is whether participants are rating their overall agreement with statements such as “I want to be healthy” without linking that back to what the item really intends is which is “I am motivated to eat less meat because I want to be healthy”. Putting the part about motives to eat less meat in the directions separated from the rest of the item seems to enhance the chance that participants might ignore/forget the context for statements like “I want to be healthy”. Perhaps not given that the other items in the scale about environment/animal rights should keep the frame in mind, in theory at least. Perhaps you could briefly explain why the scale was set up this way and any potential limitations/benefits to that approach?

Most other concerns had to do with increasing the clarity of the manuscript and including additional details. I’d like you to please address each of these issues.

In summary, I think this is a promising manuscript and, I hope you will revise it for further consideration at Collabra: Psychology. I look forward to receiving your revision.

Please ensure that your revised files adhere to our author guidelines, and that the files are fully copyedited/proofed prior to upload. Please also ensure that all copyright permissions have been obtained. This is the last opportunity for major editing, therefore please fully check your file prior to resubmission.

If you have any questions or difficulties during this process, please contact us at the editorial office editorialoffice@collabra.org.

We hope you can submit your revision within the next six weeks. If you cannot make this deadline, please let us know as early as possible.

Sincerely,

Rebecca Schlegel

# Reviewer 1

##### Open response questions

### **Please write your review here. The author(s) will see this review. Your identity will not be revealed to the authors unless you also include your name (i.e., sign your review) in this box. It is up to you whether to reveal your identity or not, either is fine.**

This paper explored dietary motives for vegetarianism (among vegetarians and omnivores) and identified how these relate to personality facets. It was very well written and generally easy to follow. I have some specific suggestions for improvements below.

This study used a sample recruited from Prolific, with an average age of 31. The paper would benefit from a longer discussion about the nature of this sample (e.g., age, political orientation, religion, etc.) and how this may have affected results. It would be useful to test if age or political orientation might be accounting for some of the links between personality facets and health motives reported here.

There were far more women in this sample than men, and I would like to see a larger discussion (and analysis) of potential gender differences. It would also be valuable to know if there are different correlations between vegetarian motives and personality facets among men and women (even if this is just reported in the supplement).

Introduction

The introduction did not sufficiently explain the rationale for this study and was quite brief (1.5 pages). Beyond acknowledging a gap in prior research, it would be helpful to more clearly identify the importance of this work. It focused too strongly on psychometric validation rather than what this research can contribute to understanding personality/individual differences. Similarly, though a facet-level measurement approach to personality was used in this study, there was no clear explanation about why this was theoretically beneficial.

I got the impression that many of the statistical tests reported here were exploratory, but I did not see this explicitly noted in the manuscript. Noting clear hypotheses versus exploratory tests would be useful. The introduction should also draw more from prior literature on vegetarianism/motives and personality to better situate the associations tested in the study. Currently, there is very little in the introduction that informs a reader that this paper will be examining personality.

Results

Alphas for each personality scale should be reported, rather than the median alpha (p. 5).

It would be helpful to organize the results on personality facets and motives more clearly (e.g., more titles or sections) given the high number of results that are reported. It was really difficult to follow the description of these results.

It was challenging to interpret precisely what was done in the analyses reported on p. 10 (and in Table 4—quoted below) and more clarity here is necessary for readers unfamiliar with these techniques.

“We correlated each of the Fisher-transformed columns in Table 3 in order to ascertain how similar the personality trait profile of each of the motives were across samples.”

I appreciate the interesting findings in this paper and wish the authors well in refining this further.

##### Rating scale questions

|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| --- | --- | --- | --- | --- | --- |
| The study/studies in this manuscript have strong construct validity (good measures and/or manipulations of the constructs the authors wish to study). (Choose “Neutral” if this is not an empirical manuscript) |  |  |  |  | ✔ |
| The study/studies in this manuscript have strong statistical validity (appropriate statistical tests, assumptions are clear and reasonable, no statistical errors, appropriate statistical inferences, etc.). (Choose “Neutral” if this is not an empirical manuscript) |  |  |  | ✔ |  |
| The study/studies in this manuscript have strong internal validity (any causal claims or implications are well-justified, alternative explanations are thoroughly considered, etc.). (Choose “Neutral” if this is not an empirical manuscript, or no causal claims are made or even vaguely implied.) |  |  |  | ✔ |  |
| The study/studies in this manuscript have strong external validity (authors appropriately constrain their conclusions based on the limits of the generalizability of their findings to other contexts (including from lab to real world), other populations, other stimuli or measures, etc.) |  |  | ✔ |  |  |

