Role of Working Memory in Language Activation during Visual Scene Processing

Sarah Chabal
Northwestern University, Evanston, Illinois, United States

Matias Fernandez-Duque
Northwestern University, Evanston, Illinois, United States

Sayuri Hayakawa
Northwestern University, Evanston, Illinois, United States

Viorica Marian
Northwestern University, Evanston, Illinois, United States

Abstract

The current study examined the role of working memory in language activation during visual processing. Twenty-six native English speakers searched for a visual target while completing a concurrent linguistic memory task, a concurrent spatial memory task, or in the absence of dual-task demands. Linguistic activation was measured by comparing visual fixations to phonologically-overlapping items and control items whose names did not overlap with the target. Participants experienced significant phonological competition across all conditions, but memory load impacted the timing of competitor co-activation (delayed and more sustained under spatial load), as well as the magnitude (attenuated under both spatial and linguistic loads) compared to the no-load condition. We conclude that linguistic representations are accessed during visual search even with concurrent cognitive loads, but that working memory influences the degree of language-based competition, possibly by modulating the activation and maintenance of linguistic and spatial information.