

Influence of task type in novel metaphoric and anomalous utterance comprehension in Polish: An ERP study

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Research on figurative language comprehension using Event Related Potentials has shown that metaphoric expressions evoke larger N400 than literal expressions (Coulson and Van Petten, 2002), that in very early stages of processing novel metaphoric expressions seem to be perceived like anomalous utterances, and that anomalous sentences seem to evoke larger N400 than literal statements and novel metaphors (Tartter, V. et al. 2002). In the present study novel metaphors (*In May, the castle ruins exploded with flowers*); literal sentences (*He served breakfast on a tray with fresh flowers*); and senseless sentences (*They were eating the soup with big, metal flowers*) were presented to the participants, whose task was to decide whether the sentences were or were not meaningful.

The analysis of peak N400 amplitudes of correct responses at Cz revealed a significant effect of sentence type. Moreover, metaphoric utterances evoked significantly longer reaction times and a significantly larger N400 than literal utterances, which is in line with previous findings. However, the results of Tartter et al. (2002) were only partially corroborated, as anomalous sentences did not differ from literal sentences in terms of reaction times or in N400 amplitudes. Moreover, anomalous sentences evoked N400 amplitudes comparable to those evoked by novel metaphoric sentences. The authors of the experiment point to the nature of the task applied in the present study as the cause of this difference in results. Namely, in Tartter et al.'s experiment participants read the sentences, while in the present study they were asked to decide on their meaningfulness. It is important to mention that anomalous sentences used in the present experiment obtained the mean score of 4.7 on a 5 point meaningfulness scale, where 5 indicated *least meaningful*. This result was reflected in the analysis of behavioral data, as anomalous sentences evoked a significantly smaller number of errors than literal or metaphoric sentences and did not differ in terms of reaction times from literal sentences, which suggests that it was relatively easy for the participants to decide that the sentences were meaningless. Furthermore, it seems that what is visible in ERP results is the effort to integrate the final word into the preceding semantic context, so the metaphoric sentences which participants perceived as meaningful were the most difficult to process. While processing of anomalous sentences involved the recognition that the final word did not match the sentence context and could thus be rejected, processing of novel metaphoric sentences involved both the recognition that the final word was not an expected, but still a possible, match for the sentence context, as well as further processing of its meaning, which required additional cognitive effort.

Coulson, S., & Van Petten, C. (2002). Conceptual integration and metaphor: An eventrelated potential study. *Memory and Cognition*, 30(6), 958-968.

Tartter, V., Gomes, H., Dubrovsky, B., Molholm, S., Stewart, R. V. (2002). Novel metaphors appear anomalous at least momentarily: Evidence from N400. *Brain and Language*, 80, 488-509.