# Reviewer 2

##### Open response questions

### **Please write your review here. The author(s) will see this review. Your identity will not be revealed to the authors unless you also include your name (i.e., sign your review) in this box. It is up to you whether to reveal your identity or not, either is fine.**

I recently had the chance to review “An investigation of plant-based dietary motives among vegetarians and omnivores”. Thank you for the opportunity. The motivation for the study hinges off whether one believes that this represents an important addition to the work of Hopwood et al 2020. As I started reading the introduction my first thought was that this has all been covered in more detail and with outcomes linked to animal rights motives in a larger study published less than a year ago. The authors need to make a bigger and clearer case as to why this work is of interest given the prior, recent work on the same topic. Why is the sample of vegetarians too small? According to what cut-off was it adjudged too small? In the discussion you mention that this work looks at facets as a strength over the Hopwood 2020 paper, but this doesn’t clearly appear in the introduction. At present, the study feels undermotivated. The authors make a series of hypotheses. Were these hypotheses pre-registered? The authors predict “no differences on the health scale” (p.4). You cannot predict a null effect using NHST.
The expected patterns of correlations between motives and personality were underspecified. Based on Hopwood et al 2020 alone, it should have been possible to make some quite clear predictions here, at least for the omnivore sample. The authors also state that “We expected these patterns of correlation to be similar across vegetarian and omnivore participants” – why? On what grounds was this expected? The authors have a good, relatively diverse sample of participants. This is one of the real strengths of this work. Why was this specific sample size collected? Thank you for making the data and questionnaire openly available. In the results I could not understand this statement: “which is also reflected in the .56 correlations between those motives in non-vegetarians, in contrast to the -.03 correlation in omnivores.”. Aren’t omnivores and non-vegetarians the same people in this study?
In the discussion there were points where I did not follow the authors logic. Perhaps this was a result of the somewhat terse writing style. For example, the authors write: “Moreover, this variation has a similar structure and meaning in vegetarians as it does in nonvegetarians. As such, understanding general variation in vegetarian eating motives could lead to novel insights about the psychology of dietary preferences (Rosenfeld & Burrow, 2017).” I do not see how the second point follows from the first. If the variation has similar structure and meaning in both groups, why does studying this variation lead to novel insights? I am not saying that it could not, it just feels like I am missing a step. The authors claim that the “health motives function rather differently than environmental and animal rights motives”. What is meant by functions here? The study examines how the motives relate and the extent to which they are correlated with personality. I did not really see any ‘function’ in the study itself. Again, the authors in the discussion state that “In contrast to health motives, strong environmental and animal rights motives are reliable markers of vegetarian dietary status.” I do not see how you reached this conclusion based on the analyses conducted. If you had run a binary logistic regression predicting dietary group based on the three motives and found that environment and animal rights predicted, and health did not (which might be a neat analysis to do anyway) then I would understand this conclusion. I am sorry to dwell on the negatives. I do find this line of work interesting and important.

##### Rating scale questions

|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| --- | --- | --- | --- | --- | --- |
| The study/studies in this manuscript have strong construct validity (good measures and/or manipulations of the constructs the authors wish to study). (Choose “Neutral” if this is not an empirical manuscript) |  |  |  | ✔ |  |
| The study/studies in this manuscript have strong statistical validity (appropriate statistical tests, assumptions are clear and reasonable, no statistical errors, appropriate statistical inferences, etc.). (Choose “Neutral” if this is not an empirical manuscript) |  |  | ✔ |  |  |
| The study/studies in this manuscript have strong internal validity (any causal claims or implications are well-justified, alternative explanations are thoroughly considered, etc.). (Choose “Neutral” if this is not an empirical manuscript, or no causal claims are made or even vaguely implied.) |  |  | ✔ |  |  |
| The study/studies in this manuscript have strong external validity (authors appropriately constrain their conclusions based on the limits of the generalizability of their findings to other contexts (including from lab to real world), other populations, other stimuli or measures, etc.) |  |  | ✔ |  |  |

**Author response**

Jan 15, 2021

Dear Editor Schlegel

Thank you and your anonymous reviewers for commenting on our manuscript, “An investigation of plant-based dietary motives among vegetarians and omnivores”. We were delighted that you provisionally accepted the paper, and understand that we needed to make some changes in order for you to accept it. We have revised the paper considerably in light of your comments and the reviews, and are resubmitting it for your consideration. We look forward to your feedback and would be happy to provide any other information you might find helpful.

Sincerely,

Chris Hopwood on behalf of study co-authors

**Editor**

1. One concern raised by both reviewers (that I share) is that the introduction is quite brief and more could be done to explain the rationale for the study beyond filling a gap. While Collabra does not accept/reject papers based on novelty, I do think it will still help readers understand the paper and its value better to more explicit about this.

