

Morpho-syntactic context effects in spoken language : An ERP study



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INTRODUCTION

It has been shown that a **sentential context** can help us to **predict upcoming words**. The **N400 amplitude** to a word is found to be **inversely proportional to the probability** that it was produced as a continuation in an offline sentence fragment completion task, suggesting that the **activation level of words** is in part determined by the context (Kutas and Hillyard, 1984; DeLong, Urbach, Kutas, 2005).

Although extensive work has been conducted on expectancies related to **semantic context**, much less is known about **morpho-syntactic expectancy**.

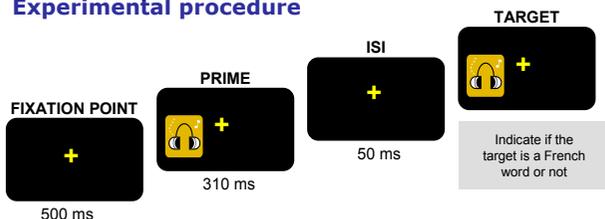
AIM : To test whether a subject pronoun can produce expectancies about the verbal inflection

METHOD

Auditory grammatical priming

		CONTEXT PRIME		
		Congruent	Neutral	Incongruent
TARGET	Words	Nous serrons	Zous serrons	Vous serrons
	Non-Words	Nous vasons	Zous vasons	Vous vasons

Experimental procedure

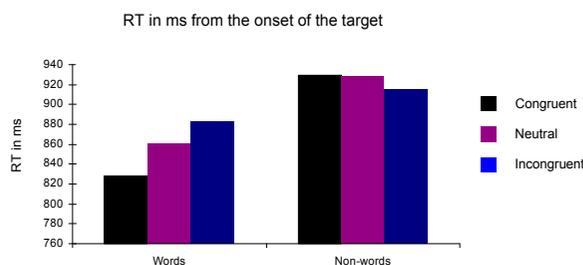


EEG Data analysis

- Scalp voltages were collected by a 256-channels Geodesics Sensor Net (0.1-200 Hz bandpass, 500Hz sampling)
- Two ERP measures :
 - Time-locked with the onset of primes
 - Time-locked with the onset of verbal inflection on the target

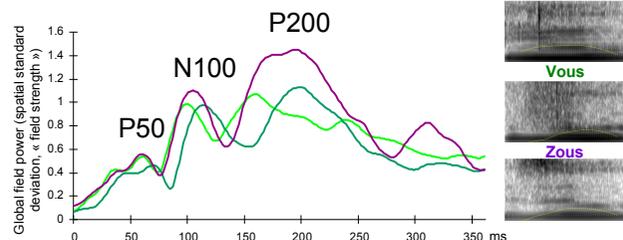
RESULTS

Behavioral results



EEG results

ERP from the onset of primes



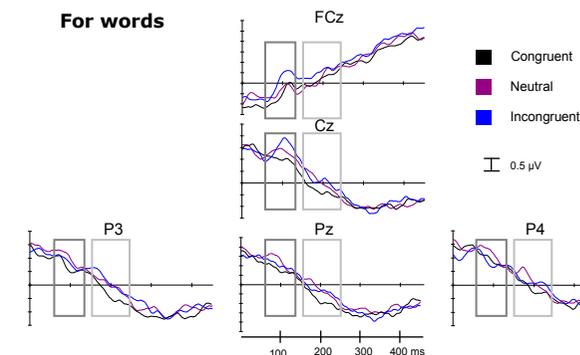
Three processing stages related to primes

- I- Later latencies of P50 and N100 and a weaker amplitude of P50 after « vous » as a function of differences in spectral information on primes (see spectrograms above)
 - ➔ SENSORY OR PHONOLOGICAL PROCESSING
- II- An earlier latency of P200 after « nous » and a greater amplitude of P200 on « zous »
 - ➔ LEXICAL PROCESSING
- III- A different topographic map elicited after the pronouns
 - ➔ EXPECTANCY OF VERBAL INFLECTION

RESULTS

ERP from the onset of verbal inflection

For words



70-140 ms : Incongruent context elicited more negative values than the other two contexts at frontocentral recording sites, and neutral context elicited more negative values than congruent context at centroparietal recording sites.

150-250 ms : Incongruent and neutral contexts elicited more negative values at centroparietal recording sites than congruent context.

For non-words

Neutral context elicited more negative values at right central recording sites than the two other contexts as early as 100 ms after the onset of verbal inflection.

CONCLUSIONS

- The early differences between the three contexts on word targets and the specific topographic map after the "zous" prime lead us to suggest that participants expected the **verbal inflection on the basis of the preceding pronoun**.
- However, the pattern of the late differences between the three contexts on word targets suggest **post-lexical checking** in addition to this expectancy of the verbal inflection.

References

Kutas, M. and Hillyard SA. (1984) Brain potentials during reading reflect word expectancy and semantic association. *Nature* **307**, 161-163.
DeLong, A.K., Urbach, T.P. & Kutas M. (2005) Probabilistic word pre-activation during language comprehension inferred from electrical brain activity. *Nature Neuroscience* **8**, 1117-1121.

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