Oct 08, 2021

Ref.: Ms. No. RPAC-2021-0023

Cognitive Music Listening Space: A Multivariate Approach Auditory Perception & Cognition

Dear Mr. Mizener,

Reviewers have now commented on your paper. You will see that they are advising that you revise your manuscript. If you are prepared to undertake the work required, I would be pleased to review a revision.

For your guidance, reviewers' comments are appended below.

If you decide to revise the work, please submit a list of changes or a rebuttal against each point which is being raised when you submit the revised manuscript.

Your revision is due by Nov 22, 2021.

To submit a revision, go to <https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.editorialmanager.com%2Frpac%2F&amp;data=04%7C01%7Cbmizener%40utdallas.edu%7C4a43845c3a5b49ed1eec08d98a8868eb%7C8d281d1d9c4d4bf7b16e032d15de9f6c%7C0%7C0%7C637693140752187302%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&amp;sdata=veBs4EZVCTYuTQE%2BL0KGfyd7SLxXG6mMm9hwYUN8%2BQc%3D&amp;reserved=0> and log in as an Author. You will see a menu item called 'Submission Needing Revision'. You will find your submission record there.

Yours sincerely

Melissa Jungers

Associate Editor

Auditory Perception & Cognition

Comments from the Editors and Reviewers:

Dear Mr. Mizener,

Thank you for your submission to Auditory Perception and Cognition. I apologize that the review has taken some time. I was unable to find a third reviewer in a timely manner, so I opted to serve as both a reviewer and Associate Editor so that the paper could move forward. Below, you’ll see comments from two reviewers and from me. I invite you to revise and resubmit your manuscript. The reviewers’ comments are straightforward, but there are several themes that should be addressed in a revision:

1) Analyses. The paper has many different types of analyses. Reviewer 1 notes that the “sheer volume of analyses thrown at the reader needs to be restrained or combined into more easy-to-consume plots” and Reviewer 2 comments, “I found the arguments for when one would use these methods to be lacking.” Please add stronger support for why particular analyses are useful in this music listening study (and music cognition more broadly) and consider streamlining the analyses.

2) “Cognitive music listening space.” Reviewer 2 questions whether “cognitive” is the appropriate term for what is being examined in the study. Are the studies truly tapping into cognition or perhaps an aspect of cognition? Please clarify the findings and explain/defend what the results show.

3) Participants. Reviewer 2 notes that the psycholinguistic literature should be cited to provide background for possible semantic network differences between American and French speakers. More demographic details should be provided about the participants.

Please address these items in your revision. Additionally, a letter that responds to each point made by the reviewers and explains how each point was addressed (or why you chose not to address it) would be helpful.

Sincerely,

Melissa Jungers

Reviewer #1: The authors investigated music perception in essentially a two by two design wherein the factors were nationality (French versus American) and music ability (highly-trained versus laypeople). Perception was assessed by having participants assign 1) descriptive adjectives and 2) more measurable features to novel compositions. Data was then analyzed with several dimension reduction procedures for highly-trained alone, laypeople alone, and the two groups together. Highly-trained musicians did not exhibit differences across nationality, though significant dimensions were revealed along which different compositions ranged. Laypeople, however, did exhibit nationality differences, as well as significant dimensions according to composition. This pattern of results persisted when the groups were combined in the omnibus test. The authors use this study to also underscore the feasibility of conducting large-scale online research.

I have several general and several specific concerns that I'll list in that order.

General Concerns

There is a lack of statistical results. I do understand that the authors explained this in the introduction with their rationale for using dimension reduction procedures, but these types of procedures work best when paired with some type of inferential statistic (frequentist or Bayesian) to help interpret the results. I make liberal use of multidimensional scaling (MDS) in my own work because it is both useful and provides far more information than it often is credited for. However, the end result cannot be the resulting cognitive space, even with confidence intervals imposed around the centerpoint. The standard errors can be fed back into a formula to obtain observed values that can be compared to critical values which, as this study is really a two by two design, be corrected for multiple comparisons. There are also some new methods to use the cognitive space derived from MDS or other similar procedures in hypothesis testing (see Patten & McBeath, 2020 and Patten, McBeath, & Baxter, 2018).

There seems to be too much information at times. Certain elements of the data transformations, such as constructing the brick, are unnecessary and might confuse some readers. Likewise, the same is true for figures elucidating these procedures.

