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## Category naming effects during intraoperative language mapping

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## Category Naming Effects during Intraoperative Language Mapping

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### Introduction

Anterior temporal lobectomy is widely used for treatment of intractable temporal lobe epilepsy. Intraoperative language mapping routinely involves rote speech production and/or confrontation naming. Some patients experience a decline in naming postoperatively, although research has yielded conflicting results as to the cause, nature and extent of these deficits. Based on Damasio et al.'s (1996) convergence model in naming, our pilot study (2007) identified anterior temporal lobe language sites when incorporating tools, animals and familiar faces, in our mapping protocol. The purpose of our present investigation was to replicate these results in a larger sample size and to determine the existence of specific category effects.

### Methods

We report 21 patients with epilepsy undergoing a dominant anterior temporal lobectomy with amygdalohippocampectomy. Standardized language testing, including the Boston Naming Test (BNT) was conducted, pre- and postoperatively. For our mapping protocol, we preoperatively identified photographs of animals, familiar faces and tools that each could be named within ~ three seconds.

Intraoperatively, 10 sites covering the entire temporal lobe were labeled and stimulated by the neurosurgeon, during laptop presentation of animals, tools and faces. Three trials were conducted at each site, with presentation of one face, one animal and one tool. Across subjects, 196 different sites, with a total of 1764 stimuli were included.

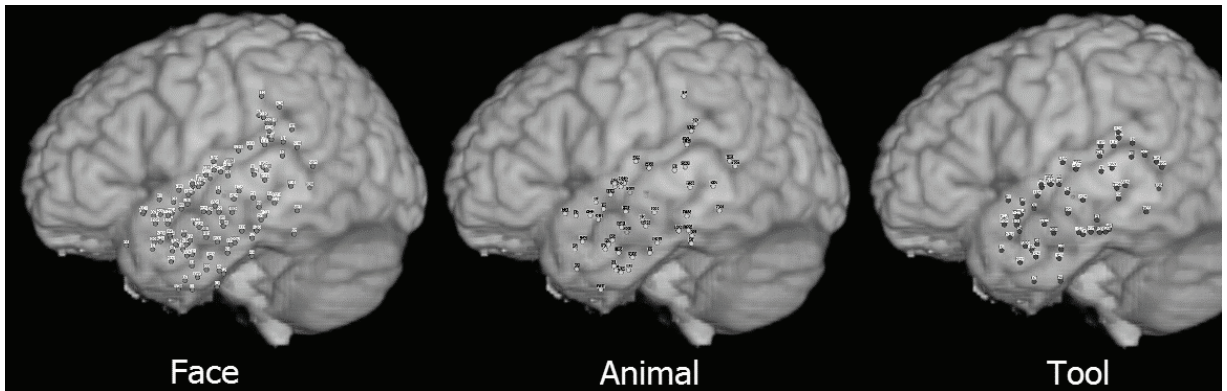
The sites were registered to the cortical surface, by overlaying the individual subject's intraoperative photograph onto the skull-stripped brain image. Each MR brain image was then spatially normalized to a common atlas space, using the MNI single subject brain image as the template. Errors occurring for faces, animals and tools were calculated and summarized for statistical analysis.

### Results

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Preoperatively, 15/21 subjects demonstrated impaired naming performance on the BNT. Intraoperatively and across subjects, familiar face errors occurred in 30% of trials, tool errors in 13% and animal errors in 13%. Although face naming errors were distributed evenly over the temporal lobe, the error rate for tools reached significance in the posterior temporal regions.

### Conclusions

Our category specific naming protocol successfully identified language sites in the anterior temporal lobe (ATL), with its utility in impacting surgical outcomes requiring further study. In contrast to other investigations (Damasio et al, 1996), errors in naming unique faces were not specifically associated with ATL but implicated the entire temporal lobe. Tool naming, however, was associated with the posterior temporal lobe. In general, our findings may reflect altered language functioning and/or its representation in patients with temporal lobe epilepsy, along with inter patient variability.

### References

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