Neural substrates of novel meaning construction in bilingualism

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Previous psycholinguistic research has shown that figurative meaning comprehension is more cognitively taxing in the non-native (L2) relative to the native (L1) language (e.g., Mashal et al., 2015; Su et al., 2019; Citron et al., 2020). Yet, studies conducted thus far have mostly focused on the processing of conventional (familiar) nonliteral utterances, and therefore cognitive mechanisms involved in bilingual novel (unfamiliar) meaning construction remain under-investigated, while such investigation would crucial to cast more light on how bilinguals build new meanings. In the present event-related potential (ERP) study, novel meaning construction was examined using two types of highly creative utterances: novel nominal metaphors (A is B; e.g., *Love is a monastery*) and novel similes (A is like B; e.g., *Love is like a monastery*), so as to show whether similar mechanisms are engaged in creative meaning construction in both languages. To this end, highly proficient late unbalanced Polish (L1) – English (L2) bilinguals (N=29) performed a semantic decision task to L1 and L2 stimuli, in which they decided whether the presented novel nominal metaphors, novel similes, as well as literal and anomalous sentences were meaningful or meaningless. The stimuli were highly controlled for in terms of their meaningfulness, familiarity, and metaphoricity level (Jankowiak, 2020).

Electrophysiological results showed a language-specific effect within the N400 time frame (350–450 ms), where we found a graded effect across the utterance type in L1 (p = .004), with the most pronounced N400 amplitudes for anomalous utterances, followed by novel nominal metaphors, novel similes, and finally literal sentences. In L2, in contrast, both novel nominal metaphors and novel similes converged with anomalous sentences, and evoked more robust N400 amplitudes compared to literal sentences. Such results thus indicate that, at the stage of lexico-semantic access, comparison mechanisms initiated when processing similes facilitated novel metaphor processing, yet only in L1. Nonetheless, within the time window of the late positive complex (LPC; 600–800 ms), prolonged negativity was observed in response to novel nominal metaphors and anomalous utterances in both languages. Novel similes, on the other hand, converged with literal sentences, both of which elicited more positive LPC amplitudes. These patterns of results therefore point to the ongoing difficulty of meaning integration of novel nominal metaphors, yet not novel similes, irrespective of the language of operation.

Altogether, the observed findings might be interpreted in line with the Career of Metaphor Model (Bowdle & Gentner, 2005), showing that novel meaning construction might involve comparison mechanisms between metaphor source and target domains. Importantly, while such comparison processes seem to facilitate lexico-semantic access only in L1, the stage of meaning integration seems to be similarly modulated by a simile form in both the native and non-native language.

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