There may be too many analyses. It would be a more understandable and comprehensive read if only some of the multivariate approaches were used. Correspondence analysis, as far as I'm aware, assesses only two dimensions. It's possible, if not likely, that the data in this work exist in several dimensions. The MDS procedure is not limited to two dimensions and will provide a Scree plot similar to the one used in the paper that will allow the authors to pinpoint the number of dimensions necessary for this data. Using two dimensions for a data set that exists in three will produce erroneous correlations and proximities. Likewise, reporting both hierarchical cluster analysis and MDS can be condensed by using an additive tree cluster or embedding the hierarchical analysis into the MDS results a la Shepard (1980).

Specific Concerns

There is some sort of issue with spacing throughout the manuscript. Page 2, line 7; page 3, line 24, line 27, line 32, line 46, line 53 and throughout. Usually it is a missing space, though there are instances of an extra space.

Page 3, line 7: No capitalization for "world".

Page 3, line 27: Remove "In 2004". Also consider the advice of Kail (2015), which urges authors to focus on the findings of studies rather than the people who found them. After all, the topic of the sentence should be the phenomenon in question and not the scientist. This sentence, then, might read, "Something as simple as the sound of a crunch when eating a potato chip influences the taste (Zampini & Spence, 2004)."

Page 4, line 7: This paragraph (or the discussion of MDS later on) would be more complete with references to Shepard (specifically 1962 and 1980, though others are applicable) and Kruskal (specifically Kruskal & Wish, 1978). Hout et al. (2013) may also be useful.

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Page 8, line 53: MDS can also analyze correlations and confusion matrices, in addition to distance. "Similarity" might be a better term.

Page 16, line 43: The RotCorr procedure (in Patten, McBeath, & Baxter, 2018 and available at <https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fpearllabresearch.weebly.com%2Frecent-publications--programs.html&amp;data=04%7C01%7Cbmizener%40utdallas.edu%7C4a43845c3a5b49ed1eec08d98a8868eb%7C8d281d1d9c4d4bf7b16e032d15de9f6c%7C0%7C0%7C637693140752187302%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&amp;sdata=h3rWa4KoRsy2dPZfQFAfZJ1v6IuxAvoUFbjmcy%2BF2w0%3D&amp;reserved=0>) can quantify the correlation between arousal and dimension 1. Feel free to reach out with questions on this if you decide to use it and have any.

Page 22, line 31: It would be nice to see values for the means and variances.

Page 23, line 19: The relative closeness of factor scores is a good place to add statistical validity. Using each individual's point as a datum, a t-test can be calculated to give meaning to the distance between centerpoints.

Page 36, figure 2: This Scree plot is odd to me. I'm used to looking for a point of diminishing returns (i.e., where the curve flattens out) to determine the appropriate dimensionality of my results. Two dimensions looks like a bad fit on this plot. Three looks much better, and a case could be made for 6. I see that explained variance decreases with increasing dimensionality, but variance is not always correlated with meaningful dimensions (though it is a central assumption of PCA and other procedures) and stress between points (and, thus, the estimation of distances) should improve with increasing dimensionality.

Overall, I like this paper. I think the message of ecologically valid data being available in unusual circumstances is an important one. Likewise, the message of using multivariate procedures to help us understand confusing data is necessary and something I very much agree with. I think the results are interesting, as well. Unfortunately, in its current state, the work feels unfinished and unpolished. I think the sheer volume of analyses thrown at the reader needs to be restrained or combined into more easy-to-consume plots (for instance, instead of displaying all the excerpts that predicted a dimension, what acoustic features can be pulled from those excerpts that explain the dimension?). I'm recommending the journal not accept the work in its current state, but I urge the authors to resubmit after tightening the study up a bit.

I would be happy to read a future version of this manuscript. I would also be happy to lend my assistance in the use of RotCorr if the authors wish.

Reviewer #2: In the manuscript, "Cognitive Music Listening Space: A Multivariate Approach," the author implement various types of cluster analyses (e.g., CA; HCA; MFA; MDS; PLSC) to evaluate how American and French listeners describe (i.e., through the selection of provided adjectives) musical stimuli. The purpose of this study was to provide an alternative approach to investigating how music is represented by listeners, which may be useful when in lab data collection is not possible (e.g., COVID-19 pandemic).

Based on my review of the manuscript, I found the content easy to read and follow. Overall, I found that the implementation of these techniques to be quite beneficial to, as the authors stated "add to the methodological toolbox." While I agree, conceptually, that these methods will enrich one's methodological toolbox (not just psychologists, these methods would benefit a number of social scientists), I found the arguments for when one would use these methods to be lacking.

