Comments by the editor:

1. **One big picture note: generally, Reviews should avoid using first-person language. Although this is not a hard rule, the idea is that Reviews should not be centering the perspective of the authors, as this would be more suitable for an Opinion. Please try to revise the highlights and the abstract to place less focus on your perspective. This will give a stronger impression of a Review. For example, “We show that current voice naturalness research is situated within different research domains that resemble echo chambers within science – they neither cross-refer to one another nor to current voice perception theory” --> “Current voice naturalness research is situated within different research domains that resemble echo chambers within science. They neither cross-refer to one another nor to current voice perception theory”. You need not contort the language awkwardly to avoid the first person, but please tilt the language away from this, throughout the piece. I’ve edited the introduction section to provide an example.**

Response:

Thank you for your edits and comments in the manuscript. We incorporated most of your suggested changes. In what follows, we will elaborate on a few ones where we slightly deviated from your recommendations:

Regarding first-person language: we revised the manuscript and the highlights accordingly. There are, however, a few exceptions where we kept the first-person expression. Specifically, we kept it in the section on the definitions of naturalness (e.g. “we propose a taxonomy”) because we feel that this reflects an original position and contribution of the authors and we therefore wanted to frame it as such. We hope, you agree with us on this point.

Regarding your question about the purpose of our argumentation based on the ChatGPT output (page 10): We have now rephrased that part to clarify the point we wished to make here, which now reads as follows: “*At first sight, the concepts of authenticity and naturalness appear highly similar. In fact, when ChatGPT was prompted for synonyms of naturalness, authenticity was its first reply (Figure 1B), which may suggest that in openly accessible online sources, these two terms are indeed frequently occurring in an interchangeable manner. Accordingly, it might be argued that authenticity is just a special form of deviation-based naturalness, with a more specific reference.”* (page 10)

On page 12, you asked whether the preliminary evidence about authenticity conflicted with the predictions made in the previous paragraphs: Yes, that is correct, and we appreciate that we should better highlight this point. We now amended: “*However, comparably early effects also have been….*”(page 12/13)

Figure 3, in the caption, you recommended replacing “enacted” with “performed”: Here, we prefer to keep the original wording, because “enacted” is an established word in the literature on vocal emotion perception, so readers may be more familiar with it.

Regarding the references: Thank you for pointing out that some information was missing. We rechecked all references and made some small additions. The literature we cite is very heterogeneous with regard to format due to the interdisciplinary nature of the topic, including books and conference contributions. Therefore, they sometimes deviate from classical literature about cognitive neuroscience (e.g. sometimes they have no page numbers). We compiled the citation information to the best of our knowledge, but it may be that some references may still need adjustment upon final review.

Regarding the supplemental materials: as of now, we have not yet removed the references to the OSF repository from the manuscript. However, we have marked alongside how we would link the supplemental materials we are about to prepare.

Comments by Reviewer 1:

**Thank you to the authors for their thorough work on revising the paper in response to my previous comments. On this reading I found the paper to be more coherent and impactful. It will be a valuable and timely contribution to the literature, and I look forward to seeing it published!**

Response: Thank you very much for this positive evaluation and your valuable feedback!

**I just have a few very, very minor comments on wording:**

1. **Page 6 line 20: "In principle, such empirical heterogeneity can be a powerful source of insight". I understood what is meant here, but somehow it didn't flow for me as it's immediately followed by a sentence suggesting that the impact of different scales might be minimal. So perhaps it requires a little more qualification about how heterogeneity might add to understanding rather than limiting it (or having no impact at all).**

Response: This is a valid point. We rephrased this part as follows:

“*In principle, such empirical heterogeneity can be a powerful source of insight, potentially revealing the degree to which methodological aspects affect results. For example, there is recent evidence from face perception that differences in rating scales may not have a large impact on outcome [66]. However, it cannot be concluded that this generalizes to naturalness ratings, and the insufficient report of empirical details impedes a meaningful comparison of findings*.” (page 6)

1. **Page 6, line 35: "Finally, few studies only..." --> "Finally, only few studies.."**

Response: Changed as suggested.

1. **Page 6, line 48: "However, while the scientific findings are well-received within each domain" --> I'm not totally clear on the point that needs to be made here with the term "well-received". I usually take this term to mean that people like/appreciate something, but I'm not sure that can be said here without further qualification about something like the quality of the journals / citation rates in which the work appears. Is it that the work on naturalness is well-cited and/or theoretically impactful within individual research domains? Or more simply that it is appropriate to domain-specific audiences but doesn't translate across disciplinary boundaries?**

Response: Good point. Our point here specifically targets referencing and cross-citation, which seems to happen within domains but rarely across the disciplinary boundaries. To make this clearer, we reworded the sentence into:

*“However, while the scientific findings are acknowledged and referenced within each domain, these domains are poorly interconnected.”* (page 6)

1. **Figure 2 caption: "....marked by the human voice border" --> I somehow just couldn't get this final sentence to scan easily. Are the samples defining the border, or rather (as I suspect) the human's perceptual evaluation of the samples? Would it be better to say something like "****Human-likeness can be assessed from audio samples by judging whether or not they lie within the perimeter of an acceptable human voice space (or "human voice border").**

Response: Changed as suggested.

