

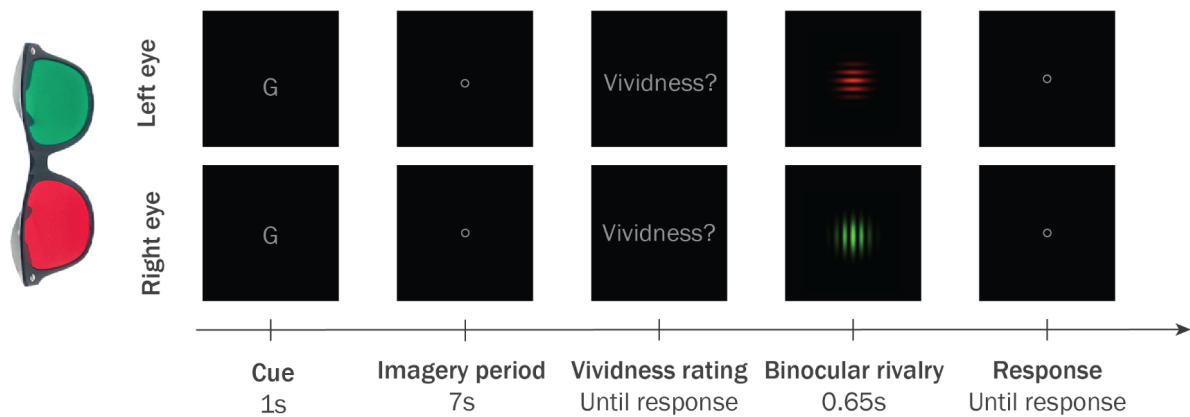
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Supplemental Information

**Decoding sound content in the early visual cortex
of aphantasic participants**

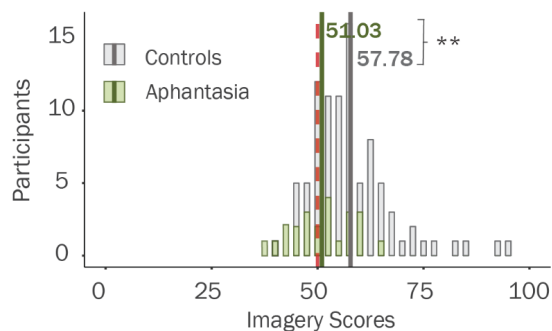
Belén M. Montabes de la Cruz, Clement Abbatecola, Roberto S. Luciani, Angus T. Paton, Johanna Bergmann, Petra Vetter, Lucy S. Petro, and Lars F. Muckli