Moreover, implicitly and even explicitly, it makes sense that these types of methods are useful. However, these types of cluster analyses are common in the cognitive sciences (e.g., among psycholinguists) — e.g., like LSA (latent semantic analysis) — and most cognitive scientists are not stranger to these types of techniques.

However, the techniques described and used in the manuscript do seem somewhat novel for the field, and it seems the authors missed an important opportunity to contrast how these methods are different for other common cluster analyses used in the cognitive sciences.

The manuscript would also benefit from a deeper discussion of when and why these methods would be used in perceptual frameworks, and how they may be useful for auditory research more specifically. I am not sure many perceptual psychologists who study auditory domains would be convinced by the arguments made - mostly because they need more theoretical backing. I just think a stronger justification is warranted and would only strengthen the manuscript.

Another point, I am not sure that "cognitive music listening space" is really describing what it is that the authors are doing. Are the authors really describing cognition or are they describing an aspect of cognition. The authors even discuss how semantic space in one's cognitive system may be shaping the words and interpretations the participants were using to categorize the musical stimuli. I think the authors should consider the implications of describing their task as cognitive, when I am not sure it truly is. Or they need to make a very clear argument for why "cognitive" is better than something else.

Finally, the authors should consider pulling from the psycholinguistic literature more to discuss the cultural differences in their semantic networks to better describe the differences between French and American speakers. It isn't enough to say, that it is likely the case, rather find citations to back it up. This will make the results more compelling and may even provide a context to bridge the gap between other domains, making the manuscript beneficial to other readers.

Other than that, I thought the manuscript was well written and easy to follow. There are some minor changes that need to be made, which include the following:

1. The authors describe the figures in the main body of the text in a way that makes the text and figures redundant. The authors should either remove the figures or they should provide a general description of the clusters, instead of providing an overly detailed description.

Reviewer 3 (Associate Editor). In “Cognitive Music Listening Space,” French and American listeners used quantitative musical dimensions or adjectives to describe music stimuli. The participants in the first experiment were trained musicians and those in the second experiment were recruited without reference to music experience. The third experiment’s goal was to combine the information from each experiment and identify the important variables. The first experiment showed no differences by nationality and two dimensions emerged: arousal and complexity. The second experiment showed differences in adjective choice by nationality and revealed the use of the emotional dimensions of valence and arousal. The third experiment pulled shared variables across the experiments to form two latent variables. This paper presents a unique way to study a complex topic. It includes expert musicians and a more general population from two nationalities. As an exploratory study with multiple analyses, it will appeal to the readers of auditory perception and cognition. However, there are several major concerns that should be considered before publication.

Major concerns:

1. Participants. Demographic information should be included about the participants, such as average age, gender, years of musical experience, language(s) spoken, etc. Minimally, this information could be represented in a chart in the supplemental material section. The recruiting methods, with an emphasis on UT undergraduates in Experiment 2, could lead to participants who differ in more ways than musical expertise across the two experiments.

The participant loss should be addressed. In Exp. 1, only 27 of the 84 responses were included. In Exp. 2, only 278 of the original 520 were included after removing incomplete surveys and individuals who reported a nationality other than American (or an American-other nationality compound). The choice to include only complete surveys is a valid one, but the large number of participants who were not included should be mentioned in the discussion. What does this data loss tell us about on-line data collection?

2. The tasks in Exp. 1 and Exp. 2 are different and are performed by different populations. Please give stronger justification for directly comparing these results in Exp. 3. Is there literature supporting this type of combination? How might experienced musicians perform on Exp. 2? Would they be expected to use the adjectives in a similar way?

J3. The methods of analysis are well described, beginning on p. 7. Although each analysis contributes a specific aspect or view of the data, it is not clear why so many methods are needed. Do some analyses offer a better picture, while other analyses contribute less to answering the initial research questions? It is worth emphasizing the contribution of each and why each is needed.

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In compliance with data protection regulations, you may request that we remove your personal registration details at any time. (Use the following URL: <https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.editorialmanager.com%2Frpac%2Flogin.asp%3Fa%3Dr&amp;data=04%7C01%7Cbmizener%40utdallas.edu%7C4a43845c3a5b49ed1eec08d98a8868eb%7C8d281d1d9c4d4bf7b16e032d15de9f6c%7C0%7C0%7C637693140752187302%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&amp;sdata=OoIpgTTvDwFcEA5dL6GstXIf9z%2Bsa8H%2FAEpWrE%2Beago%3D&amp;reserved=0>). Please contact the publication office if you have any questions.