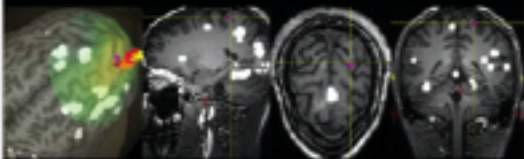


RDPModels

Modeling Recognition

- If we thought that conceptual knowledge (e.g. what a 'dog' is gets stored in neuron X) gets stored by a specific neuron/group of neurons, we would expect stroke damage to result in *very* selective losses for recognizing specific objects on the one hand (e.g. lose neuron X and lose your concept of dog), while leaving knowledge for all other kinds of objects completely intact on the other
- This doesn't seem to be what happens and people tend to get more generalized kinds of behavioural effects from neurological damage
- Note that one complication to the above is people sometimes do seem to have pretty specific behavioural consequences from neurological damage, e.g. a case study of visual agnosia that was restricted to musical instruments



ESSENTIALS OF COGNITIVE NEUROSCIENCE

Bradley R. Postle

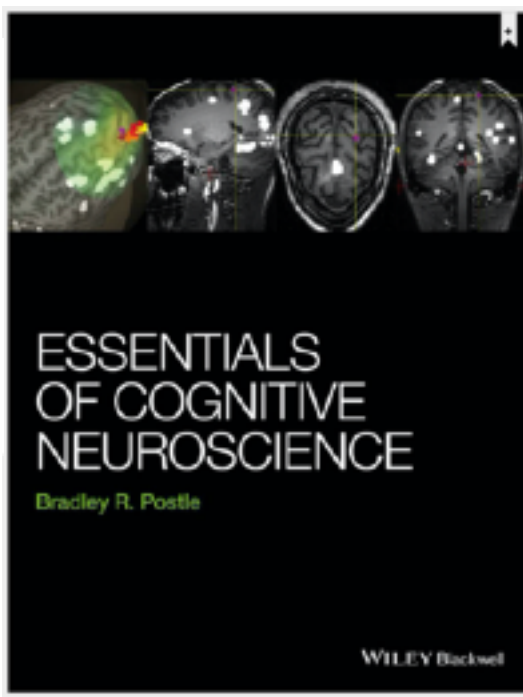
WILEY Blackwell

RESEARCH SPOTLIGHT

9.1 Where's the recognition in visual object recognition?

RESEARCH SPOTLIGHT

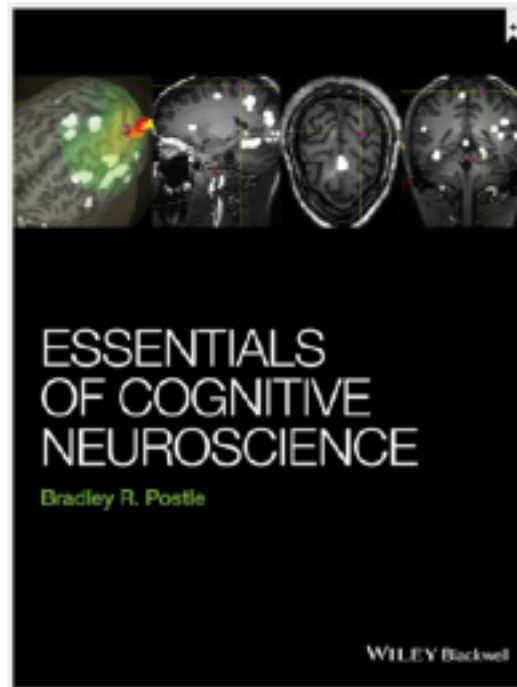
9.1 Where's the recognition in visual object recognition?



PDP Models

Modelling Recognition

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fMRI Methodology

The Problem of Multiple Comparisons

- Returning to the world of fMRI, let's first briefly consider two kinds of challenges associated with that technique, as they relate to Kanwisher's work on the FFA
- Recall the problem of multiple comparisons raised on slide 28 of lecture 1: the dead salmon that produced a (definite!) false positive in an fMRI study using analysis methods typical of the time

Neural correlates of interspecies perspective taking in the post-mortem Atlantic Salmon: An argument for multiple comparisons correction
 Craig M. Bennett¹, Abigail A. Baird², Michael B. Miller¹, and George L. Wolford³
¹ Psychology Department, University of California Santa Barbara, Santa Barbara, CA; ² Department of Psychology, Vassar College, Poughkeepsie, NY; ³ Department of Psychological & Brain Sciences, Dartmouth College, Hanover, NH

METHODS
 Subject: One mature Atlantic Salmon (Salmo salar) perished. The salmon was approximately 18 inches long, weighed 1.5 lbs, and was frozen.

Task: The task administered to the salmon involved one monitoring task. The salmon was shown a series of photos, each depicting a novel stimulus with a specified emotional valence to determine when emotion the individual in the experiment.

Design: Stimuli were presented in a block design with each stimulus presented for 10 seconds.

GLM RESULTS

A t -contrast was used to test for regions with significant BOLD signal change during the photo condition compared to rest. The parameters for this comparison were $t(131) > 3.15$, $p(\text{uncorrected}) < 0.001$, 3 voxel extent threshold.

We realise that some of our colleagues within the specialties of neuroscience and psychology, who we suspect could be afflicted by the aforementioned bah humbug syndrome, would argue that studies such as the present one overemphasise the importance of localised brain activity and that attempts to localise complex emotions in the brain contribute little to the understanding of these emotions. Citing a paper reporting fMRI evidence of brain activity in frozen salmon,¹⁸ representatives of this view have even coined terms for this practice such as "blobology," "neo-phrenology," "neuro-essentialism," and "neuro-bollocks" (Grinch and colleagues, personal communication). Naturally, in keeping with the good spirit of the holiday, we disagree with these negative perspectives.

Can we conclude from this data that the salmon is engaging in the perspective-taking task? Certainly not. What we can determine is that random noise in the EPI timeseries may yield spurious results if multiple comparisons are not controlled for. Adaptive methods for controlling the FDR and FWER