Response: We have expanded the introduction to explain the rationale for this study more fully.

2. One additional question I had which is somewhat out of the scope of the current article given that the measure has been established, but could maybe still be addressed is how to think about the health motives and the lack of difference between groups in mean levels on the health subscale. This strikes me as somewhat odd. Why would omnivores not differ from vegetarians in their motives to eat less meat for health reasons? I appreciate the discussion of this in the general discussion, which did make sense to me, except that the omnivore’s health motives did seem relatively high in an absolute sense. One thing that I couldn’t help but wonder is whether participants are rating their overall agreement with statements such as “I want to be healthy” without linking that back to what the item really intends is which is “I am motivated to eat less meat because I want to be healthy”. Putting the part about motives to eat less meat in the directions separated from the rest of the item seems to enhance the chance that participants might ignore/forget the context for statements like “I want to be healthy”. Perhaps not given that the other items in the scale about environment/animal rights should keep the frame in mind, in theory at least. Perhaps you could briefly explain why the scale was set up this way and any potential limitations/benefits to that approach?

R: This is a good point. We set the scale up this way to save avoid item redundancy and save time. This strategy assumes that the respondents read the instructions. This assumption is supported by research suggesting that non-vegetarians do generally perceive vegetarian diets as healthy (Corrin, T., & Papadopoulos, A. (2017). Understanding the attitudes and perceptions of vegetarian and plant-based diets to shape future health promotion programs. *Appetite*, *109*, 40-47.). However, we agree that it is possible that at least some respondents did not pay attention to the instructions, and of course nearly everybody wants to be healthy. As you say, there is nothing we can do about that in this study, but it is worth testing in future research. We have added a paragraph describing this issue to the Discussion on pages 15-16.

**Reviewer 1**

1. This paper explored dietary motives for vegetarianism (among vegetarians and omnivores) and identified how these relate to personality facets. It was very well written and generally easy to follow. I have some specific suggestions for improvements below.

R: Thank you for your positive comments and for taking the time to review our paper.

2. This study used a sample recruited from Prolific, with an average age of 31. The paper would benefit from a longer discussion about the nature of this sample (e.g., age, political orientation, religion, etc.) and how this may have affected results. It would be useful to test if age or political orientation might be accounting for some of the links between personality facets and health motives reported here.

R: We describe the sample in terms of age, ethnicity, gender, region, and political orientation on pages 7-8. We did not assess religion. We discuss the potential impacts of demographic factors in the Discussion. Below are correlations between the motives and personality domains, controlling for conservatism. They are pretty similar to the bivariate correlations. We would be willing to include these results in the paper if the Editor wishes, although we see these results as only distantly related to our paper.

|  |  |  |  |
| --- | --- | --- | --- |
| conservatism | health | environment | animal |
| neuroticism | -.094 | -.012 | .048 |
| extraversion | .236 | .169 | .126 |
| openness | .076 | .230 | .300 |
| agreeableness | .131 | .148 | .211 |
| conscientiousness | .210 | .145 | .117 |
| age |  |  |  |
| neuroticism | -.104 | .056 | .105 |
| extraversion | .253 | .11 | .091 |
| openness | .036 | .299 | .346 |
| agreeableness | .113 | .163 | .217 |
| conscientiousness | .219 | .079 | .066 |

3. There were far more women in this sample than men, and I would like to see a larger discussion (and analysis) of potential gender differences. It would also be valuable to know if there are different correlations between vegetarian motives and personality facets among men and women (even if this is just reported in the supplement).

R: Please see correlations between vegetarian motives and personality domains in women and men below. There were few notable differences in the patterns of correlations. We would be willing to include these results in the paper if the Editor wishes, although we see these results as only distantly related to our paper.

|  |  |  |  |
| --- | --- | --- | --- |
| women | health | environment | animal |
| neuroticism | -.068 | -.039 | .041 |
| extraversion | .225 | .142 | .069 |
| openness | .115 | .223 | .284 |
| agreeableness | .111 | .175 | .181 |
| conscientiousness | .221 | .149 | .056 |
| men  |  |  |  |
| neuroticism | -.164 | .145 | .126 |
| extraversion | .290 | .109 | .144 |
| openness | .009 | .306 | .350 |
| agreeableness | .188 | .119 | .211 |
| conscientiousness | .239 | -.004 | .069 |

4. The introduction did not sufficiently explain the rationale for this study and was quite brief (1.5 pages). Beyond acknowledging a gap in prior research, it would be helpful to more clearly identify the importance of this work. It focused too strongly on psychometric validation rather than what this research can contribute to understanding personality/individual differences. Similarly, though a facet-level measurement approach to personality was used in this study, there was no clear explanation about why this was theoretically beneficial.

