Contrasting ERP effects of temporal and modal adjectives within a phrasal context

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A central question in the neurobiology of language is how the human brain computes the meaning of complex expressions, such as phrases and sentences, from the meanings of constituent parts. Most models of language in the brain currently lack the theoretical distinctions required to address this problem correctly. One key distinction is that between intensional and denotational semantics, central in the philosophy of language, formal semantics, and computer science. We used EEG to study adjective-noun phrase composition, focusing on the on-line consequences of different intensional and denotational semantics of the modifying adjective. The modal and temporal meaning of the adjective was manipulated, and its contribution to the interpretation of the noun phrase, in sentences from four experimental conditions, presented to Bokmål Norwegian speakers: privative modal (e.g., ‘fake president’), privative temporal (e.g., ‘former president’), non-privative modal (e.g., ‘real president’), and non-privative temporal (e.g., ‘current president’). ERPs were time-locked to the visual onset of the nouns. The effects of intensionality (modal vs temporal adjective) were found in the N400 time interval, with a larger N400 component for nouns after modal adjectives. Instead, the effects of denotation (privative vs non-privative adjective) were found in a post-N400 frame, with a more negative deflection in the privative case. I will discuss some implications of these results for theories of compositional language processing in general and of processing temporal/modal aspects of meaning in particular.