Patients with Hemispherectomies Evince Intact Visual Recognition Behaviors

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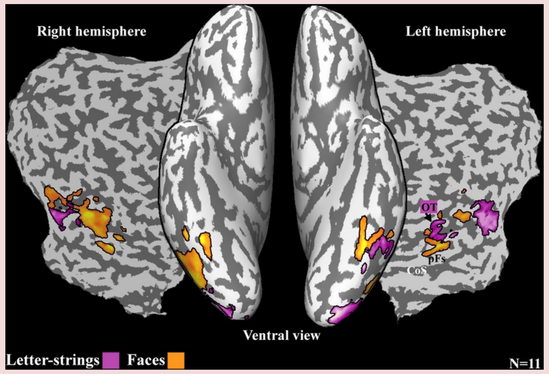
Background

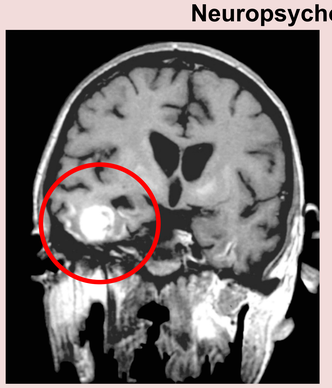
Each hemisphere has been thought to chiefly govern face or word recognition.[1]

Imaging Evidence

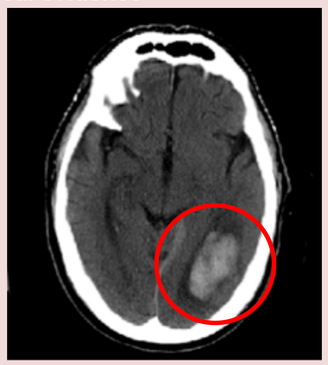


Brain map showing the averaged blood oxygen level dependent response of 11 healthy adults. There is greater right and left hemispheric responses for face and lexical stimuli, respectively.[2]

Neuropsychological evidence



Prosopagnosic (face-blind) patient with a right focal lesion.[3]



Prosopagnosic (face-blind) patient with a right focal lesion.[3]

In adults, even focal lesions to right or left temporal cortex result in dramatic deficits in face or word recognition, respectively.[3]

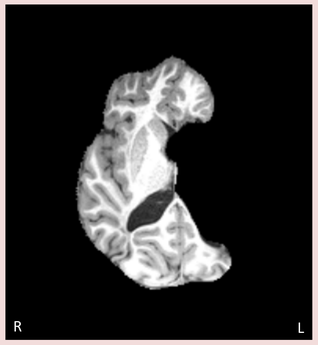
But *children* with focal resections in temporal cortex show a remarkable ability to maintain visuoperceptual behaviors.[4]

But what are the consequences of the extreme case, of removing a single hemisphere in childhood?

Patient Sample

18 patients with a full hemispherectomy participated (11 with left resections, 7 with right resections).
Each patient was matched to age-matched controls.
Axial cross-sections of two example patients are shown below:

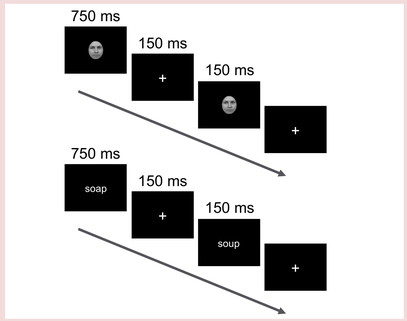
Patient ID1



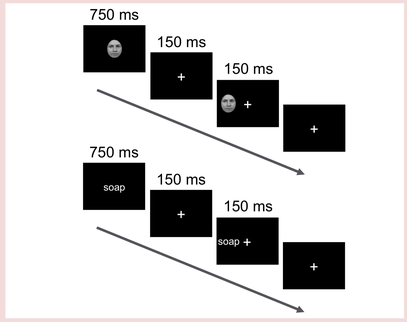
Patient ID2

Experimental Design

Goal: comparison of each single hemisphere of controls to each patient's single hemisphere.



Patients and some controls (n = 24) saw faces and words presented at central fixation and were asked to report if they were the same or different.



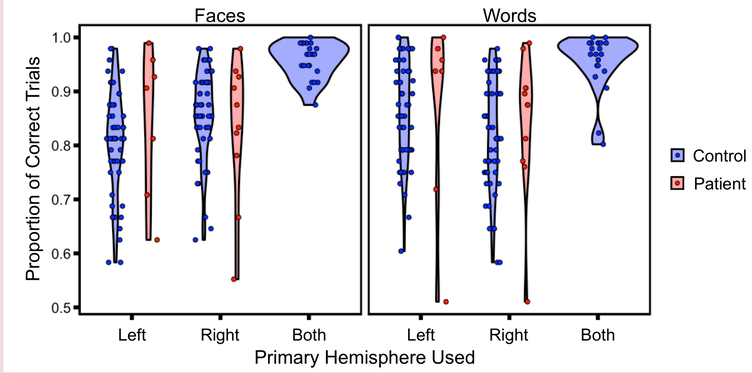
Other controls (n = 55) saw faces and words presented at in one visual field (thus, chiefly using one hemisphere) and were asked to report if they were the same or different.

Results

1) No differences between left versus right hemispherectomy patients

2) No differences between patients and controls viewing stimuli in a single hemifield

3) Two hemispheres are better than one, not only for patients, but also for controls



Results

Patients with a single hemisphere show comparable face and word discrimination as controls using a single hemisphere.

Two hemispheres are still more efficient than one, suggesting that face and word representation is bilateral.

A single hemisphere is sufficient but not optimal for face and word perception, for both patients and controls.

Acknowledgments and References

Acknowledgments

We would like to acknowledge Raina Vin and Dr. Marge Maallo for assistance with data collection. We would also like to thank the Brain Recovery Project for their extraordinary help in recruitment. *The project described was supported by Award Numbers T32GM081760 from the National Institute of General Medical Sciences and R01EY027018 from the National Eye Institute. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of General Medical Sciences, the National Eye Institute, or the National Institutes of Health. Funding to attend this conference was provided by the CMU GSA/Provost Conference Funding.*

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