FENS Forum 2010 - Amsterdam

- Posters: to be on display from 8:00 to 13:15 in the morning and from 13:30 to 18:45 in the afternoon. Poster sessions run from 09:30 to 13:15 in the morning and from 13:30 to 17:30 in the afternoon.
A one hour time block is dedicated to discussion with the authors (authors should be in attendance at their posters as from the time indicated.)
- For other sessions, time indicates the beginning and end of the sessions.

First author   Folia, Vasiliki (poster)

Poster board F18 - Wed 07/07/2010, 11:15 - Hall 1
Session 205 - Human cognition 5
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Title   Broca's region: Implicit sequence learning and natural syntax processing

Text   In an event-related fMRI study, we examined the overlap between the implicit processing of structured sequences, generated by a simple right-linear artificial unification grammar, with natural syntax related variability in the same subjects. Research investigating rule learning of potential linguistic relevance through artificial syntax often uses performance feedback and/or explicit instruction concerning the underlying rules. It is assumed that this approach ensures the right type of "rule-following"because the rules are either explicitly provided to the subjects or explicitly discovered by the subjects during trial-and-error learning with feedback.

In this work, we use a novel implicit preference classification task based on the structural mere exposure effect. Under conditions that in important respects are similar to those of natural language development (i. e., no explicit learning or teaching instruction, and no performance feedback), 32 subjects were exposed for 5 days to grammatical sequences during an immediate short-term memory task. On day 5, a preference classification test was administered, in which new sequences were presented. In addition, natural language data was acquired in the same subjects. Implicit preference classification was sensitive enough to show robust behavioral and fMRI effects. Preference classification of structured sequences activated Broca's region (BA 44/45) significantly, and was further activated by artificial syntactic violations. The effects related to artificial syntax in BA 44/45 were identical when we masked these with activity related to natural syntax processing. Moreover, the medial temporal lobe was deactivated during artificial syntax processing, consistent with the view that implicit processing does not rely on declarative memory mechanisms supported by the medial temporal lobe.

In summary, we show that implicit acquisition of structured sequence knowledge results in the engagement of Broca's region during structured sequence processing. We conclude that Broca's region is a generic on-line sequence processor integrating information, in an incremental and recursive manner, independent of whether the sequences processed are structured by a natural or an artificial syntax.

Theme   F - Cognition and behaviour
Human cognition and behaviour - Language