1. **Figure 3 caption: A suggestion for the penultimate sentence: "...** **or it could be real or fake in relation to person-related identity information."**

Response: Changed as suggested.

Comments by Reviewer 3:

**The authors have addressed most of my comments - I'd like to thank them for the thorough revision. There are just a few, minor issues that I'd like to push back on - just for the authors' consideration.**

Response: Thank you for this positive evaluation and your helpful feedback!

1. **Spontaneous evaluation of voice naturalness - in my previous review I mentioned that I'm not aware of much evidence that listeners spontaneously evaluate voices on naturalness as some of the work on this topic does not seem to include judgements of naturalness when listeners are asked to freely describe their first impression of a particular voice. The authors offer a paper by Kuhne et al. (2020) in their response that does focus on naturalness, but it doesn't exactly address my point. In Kuhne et al. perceivers are explicitly asked to rate voices for naturalness or for how human they sound but they do not show any evidence that perceivers would evaluate voices on a dimension related to naturalness unprompted.**

Response: Indeed, the evaluations in Kühne et al. (2020) were promoted specifically for naturalness. Evidence for unprompted evaluations of naturalness is very sparse and presumably depends on the stimulus material used. In a dataset where healthy human, pathological human and synthetic voices are mixed, spontaneous evaluations related to naturalness may be more likely. Nevertheless, in the work of Lavan (2023), where the dataset was comprised of healthy human speakers only, some evaluations occurred that are related to naturalness, such as “robotic”, “monotone”, “speech impediment”, or “muffled”. Therefore, although more data would be desirable, there is evidence for unprompted naturalness evaluations. Lavan (2023) is referenced in the respective sentence in the manuscript.

1. **Face/voice impression models - when discussing the different labels used for the main dimensions of face/voice person perception, the authors distinguish between warmth and competence (Fiske et al., 2007) and the trustworthiness-dominance model of Oosterhof and Todorov (2008). I think it's important to acknowledge that these models are based on different types of cues - while the latter model is based on face-based impressions, the former one is a more general social cognition model, mostly based on text cues. It, therefore, might be factually inaccurate to suggest that the warmth-competence model has been proposed for the underlying structure of face or voice impressions.**

Response: This is a good point. We have now clarified that these models in their original evolution were based on different types of cues. At the same time, it is important to note that there is now substantial work to integrate the warmth-competence model with the trustworthiness-dominance model (e.g., Sutherland et al., 2016, Cognition), validating our argument. In the paper, we now clarify as follows.

“*Poor interconnectivity is not unique to naturalness but can affect many other research domains within person perception. Consider fields with different research traditions, such as impression formation according to social psychological models of inter-group perception versus face/voice perception models. These models were developed for different types of perceptual cues, and different two-factor models with different labels have been proposed in both cases (e.g., warmth vs. competence, e.g. [70]; or trustworthiness vs. dominance, e.g. [71]). More recently though, these fields arguably benefited from interconnectivity, with substantial research to link these distinct clusters and uncover both these specific taxonomies and their empirical relationships [72,73].*” (page 6)

1. **Deviation-based vs human-likeness-based naturalness - I still struggle a little to differentiate between these two types as one does seem like a version of the other. It is not quite clear to me why the human-likeness-based naturalness has the additional assumption of the existence of non-human voices and that's not true for deviation-based naturalness. Why couldn't the deviation-based naturalness cross the boundaries between human and artificial voices? Perhaps some further elaboration on this point would help clarify the taxonomy proposed by the authors.**

Response: This is a valid point. The key point here is that the additional assumption of the non-human voice is obligatory for the definition of human-likeness-based naturalness, whereas for the deviation-based naturalness it is not (although it is possible). This may seem as a small detail, but in our view, this has important practical implications and ties back to the intuitive understanding of readers regarding the distinction between pathological vs. synthetic voices. We tried to make this more specific by rephrasing the wording:

“*Compared to the deviation-based definition, the concept of human-likeness-based naturalness requires an additional obligatory assumption: the existence of a non-human voice space. This highlights the notion of a categorical boundary to human voices, although the transition between categories can be continuous. In other words, a definition of human-likeness is only meaningful if we assume that voices can be non-human in principle. Although deviation-based naturalness may, in certain cases, cross the boundary to the non-human voice space, this boundary is not essential for its definition. Apart from this critical distinction, however, human-likeness-based naturalness may represent a special case of deviation-based naturalness: the reference is a human voice (or listeners´ representation of a human voice), and the deviation is assessed along the human/non-human spectrum. The above considerations suggest that the human-likeness-based conceptualization is particularly well-suited for research into synthetic voices*.” (page8)

1. **p.6, just before reference 67 - it is not clear what type of reliability the authors are referring to here**

Response: Good point. We specified this as “*interrater reliability*” now.

1. **p. 6, last row - the authors refer to some highly divergent research traditions, but it is not clear what traditions they are referring to. It seems like they are referring to face vs voice impressions which I wouldn't necessarily call highly divergent, given that a lot of the voice impressions literature is strongly rooted and based on research on faces.**

Response: We have now reworded this, and replaced “highly divergent research traditions” with “different research traditions”. Please also see our response to your point #8. Rephrasing this paragraph according to your suggestions also clarifies which different research traditions we refer to. Overall, we appreciate your careful and critical reading; we believe your comments have helped us clarity these sections, and we hope you agree.