A Imagery Priming Test

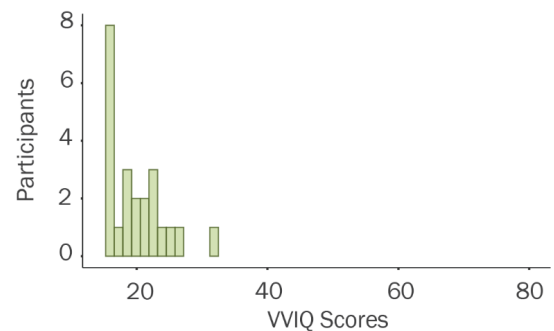


B Behavioural results

B1 Imagery priming scores



B2 Voluntary Visual Imagery Questionnaire



B3 Spontaneous Use of Imagery scores

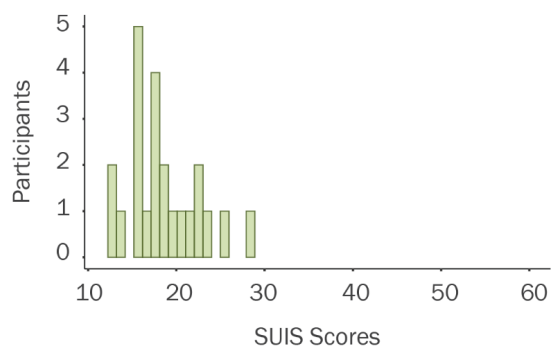
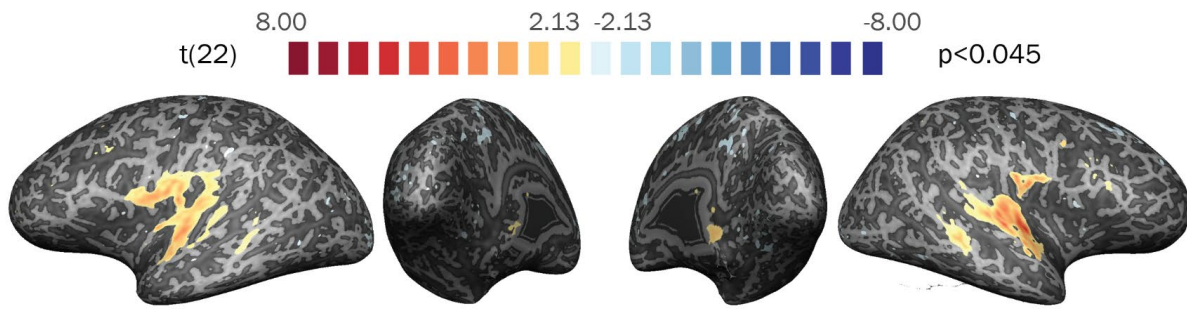
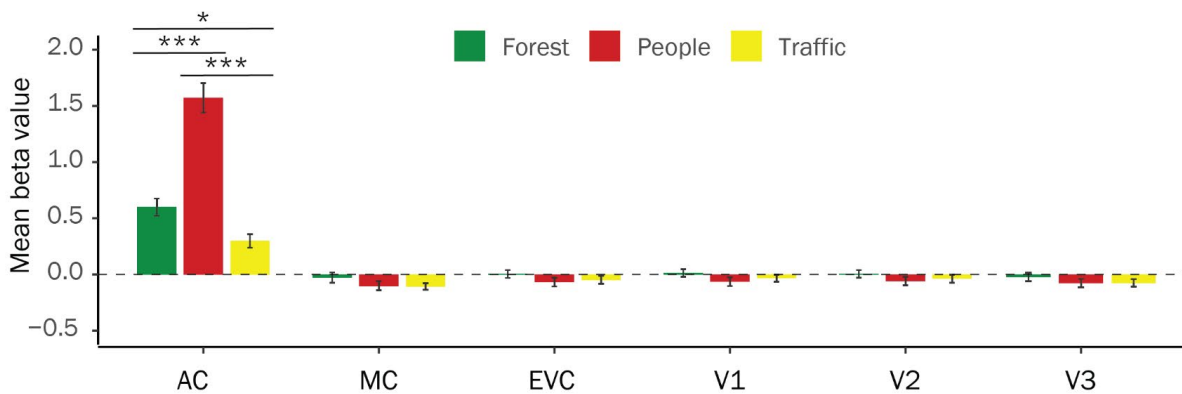


Figure S1 Behavioural methods and results, related to Figure 1 A. During the imagery paradigm, participants were presented with a colour cue binocularly (“G” for green or “R” for red). Next, they were asked to imagine/think about the cued coloured grating as vividly/strongly as possible. Then, participants were asked to rate their imagery strength (1= no vivid at all, 4= as vivid as seeing). Finally, the rivalry display was presented and participants indicated their response on the dominant percept. Participants completed 10 trials during training, and 100 during the main run. B. Imagery priming test from our aphantasic participants in green and Bergmann et al.’s^{S1} control participants in grey. Significance level was established as $p < 0.05$, with ** indicating $p < 0.01$. The red dashed line indicates chance level (50%). Participants self-reported C. voluntary visual imagery questionnaire (VVIQ)^{S2,S3} and D. spontaneous use of imagery scale (SUIS).

