Neural mechanisms of top-down control during visual search: Effects of template complexity

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Introduction

Current models propose that visual search is a process of biased competition in which one or multiple templates describing the target are in competition. Where the template most similar to the target wins the competition, resulting in an expectancy-driven bias... (F(4,56)=-86.8, p<.000)

- F(681x2235) = Target Present RTs, but more so for Conjunction Search trials
- There was a significant Template Complexity X of two features (such as colour and shape) rather than a single feature
- Previous fMRI studies have investigated the neural correlates of target processing for feature vs. conjunction visual search displays
- Results suggest that the template complexity has specifically addressed for other purposes
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Aims

- To explore the neural correlates of Template Propagation, using both Attend and Control Attent Display
- To assess the effects of Template Complexity (Feature vs. Compact) on both Visual Search and Template Propagation

Methods

- Subjects: 11 normal left-handed participants (12-45 yrs, 6 female) normal vision
- Design: A modified Visual Search Task using Feature and Composite Displays (14 x 2). All trials consisted of 12 items
- Procedure: Hand and the scanner, equipped with a SENSE coil. Gradient echo sequence: T1-FLAIR, 90 degree flip angle, FWHM=20, 30 slice thickness, 10-15-15, 1.5 mm slice interval.
- Results
- Significant BOLD signal changes were present in bilateral putamen and lateral cerebellum. The ACC, Cbll, and L Fusiform gyrus and R parietal cortex are also significantly increased in bilateral DLPFC. No significant change was present in R DLPFC. Such effects were stronger for Conjunction than Feature Cues in bilateral ACC, Cbll, and L Fusiform gyrus and R parietal cortex.

Conjunction: Template Preparation during visual search activities, refers to a lesser degree, several of the seven areas above involved in visual search (F=12). In addition, unique activations in lateral PFC (R=22), CBL (suggest a role for these structures in top-down impact of prefrontal cortex)

References