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**Supplemental Discussion and Analyses**

**Voxel-level overlap between blind and sighted participants.** As noted in the text, more fine-grained analyses can be carried out that address the relative similarity between the blind participants and the sighted participants, taking as a baseline the similarity among the sighted participants. Specifically, it is possible to address the issue of similarity at the voxel-level.

The conclusion that category preferences, as measured by the amplitude of BOLD responses, in higher order 'visual' areas do not require visual experience is established by the findings reported in Figures 2 and 3. Those ROI analyses already indicate overlap in standardized (Talairach) space for category preferences between sighted and blind participants. It is also important to note that the issue of whether there is overlap in standardized space relates to a stronger hypothesis than the claim that category preferences in higher order 'visual' areas do not require visual experience. This is demonstrated by the fact that many investigators establish effects of functional specialization by defining ROIs on a subject-by-subject basis, either on the basis of a functional localizer (e.g., Downing, Jiang, Shuman, and Kanwisher, 2001, Hasson, Harel, Levy, and Malach, 2003, Spiridon and Kanwisher, 2002) or on the basis of anatomy (e.g., Dilks, Baker, Peli, and Kanwisher, 2009; Pietrini and colleagues, 2004; Shmuelof and Zohary, 2005). The premise behind defining regions of interest on a subject-by-subject basis is that overlap at the voxel-level in standardized (i.e., stereo-tactic) space across participants is not a criterion for demonstrating functional specialization within higher-order visual object recognition areas.

Nevertheless, in order to provide at least descriptive information about proportion overlap of category preferences for the blind and sighted participants, we conducted two analyses. These analyses were carried out over individual participant statistical contrast maps in standardized

(Talairach) space taking voxels (resolution = 3x3x3mm) as the units of analysis for proportion overlap.

In the first analysis we calculated the proportion of all functionally defined ventral stream voxels that showed category preferences (in both directions) for each participant who performed the auditory size-judgment task (thresholded at $p < .01$). The results of this analysis (Supplemental Figure S1A) indicate that the blind participants presented with at least the minimum level of proportion activated voxels as the sighted participants.

In a more stringent test of voxel-wise similarity between the sighted and blind participants we calculated the proportion of voxels showing category preferences, comparing each individual participant who performed the auditory size judgment task to the group of sighted participants viewing pictures. We first computed statistical contrast maps (animal > nonliving, $p < .05$, FDR corrected) for 20 group-level analyses (random effects) for the participants viewing pictures, each time leaving out one participant. We also computed the corresponding 20 individual-participant statistical contrast maps (animal > nonliving, $p < .01$). On the basis of those data, we could determine for each participant, the proportion of voxels showing category preferences (in both directions) that overlapped with the same category contrast, as defined in the group analysis that did not include that participant. For instance, we first determined the set of voxels showing differential BOLD responses for animal stimuli compared to nonliving stimuli for participant S1; we then determined the set of voxels showing differential BOLD responses for animal compared to nonliving stimuli in the group-level random effects analysis that did not include participant S1 (i.e, over participants S2-S20). Proportion overlap was then defined as the proportion of participants S1's 'animal' voxels that overlapped with the set defined on the basis of the group analysis.

The same procedure was performed for each individual who completed the auditory size judgment task (sighted and blind). Specifically, for each participant who completed the auditory size-judgment task, the proportion overlap was computed between that participant and the 20 group level analyses (described above). The mean proportion overlap from those 20 comparisons was then used as a 'best guess estimate' of that participant's similarity to the group of 20 participants. The results are plotted in Supplemental Figure S1B (left panel of the graph). The critical point is that the distribution for blind participants overlaps that for sighted participants performing the same task.

We then reran the entire analysis, this time calculating between-category overlap. In other words, we asked: of voxels in participant *n* that show differential BOLD responses for animal compared to nonliving stimuli, what proportion show differential responses for nonliving compared to animal stimuli across the group(s) of sighted participants. As would be expected if relatively non-overlapping sets of voxels show category preferences for nonliving and living things, the distributions for proportion overlap are shifted down (i.e., lower) compared to the analysis calculated within-category (Supplemental Figure S1B, right panel of the graph).

These analyses of proportion overlap are informative at a descriptive level in that they indicate that proportion overlap of category preferences for the blind participants is similar (i.e., as established numerically by overlapping distributions) to that for sighted participants. However, and as noted above, the theoretical implications that follow from our findings do not critically depend on the results of the proportion overlap analyses. Future research aimed at addressing other theoretical issues, and in particular issues relating to potential *differences* between sighted and blind individuals, may require large sample sizes to further explore these issues.