R: We have elaborated on the rationale considerably in our revised and expanded introduction.

5. I got the impression that many of the statistical tests reported here were exploratory, but I did not see this explicitly noted in the manuscript. Noting clear hypotheses versus exploratory tests would be useful.

R: As we did not preregister this study all hypotheses and analyses are exploratory. We now clarify this on page 8 of our manuscript.

6. The introduction should also draw more from prior literature on vegetarianism/motives and personality to better situate the associations tested in the study. Currently, there is very little in the introduction that informs a reader that this paper will be examining personality.

R: We now briefly review the literature on associations between vegetarian diet/ motives and personality in the Introduction, on page 6.

7. Alphas for each personality scale should be reported, rather than the median alpha (p. 5).

R: We now report alphas for all study variables on the study OSF page. We would include them in the paper if the Editor prefers this.

8. It would be helpful to organize the results on personality facets and motives more clearly (e.g., more titles or sections) given the high number of results that are reported. It was really difficult to follow the description of these results.

R: As we hope to have made clearer in the Introduction and in describing these findings in the Results, these effects were tertiary to the aims of the study (involving the similarity of associations across groups), and so we hesitate to place too much emphasis on these results. We hope we got the balance right.

9. It was challenging to interpret precisely what was done in the analyses reported on p. 10 (and in Table 4—quoted below) and more clarity here is necessary for readers unfamiliar with these techniques.

“We correlated each of the Fisher-transformed columns in Table 3 in order to ascertain how similar the personality trait profile of each of the motives were across samples.”

R: We have expanded our description on page 13 and hope it is now clear for readers unfamiliar with this technique.

10. I appreciate the interesting findings in this paper and wish the authors well in refining this further.

R: Thanks again for taking the time to provide this review.

**Reviewer 2**

1. I recently had the chance to review “An investigation of plant-based dietary motives among vegetarians and omnivores”. Thank you for the opportunity. The motivation for the study hinges off whether one believes that this represents an important addition to the work of Hopwood et al 2020. As I started reading the introduction my first thought was that this has all been covered in more detail and with outcomes linked to animal rights motives in a larger study published less than a year ago. The authors need to make a bigger and clearer case as to why this work is of interest given the prior, recent work on the same topic.

R: We have now expanded the Introduction to make the rationale clearer.

2. Why is the sample of vegetarians too small? According to what cut-off was it adjudged too small?

R: The collective sample size of vegans/vegetarians in our three English speaking samples from that study was only 132, and varied in other characteristics. The sample size of vegans in the Dutch sample was 66 and vegetarian status was not assessed. During the review process for that previously mentioned paper, these numbers were judged to be too small for this kind of analysis (please see our more detailed discussion of this issue below in response to your eighth point), and the current paper from a study designed to address this issue was suggested as a follow-up.

3. In the discussion you mention that this work looks at facets as a strength over the Hopwood 2020 paper, but this doesn’t clearly appear in the introduction. At present, the study feels undermotivated.

R: We have now added a stronger justification for the use of facets. Specifically, on page 6 we say that the use of 30 facets provides us with many opportunities to test whether vegetarian status moderates personality-motive associations.

4. The authors make a series of hypotheses. Were these hypotheses pre-registered?

R: This study was not preregistered.

5. The authors predict “no differences on the health scale” (p.4). You cannot predict a null effect using NHST.

R: We appreciate the reviewer’s point and have made sure to avoid framing this as a “hypothesis”. In the Introduction, we frame this in terms of effect size:

“Second, we tested mean level differences between vegetarians and omnivores in the three VEMI scales, expecting vegetarians to have higher scores on the environmental and animal rights scales, but smaller or no differences on the health scale.”

Likewise, in the Results, we interpret these effects based on parameter estimates in the model and effect sizes in the raw scores. As such, we are not basing this hypothesis or interpretation in an NHST framework, although we do also test for the significance of group differences.

6. The expected patterns of correlations between motives and personality were underspecified. Based on Hopwood et al 2020 alone, it should have been possible to make some quite clear predictions here, at least for the omnivore sample.

R: That is true, but associations between eating motives and personality traits in the overall sample are not directly related to the goals of the study, as we hope is now clearer in our expanded introduction. We do think that the overall evidence from this study and Hopwood et al. 2020 is useful for people interested in the associations between vegetarian motives and personality facets, and all of the information necessary to draw conclusions about this are fully reported in the two papers. At this point, we have obviously seen the results, so we do not think it would be appropriate to generate hypotheses about these findings.

