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Introducing the Back of the Brain Project

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Background
Face and words recognition has traditionally been thought to rely on highly specialised and relatively independent cognitive processes.

Strong evidence for this has come from single case studies of patients with:
- pure prosopagnosia: a selective face recognition deficit
- pure alexia: a selective word recognition deficit

Recent theories, such as the many-to-many hypothesis (Behrmann & Plaut, 2013), suggest instead that the cognitive and cerebral processes underlying visual recognition are more distributed and interactive.

While single case studies are well suited to investigate dissociations between deficits, larger groups of patients are needed to investigate associations predicted by a distributed model.

Aim of the study
The study aims to shed new light on the processes and cerebral architecture underlying visual recognition of faces and words.

Some of the core research questions:
- Do face and word processing rely on processes that are largely independent or highly distributed and shared?
- What is the relationship between deficits in object, word and visual recognition and semantics following stroke?
- How do visual field defects affect higher-level visual perception?
- How are visual field defects related to visual recognition and semantics?
- Can reading be spared after a lesion in the left fusiform gyrus and can face recognition be spared after a lesion in the right fusiform gyrus?

Methods

70-100 patients
(stroke in posterior cerebral artery)

50 healthy controls
(matched as group for age and education)

Behavioural tests
All patients are assessed (>9 months post-stroke) a large battery of sensitive behavioural tests (see figure 1 for overview of functions assessed).
Assessment of each patient carried out over 3 days (within maximum 3 weeks).

Imaging
- Structural T1 scan
- Functional localiser: faces and scrambled faces, words and checkerboards
- Diffusion tensor imaging (DTI) scan

Figure 1: Behavioural test battery

What’s novel?
- Participants selected according to lesion localization, not according to symptoms
- All patients assessed with the same wide range of functions with sensitive tests
- Tests of face, word and object processing: Same level of processing tested across stimulus type.
- Large group of PCA patients included.

Status
- 25 patients tested (right lesions n = 6; left lesions n = 16; bilateral lesions n = 3)
- 3 control participants tested

International collaboration

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