

## **Abstract**

Electrophysiological methods can be used to address the temporal aspects of auditory verbal comprehension. Lesion data have also contributed to understand language-related ERP components. In order to examine possible interactions between syntactic and semantic processing, event-related potentials (ERPs) were recorded during French sentence comprehension using a violation paradigm. The task consisted of judging the acceptability of correct and incorrect sentences. Incorrect sentences contained syntactic, semantic, or both kinds of violations. ERPs to correct sentences were compared with those containing violations. Participants were four healthy subjects and three patients suffering from aphasia. ERPs from healthy subjects showed the following. Syntactically anomalous sentences showed several phases of differential ERP responses [Early Anterior Negativity (~150ms), Reference Related Negativity (~300ms), and P600]. Semantic anomalies yielded only an N400 enhancement. Sentences with both violations resulted in the same ERP sequence as in the case of syntactic anomalies alone – there was no N400 modulation. That differential ERP effects were non-cumulative therefore supports the predominant role of syntactic processing in sentence processing. The absence of an additive effect in the time window 300-600 ms provides evidence that a syntactic violation can disturb some aspects of the semantic processing.

By contrast to these findings, patients with left frontal damage (including inferior and middle frontal gyri, and portions of the basal ganglia) showed intact N400 and P600 effects, but no LAN to grammatical anomalies. A patient with damage to left parietal and posterior temporal cortex demonstrated an intact LAN, but no measurable N400 or P600. This suggested that parieto-temporal regions are involved in the semantic processing measured by the N400 and that the left frontal cortex might support early syntactic processes, supporting independent syntactic and semantic processing.

These preliminary data confirm that timing of specific aspects of syntactic and semantic processing appears to be crucial for successful oral comprehension. Patients' explicit everyday oral comprehension skills may dissociate from those detected during on-line sentence processing. ERP correlates and their evolution over time in patients with different types of aphasia and different types of lesions will allow a better understanding of the underlying processing and the reorganization involved in recovery.