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Discussions

Interactive comment on "Demonstrating change from a drop-in engagement activity through pre- and post- graffiti walls: Quantitative linguistics and thematic analysis applied to a space soundscape exhibit" *by* Martin O. Archer et al.

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We thank Dr Coxon for their time in promptly assessing the manuscript and have considered their comments carefully.

In general I enjoyed this manuscript and feel it would be suitable for publication in Geoscience Communication with some changes which I outline below.

95–99: I was unfamiliar with Zipf's law, and I think applying this to evaluate public engagement in this manner is highly novel and very impressive. The less

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negative the exponent, the wider the vocabulary. In Figure 3, this clearly demonstrates that for the ∼10 highest ranks, there was a significantly wider range of vocabulary. However, I do have some concerns about things that are unclear. Firstly, I think it is necessary to express and discuss the percentage of the words captured in the ∼10 highest ranks; from an inspection of the graph it looks to me like ∼90% for the "before" set and ∼80% for the "after" set, so the vast majority of the language used on the walls is presumably contained in those 10 upper ranks (if I'm misinterpreting this graph, quoting these numbers explicitly is even more important).

The proportion of words captured within a segment is the sum of the relative frequencies within that segment, which is similar to the area under the graph. We thank the reviewer for their suggestion to include the percentages in each segment, which we shall include in the revised manuscript and were as follows:

Rank	Before	After
≤ 10	$62 \pm 2\%$	$45 \pm 3\%$
> 10	$38 \pm 2\%$	$55 \pm 3\%$

Secondly, the authors say "While the exponents in the lowest ranked segments are consistent with one another," but the two exponents are not consistent with one another; $-1.00 \pm 0.04 \neq -0.85 \pm 0.05$. This part needs to be rewritten to acknowledge that a) although the two are similar, in fact the variety of language at rank > 10 decreased after the study compared to before; and b) what implications this has.

This statement was based on the fact that the two segments' error bars overlapped each other's regression lines, however, the reviewer's point has raised the fact that we did not propagate through these errors in the proportions into our standard error in the slope. Doing this we arrive at the following:

Rank	Before	After
≤ 10	-1.70 ± 0.13	-0.36 ± 0.36
> 10	-0.85 ± 0.25	-1.00 ± 0.22

This now better illustrates that the exponents in the lower ranked segments are indeed consistent with one another as well as the standard Zipf exponent of -1. Thus the implication is that there was significantly increased diversity of language in approximately half the dataset, whereas the other half were consistent with one another, thereby making the overall effect positive.

105: The authors say that "instead of using pre-determined qualitative codes, the analysis drew on grounded theory". I am unfamiliar with the word "code" used in this context. Appendix B particularly, but also the citations, helped me grasp what the meaning is (i.e., for each word, identifying its theme and then within that theme whether it means one of two extremes, i.e. "quiet" or "loud", "empty" or "full", and "slow or busy"). However, I am concerned that readers might not be as tenacious in reading around the terminology as I was as a reviewer, and so I think the paper would be much improved with a fuller explanation here.

We thank the reviewer for this suggestion. We will now include the sentence

> This finds patterns, known as qualitative codes, in the data which are then grouped into broader related themes.

after the introduction of thematic anlaysis. We shall also highlight that in our scheme the codes within a theme are typically antithetical.

108–112: Tying into my criticisms above, a better way to express this would be a table which explicitly outlines which of these are themes and which are codes, I think.

We agree with the reviewer and will add the following table:

Themes	Codes	Description
Sound	Quiet	Space is “silent” or “quiet”
	Loud	Space is “loud” or “noisy”
Emptiness	Empty	Space is an “empty” vacuum with “nothing” in it
	Full	Space is filled with material or activity such as “wind”
Dynamism	Slow	Space is slow (e.g. “calm” or “peaceful”)
	Busy	Space is highly dynamic exhibiting busy movement
Electricity	Electrical	Expressions of electrical phenomena
Space Objects	Space Objects	Commonly known celestial bodies or artificial spacecraft

113: I had not heard of Cronbach’s alpha prior to this manuscript. Most of the examples I have found of its use during my reading for this review refer to applying it to Likertscaled quantities to compare the extent to which, say, a questionnaire of questions about a given theme are telling the author about that theme. This indicates two things; firstly, to apply it the themes must have been assigned numerical values, but it is not clear to me what those values were from the explanation herein. If the authors use Cronbach’s alpha, they need to explain in more detail how the themes were quantised in order to apply the measure (are these simply the 1/2 numbers expressed in Figure 4? If so, say that, and if not, then what are they?). Secondly, as far as I can tell from my exploration of the literature, Cronbach’s alpha is applied to measure reliability, not dimensionality (as in this study); in fact, some literature I read specifically cautioned against the latter and the Cho paper cited does not seem to provide a rationale for using the measure in this way. I have no real issue with the central analysis tenet in Section 4.2, namely that the coder can differentiate to which theme a word belongs. However, if I did have an issue with it, the quoted statistic would not convince me, and should either be removed or the reasons for its validity should be expanded on significantly.

The reviewer raises valid concerns on the regular usage of Cronbach’s alpha within qualitative research in general and we appreciate that due to the word limit of the GC letters format its usage was not clearly discussed. Given that Cronbach’s alpha is not

critical to the methods or results in the manuscript, we feel it best to simply remove this sentence.

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