# Masked priming ERP supports the role of literal meaning in figurative language comprehension

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Metonymies and metaphors require the construction of meaning that goes beyond pure literal composition. However, there is a controversy over the role of literal meaning components. The indirect access account claims that literal aspects are processed first, and when no satisfactory interpretation is reached, additional meaning components are computed [1,2]. The direct access account claims that figurative aspects are accessed immediately [3]. Since the behavioral findings have been mixed, we used a combined masked priming and event-related potential (ERP) paradigm to get a finer resolution of the time-course of the comprehension of metonymies and metaphors. In particular, we wanted to tap early processing stages during which semantic activation occurs unconsciously, thereby eliminating potential influences from post-perceptual processes [cf. 4].

We compared metonymies (1a) and metaphors (2a) with their non-figurative counterparts (1b/2b). (1a) requires a transfer from the author (*Schiller*) to his work; (2a) involves a mapping, during which one or more properties of one conceptual domain (*hyaenas*) is conveyed to another (*lobbyists*). In the combined masked priming ERP paradigm, critical sentences were presented auditorily and a pattern masked prime was displayed visually 100ms before critical word onset for 67ms (see [4]). The prime (1c/2c) was semantically relevant for the literal meaning (selected in pretests). Participants performed two tasks, i) a color-change detection task occurring on the mask, to assure that they were focusing the visual display, and ii) a word recognition task at the end of each trial, probing participants' attention. Only trials with correct responses entered the analyses. As a between-subject factor, half of the participants heard the critical stimuli and were presented with a masked prime, the other half heard the critical stimuli without being presented with a prime. ERPs were time-locked to the recognition point of the critical word.

In the **unprimed conditions**, statistical analyses revealed a biphasic N400-LatePositivity pattern for metaphors and metonymies relative to their literal controls. This replicates previous findings from metaphor processing in English and Italian [5-7] and data from non-conventional metonymies in German [8]. It indicates that figurative meaning composition – across phenomena – proceeds in two phases, which we interpret to reflect demands from accessing an expression (N400) and carrying out pragmatic operations (Late Positivity).

Based on the N400-differences between figurative and literal conditions, we predicted the following masked priming effects. Direct access should be reflected by facilitation of literal conditions only, i.e. larger N400-differences in masked priming (relative to unprimed contrasts). The indirect access approach predicts facilitation of figurative and literal conditions (if literal aspects are always computed first), i.e. smaller N400-differences than in unprimed conditions. The **masked priming conditions** support the indirect access account or at least a 'lingering' account of literal meaning (smaller N400-differences). The Late Positivity emerged with a latency shift in the primed comparisons, probably due to interference from priming in earlier phases that hampers pragmatic operations. This serves as additional support for the influence of literal aspects. The combined methodology thus yields novel insights into the time-course and contribution of literal and figurative meaning aspects during online composition.

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| (1a/b) Metonymy: | *Der Student las / begegnete damals* **Schiller** *bei einer Versammlung.* ("The student, at that time, read / met **Schiller** during an assembly.") |
| (1c) (Literal) prime: | *talentiert* ("talented") |
| (2a/b) Metaphor: | *Diese Lobbyisten / Raubtiere sind* **Hyänen***, wenn man der Erzieherin glaubt.* ("These lobbyists / carnivores are **hyenas**, if you believe the kindergarten teacher.") |
| (2c) (Literal) prime: | *fellig* ("furry") |

**References**

[1] Grice, 1975. [2] Searle, 1979. [3] Gibbs & Gerrig, 1989. [4] Kiyonaga et al., 2007. [5] Coulson & van Petten, 2002. [6] de Grauwe et al., 2010. [7] Bambini, 2010. [8] Schumacher, 2011.