

DISCOURSE PROCESSING IN THE BRAIN: SETTING UP NEW DISCOURSE REFERENTS

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Introduction

During listening or reading, language users construct a mental representation of the on-going discourse, which is continuously modified and augmented. One of the modifications is to set up a new discourse referent. For instance in (1), 'Three ships' in (a) refers to a subset of the set of ships mentioned in the first sentence, but in (b) it enforces the set-up of a different set of ships.

- (a) Five ships were in the port. Three had sailed out that morning. [1]
(b) Two ships were in the port. Three had sailed out that morning.

Earlier behavioral studies showed difficulty at words such as 'Three' for (b) versus (a) type discourses [1]. This suggests that there is a strong preference to continue the discourse talking about what has been previously mentioned, and that people experience difficulty when a new discourse referent needs to be set up. In a subsequent study using Event-Related Potentials, a P600 component was found at words such as 'Three' for (b) versus (a) type discourses (at least, for a subset of the participants), suggesting that the difficulty experienced with a new discourse referent is of a formal structural kind (comparable to syntactic violations) rather than lexical-semantic in nature.

Experiment in Preparation: fMRI

Currently we are preparing an fMRI experiment to investigate which areas of the brain are involved in the set-up of new discourse referents and in detecting errors with discourse referents. Since previous neuropsychological research has implicated a right hemispheric dominance for discourse processing, we are particularly interested in differences between the hemispheres. The following type of sentences will be used, where the underscored words are the critical region:

- (a) Five ships were in the port. Three others had just left on their voyage. [2]
(b) Five ships were in the port. Three of them had just left on their voyage.
(c) Three ships were in the port. Five of them had just left on their voyage.
(d) Three ships were in the port. Five others had just left on their voyage.

Conditions (a) and (d) introduce a new set of ships. Condition (b) continues with a subset of the previously mentioned set. The comparison (a) and (d) versus (b) should yield information concerning which areas of the brain are (more) involved in the set-up of new discourse entities. Condition (c) is an anomalous condition, and compared to (b), will yield information concerning which areas of the brain will be sensitive to errors in discourse inferencing. This experiment will be carried out in spring 2005, using the future full-body scanner human 3T at the McKnight Institute. Materials are currently developed and pre-tested using behavioral tasks.

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References

- [1] Wijnen, F.N.K. and Kaan, E., Language and Cognitive Processes (in press).