Reviewer's report

Title: Cross-modal deactivations during modality-specific selective attention

Version: 1 Date: 10 July 2008

Reviewer: Michael S Beauchamp

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Minor Essential Revisions

1) The first main flaw in this paper is the use of a weak visual stimulus that fails to evoke a response from any region of visual cortex (Fig. 3). A change in the luminance of the whole visual display is likely to be an ineffective stimulus for most neurons in visual cortex and probably even the geniculate; in contrast, even a low-amplitude auditory tone drives a fair number of neurons in auditory cortex. In future experiments, a more effective (but still weak) visual stimulus, such as a low-contrast moving grating, would allow the authors to disentangle the effects of shifts in baseline activity from changes in the gain of the response to weak stimuli. In this manuscript, a brief discussion of how the results might differ with a stronger visual stimulus would be appropriate.

2) The second main flaw in the paper is the selection of the ROIs for the fMRI data analysis. There are dozens of identified auditory and visual areas. Each identified area is likely specialized for a different neural computation, and so might be differentially affected by cross-modal attention.

The paper uses a single ROI for auditory and visual cortex, consisting of a 10 mm sphere around the maxima of the auditory vs. visual contrast. It is not clear how these spheres relate to identified areas or if the results would be different if different ROIs were chosen. In particular, the visual ROI is in dorsal occipital/inferior parietal lobule. This is far from primary visual cortex (the area most likely to directly respond to a change in the display luminance) and so increased activity in this area for visual compared with auditory trials in Fig. 2 (or “vis no target” compared with “aud no target” in Fig. 4) probably represents some type of visual search or attentional process. Adding a brief discussion of this point would be valuable.

3) The sentence on page 5 “..targets that provided a very small percent change...” is confusing because percent change usually refers to the BOLD signal, but here the authors are referring to stimulus intensity.

4) It would be nice to have more behavioral data in Table 1. Specifically, the number of hits, misses, false alarms and correct rejects at each stimulus level. At the weakest stimulus levels, one could imagine that a 1% intensity auditory tone would be less detectable than a 5% brightness increment, creating a ceiling effect.
5) What was the frequency of the auditory tone?

Discretionary Revisions

6) I don’t like the use of “silent” (p. 14) to describe clustered volume acquisition schemes that introduce a gap between very loud acquisitions; it seems like describing a heavy metal concert as “quiet” because the interval between songs is low-volume. There is at least one fMRI acquisition scheme that is consistently quiet but it is little used (Jakob et al., MRM 1998).

Level of interest: An article of outstanding merit and interest in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.