

Title:

Integrating Semantic and Referential Information – Converging Evidence from Electrophysiological and Behavioral Methods

Submission type:

Either oral presentation or poster presentation

Abstract (442 words, including references):

The resolution of referential expressions in natural language utterances is a complex process that is still not fully understood. It requires an integration of informational constraints from different sources. We looked in particular at the integration of subcategorizational semantic information of predicates and more narrowly referential constraints on their pronoun arguments. In a combined EEG and behavioral study we tried to reveal the neural signatures of the integration process and their correspondence in overt behavioral responses.

Participants read short German three-sentence texts on a computer screen. The first two sentences described the overall scene and introduced two protagonists: an animate one in topic position and an inanimate one in focus position. The discourse-final target sentence started with an adjective, semantically subcategorized for either animate or inanimate arguments, followed by an auxiliary and a pronoun. The pronoun was either a personal pronoun or a demonstrative pronoun. Previous studies (Bosch, Katz, & Umbach, 2007) had experimentally demonstrated a strong referential preference of demonstrative pronouns for preceding focus referents, and a somewhat milder preference of personal pronouns for preceding topic referents. The target sentence would thus either exhibit an agreement or a conflict between the subcategorizational semantic and the referential preferences concerning the referent resolution for the pronoun. Participants rated the understandability of the target sentence on a continuous scale between '*difficult to understand*' and '*immediately understandable*'.

The analysis of the behavioral data showed significantly reduced ratings of understandability when semantic and referential information imposed conflicting constraints on the pronoun referent. In the same vein, following pronouns preferring semantically implausible antecedents, compared to congruent controls, we found a sustained negative voltage deflection at left fronto-temporal electrodes (Nref component) in the event-related potentials and enhanced theta (3-7 Hz) activity at central electrodes in a wavelet analysis on the induced oscillatory activity.

EEG and behavioral results both indicate an increased effort accompanying the resolution of pronouns with a semantic-referential conflict, yielding converging evidence for the online integration of two sources of linguistic information. In target sentences with a conflict between semantic and referential preferences the pronoun presumably gets linked to its non-preferred but semantically plausible antecedent, in order to yield a felicitous interpretation of the discourse. This would require extra processing, however, at the level of the mental discourse representation in working memory (Zwaan & Radvansky, 1998), reflected by enhanced theta activity.

References:

Bosch, P., Katz, G., & Umbach, C. (2007). The Non-subject Bias of German Demonstrative Pronouns. In: Schwarz-Friesel, M., Consten, M., & Knees, M., (Eds.), *Anaphors in Text: Cognitive, formal, and applied approaches to anaphoric reference* (145-164).

Zwaan, R. & Radvansky, G. A. (1998). Situation Models in Language Comprehension and Memory. *Psychological Bulletin*, 123 (2), 162-185.