## References

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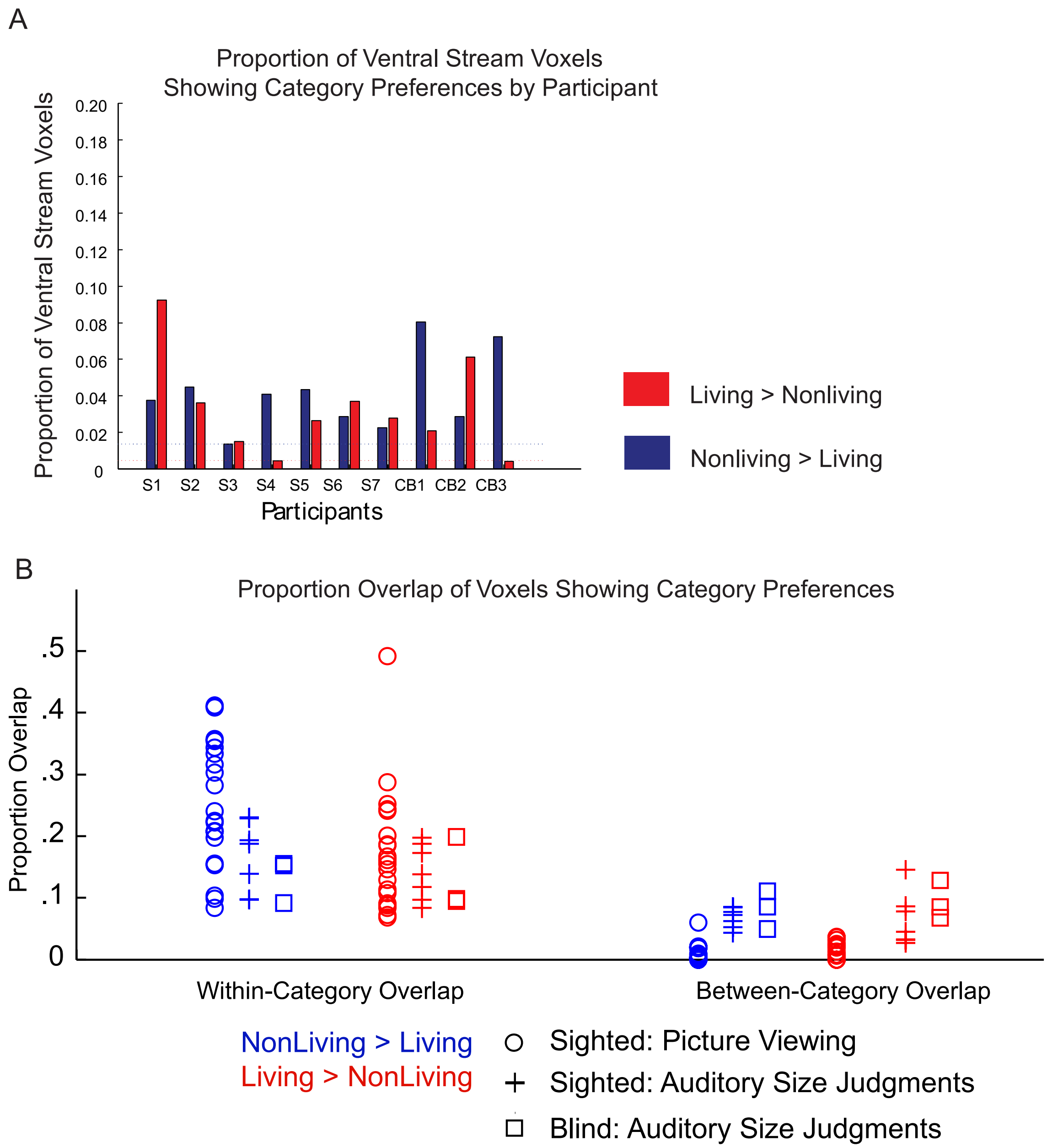
Supplemental Figure S1




**Supplemental Figure S1. A)** The graph depicts the proportion of functionally defined ventral stream voxels that showed category-preferences in every participant who performed the auditory size-judgment task. The horizontal blue and red dotted lines indicate the minimum proportion of ventral stream voxels that showed category preferences for sighted participants, for nonliving and living things, respectively. All of the blind participants presented with at least the minimum level of proportion activated voxels as the sighted participants. **B)** Each element of the graph (circles, plus signs, and squares) represent an individual participant, separately for voxels showing differential activation for nonliving things compared to living things (blue) as well as living things compared to nonliving things (red). The critical findings are that 1) overall, proportion overlap within-category is greater than proportion overlap between-category, and 2) the distributions for blind participants overlap with those for sighted participants performing the same task (see Supplemental Discussion for description of the analyses displayed in this figure).