A Whole brain univariate results



B Univariate results by sensory and retinotopic area



C Univariate results by eccentricity

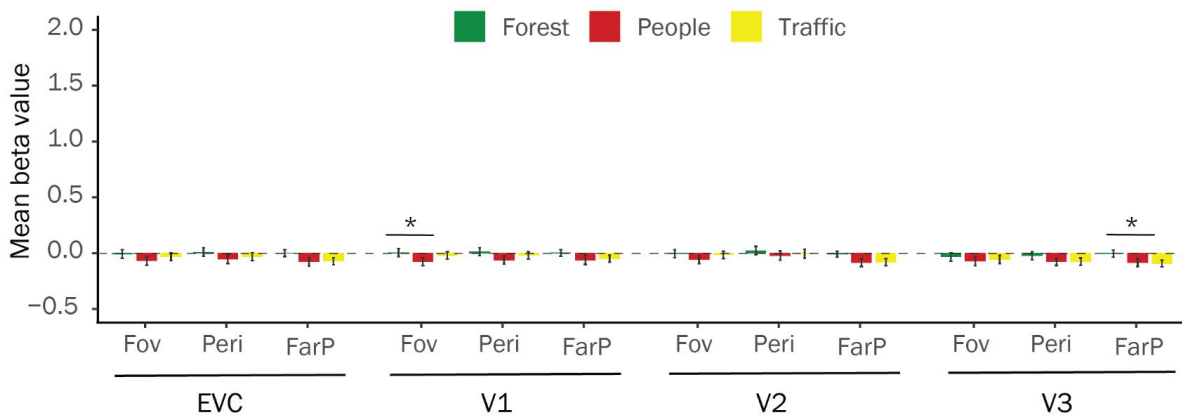


Figure S2 Univariate analysis results, related to Figure 2 A. Whole-brain results from a random effects GLM analysis projected on cortical surfaces (inflated brain of one participant). Results are thresholded at $p < 0.05$ uncorrected. B. Mean beta values for the three auditory scenes in the auditory cortex (AC), motor cortex (MC), early visual cortex (EVC), V1, V2 and V3. C. Mean beta values in the retinotopic areas' eccentricity fields, including foveal (Fov), peripheral (Peri) and far peripheral (FarP) fields. We tested within-ROI differences between sounds by pairwise comparisons, where * indicates $p < 0.05$ and ** $p < 0.001$. Error bars indicate SEM.

Area	Observed classification accuracy	Standard deviation of permutation distribution	Bayes Factor	Interpretation
AC	0.99	0.12	0.00	Extreme evidence for H1
MC	0.37	0.03	1.05	No evidence for either H1 or H0
V1	0.35	0.03	3.62	Moderate evidence for H0
V2	0.33	0.03	14.53	Strong evidence for H0
V3	0.34	0.03	6.55	Moderate evidence for H0
EVC	0.34	0.03	6.24	Moderate evidence for H0
V1 Fovea	0.29	0.03	269.61	Extreme evidence for H0
V1 Periphery	0.34	0.03	10.29	Strong evidence for H0
V1 Far Periphery	0.38	0.03	0.25	Moderate evidence for H1
V2 Fovea	0.31	0.03	45.24	Very strong evidence for H0
V2 Periphery	0.30	0.03	41.14	Very strong evidence for H0
V2 Far Periphery	0.32	0.03	38.18	Very strong evidence for H0
V3 Fovea	0.39	0.03	0.16	Moderate evidence for H1
V3 Periphery	0.30	0.03	120.43	Extreme evidence for H0
V3 Far Periphery	0.33	0.03	13.30	Strong evidence for H0
EVC Fovea	0.33	0.03	14.07	Strong evidence for H0
EVC Periphery	0.30	0.03	70.07	Very strong evidence for H0
EVC Far Periphery	0.33	0.03	13.68	Strong evidence for H0

Table S1 Bayes Factors and interpretation, related to Figure 2 Observed classification accuracies and permutation distribution variances for each of our included areas, together with their associated bayes factor and interpretation. Note that interpretations were made with respect to the null hypothesis and follow Lee and Wagenmakers' scale,^{S5} which establishes: $1 < BF < 3$ = anecdotal evidence, $3 < BF < 10$ = moderate evidence, $10 < BF < 30$ = strong evidence, $30 < BF < 100$ = moderate evidence and $BF < 100$ = extreme evidence.

Supplemental references

- S1. Bergmann, J., Petro, L.S., Abbatecola, C., Li, M.S., Morgan, A.T., and Muckli, L. (2024). Cortical depth profiles in primary visual cortex for illusory and imaginary experiences. *Nature Communications* 15, 1002. 10.1038/s41467-024-45065-w.
- S2. Marks, D.F. (1973). Vividness of visual imagery Questionnaire. *Journal of Mental Imagery*.
- S3. Marks, D.F. (1995). New directions for mental imagery research. *Journal of Mental Imagery* 19, 153-167.
- S4. Kosslyn, S.M., Chabris, C., Shephard, J., and Thompson, W. (2017). Spontaneous Use of Imagery Scale. 10.1037/t57899-000.
- S5. Lee, M.D., and Wagenmakers, E.-J. (2013). Bayesian cognitive modeling: A practical course (Cambridge University Press). 10.1017/CBO9781139087759.