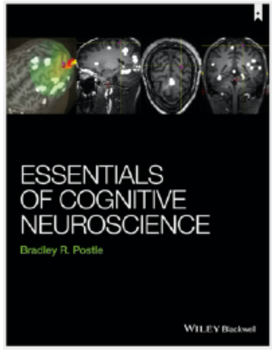
fMRI Methodology

The Problem of Multiple Comparisons

METHODOLOGY BOX

9.2 Some problems, and solutions, with univariate analyses of fMRI data



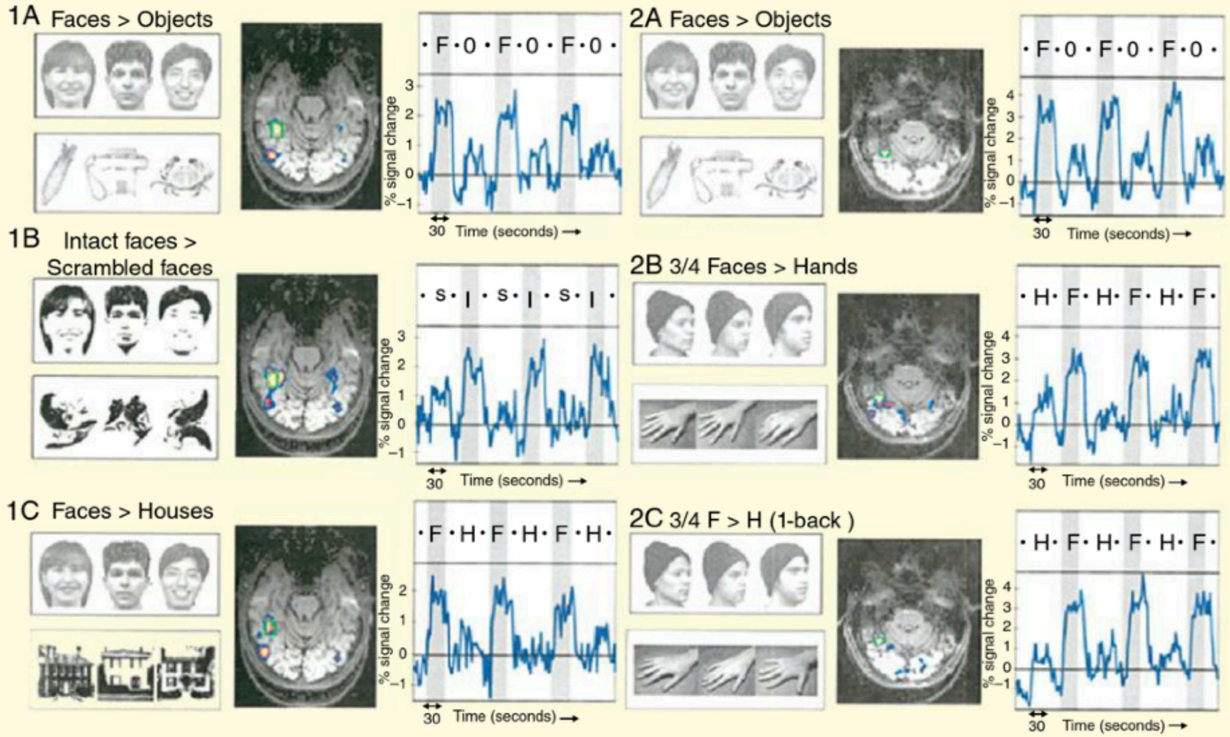


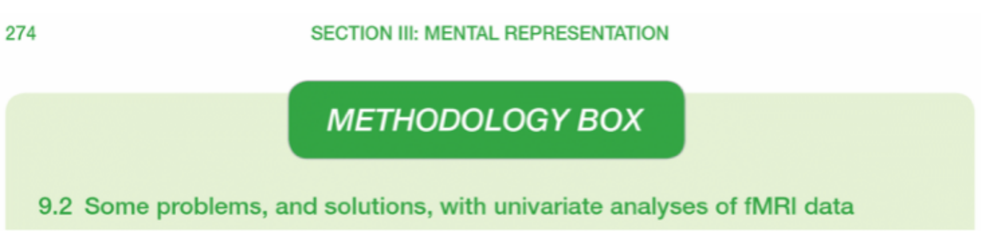
FIGURE 9.3 Examples of stimuli, fMRI statistical maps, and time series, from several assays of response properties of the FFA. The contrast illustrated in panels **1A** and **2A** (faces > objects) was used to define the FFA ROI, outlined in green in the axial images, each for a different individual subject. Panels **B** and **C** illustrate the statistical map generated by each of the contrasts, each for the same subject, with the green-outlined ROI from panel **A** superimposed. This procedure was repeated on the individual-subject data of five subjects, and each time series is the average from the FFA ROI of each. Source: Kanwisher, McDermott, and Chun, 1997. Reproduced with permission of the Society of Neuroscience.

"In Figure 8.11 A, in contrast, because the activity from the two voxels is averaged into one ROI, no correction needs to be applied, because only one test is being performed. Therefore, defining an ROI with one contrast, then "interrogating" it with either data from a different block, or a contrast that is mathematically orthogonal to the one used to define the ROI, is an effective and frequently used strategy."

(Postle, 2015)

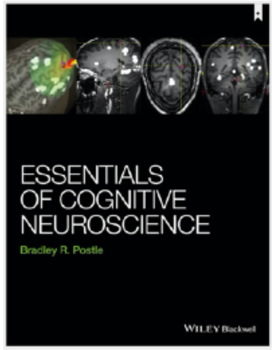
fMRI Methodology

Ruling Out Alternative Explanations



METHODOLOGY BOX

9.2 Some problems, and solutions, with univariate analyses of fMRI data



- If we find that region 1 responds more strongly to object A than object B, would you feel comfortable making the claim that must mean region 1 is specialized for object A? Probably not!

- A much stronger argument could be made if we found that region 1 responds more strongly to object A, as compared to a *large* array of other kinds of objects (object B, object C, object D, etc.)

- So we can't rule out the idea the region 1 responds to object A *and* another given object (e.g. object X) until we directly compare activation of region 1 when shown object A, with what happens when shown object X