7. The authors also state that “We expected these patterns of correlation to be similar across vegetarian and omnivore participants” – why? On what grounds was this expected?

R: We developed the VEMI to be a measure that could be used in either kind of sample, as we discussed in the original validation paper. A reviewer of that paper pointed out that we did not really test this adequately because we did not have enough vegetarians to do so. That was one of the main reasons we did this study, and we think the results are important in documenting that vegetarian motives work largely the same, albeit with mean differences for two, across vegetarian and non-vegetarian participants in Western populations. We hope this is now clearer in our expanded Introduction.

8. The authors have a good, relatively diverse sample of participants. This is one of the real strengths of this work. Why was this specific sample size collected?

R: Power analysis has not been well-articulated for measurement equivalence tests (e.g., Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural equation modeling*, *9*(2), 233-255), and there is significant ambiguity for covariance modeling in general (e.g., MacCallum, R., Lee, T., & Browne, M. W. (2010). The Issue of power in Power Analysis for Tests of Structural Equation Models. *Structural Equation Modeling, 17,* 23-41.) as well as group moderation of validity effects (Aguinis, H., & Gottfredson, R. K. (2010). Best‐practice recommendations for estimating interaction effects using moderated multiple regression. *Journal of organizational behavior*, *31*(6), 776-786). At the outset, we reasoned based on a review of this literature that sample sizes of about 300 per group would be more than adequate for fitting CFA models, testing measurement equivalence, and testing group moderation of validity effects under various data conditions.

9. Thank you for making the data and questionnaire openly available. In the results I could not understand this statement: “which is also reflected in the .56 correlations between those motives in non-vegetarians, in contrast to the -.03 correlation in omnivores.”. Aren’t omnivores and non-vegetarians the same people in this study?

R: Thanks for pointing out this typo, which we have now corrected in the paper on page 13.

10. In the discussion there were points where I did not follow the authors logic. Perhaps this was a result of the somewhat terse writing style. For example, the authors write: “Moreover, this variation has a similar structure and meaning in vegetarians as it does in nonvegetarians. As such, understanding general variation in vegetarian eating motives could lead to novel insights about the psychology of dietary preferences (Rosenfeld & Burrow, 2017).” I do not see how the second point follows from the first. If the variation has similar structure and meaning in both groups, why does studying this variation lead to novel insights? I am not saying that it could not, it just feels like I am missing a step.

R: We meant that these results suggest that you can get insights about the motives of vegetarians even in samples of non-vegetarians, and vice versa. A similar issue is commonly discussed in clinical psychology and psychiatry (can you learn about people with mental health problems by studying people from the general population?). We have expanded the text in the Introduction and Discussion, and hope we have made this point clearer.

11. The authors claim that the “health motives function rather differently than environmental and animal rights motives”. What is meant by functions here? The study examines how the motives relate and the extent to which they are correlated with personality. I did not really see any ‘function’ in the study itself. Again, the authors in the discussion state that “In contrast to health motives, strong environmental and animal rights motives are reliable markers of vegetarian dietary status.” I do not see how you reached this conclusion based on the analyses conducted. If you had run a binary logistic regression predicting dietary group based on the three motives and found that environment and animal rights predicted, and health did not (which might be a neat analysis to do anyway) then I would understand this conclusion. I am sorry to dwell on the negatives. I do find this line of work interesting and important.

R: We do not read your comments as having dwelled on the negatives, but instead find them helpful in pointing out areas where we should have been clearer. We have modified both of these sentences to clarify our meaning. Thanks for taking the time to comment on our paper.

**Editor final decision—Accept**

Jan 22, 2021

Dear Christopher J Hopwood,

I have now had a chance to read over your manuscript “An investigation of plant-based dietary motives among vegetarians and omnivores”, along with the letter describing the changes you made. Thank you for your responsiveness to the concerns that the reviewers and I raised. I am happy to say that your paper is now officially accepted for publication in Collabra: Psychology. Congratulations on this excellent work, I think it will make an important contribution to the literature and I look forward to seeing it published! I hope your experiences with Collabra: Psychology have been positive and that you will continue to consider it as an outlet for your work.

As there are no further reviewer revisions to make, you do not have to complete any tasks at this point. Our managing editor will contact you in case there are any pre-prodution file related questions. You will have an opportunity to check the page proofs before we publish your article. Thank you again for publishing in Collabra: Psychology.

Sincerely, Rebecca Schlegel