The architecture of the sign language lexicon: Evidence from ERP studies

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Most of what is known about the architecture of the mental lexicon comes from the study of spoken words or their written forms. Signs differ from spoken/written words in a number of ways that could impact lexical recognition and the architecture of the lexicon. For signs, the linguistic articulators are directly visible, their phonological structure is unique (more simultaneous, a larger phonotactic space), and many signs are iconic. Like written words, signs are perceived visually, but like spoken words, they are also dynamic and unfold over time. The visibility of the linguistic articulators has direct consequences for how single signs are recognized compared to auditory words presented in isolation (i.e., initial transitional movements of the tongue and vocal tract are not perceived). In this talk, I will present data from ERP and behavioral studies of American Sign Language (ASL) that reveal both similarities and differences in how signs and words are represented and accessed in the lexicon. First, evidence from an ERP repetition priming study reveals that signers are sensitive to linguistic information within the transitional movement to sign onset – information that is not present for isolated auditory words. Second, ERP results from a large study of deaf signers (n = 40) comprehending a large set of ASL signs (n = 400) revealed a) effects of frequency in an early and a late (N400) time window, possibly reflecting form vs. lexical-semantic frequency effects, b) effects of concreteness parallel to spoken language (greater negativities for more concrete signs), and c) no effects of iconicity on ERP components associated with lexical access. Third, evidence from a phonological priming ERP study revealed that handshape and location parameters play different roles in sign recognition. Specifically, both handshape- and location-related prime signs can pre-activate sublexical representations of handshapes and locations (facilitating processing of target signs), but at the lexical-level signs compete for selection via lateral inhibition, driven primarily by the location parameter. Finally, behavioral data from a large lexical decision study (n = 78) with a large stimulus set (n = 276 signs; 293 nonsigns) revealed a) an inhibitory effect of phonological neighborhood density for low frequency signs, parallel to the pattern found for spoken words and b) iconicity did not facilitate recognition. Together these data argue for a similar hierarchical organization of sublexical and lexical representations for spoken and signed languages, despite dramatic differences in phonological structure. In addition, the prevalence of iconic forms does not appear to alter the architecture of the sign lexicon (e.g., no direct connections between representations of form and meaning), but modality effects can be observed in the time course of (isolated) sign recognition and in how different phonological features (handshape, location) affect lexical processing.