Conflict monitoring in speech production

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Speakers can monitor their own speech for errors and other problems by listening to their own overt speech. However, there is considerable evidence that they can also inspect an internal, pre-articulatory representation of speech. Theories differ in their accounts of such internal monitoring. According to the perceptual loop theory (e.g., Levelt, 1989), internal monitoring involves the speech perception system: Speakers would "listen" to their internal speech similarly to how they listen to their external speech. A more recent account (Nozari, Dell, & Schwartz, 2011) argues for internal monitoring based on conflict between competing representations within the language production system itself. Nozari et al. showed in simulations with their two-step activation model of word production that correct productions (e.g., saying cat when cat is intended) are characterised by less conflict than in speech errors (e.g., saying dog, rat, or can when cat is intended); this was true with conflict measures based on the activation of all units (e.g., a function of the standard deviation of the activation of all nodes) or of only the two most active units (e.g., a function of the difference between these activations). Nozari et al.'s model, however, does not specify how conflict, once detected, is used. In this talk, we will first discuss the extent to which the literature supports a conflict-monitoring account vs. a perception-based account. Next, we will propose an extended version of Nozari et al.'s model that makes explicit assumptions about the processes subsequent to conflict detection. Taking our cue from the (behavioural and cognitive neuroscience) literature on conflict monitoring in action, we argue for a monitoring system that, upon detection of conflict, aselectively boosts the activation of all units. We argue that this boost would improve the signal-to-noise ratio and thereby serve three functions: (a) to steer the selection process into the right direction (i.e., to prevent errors); (b) when the system was unsuccessful in preventing errors to quickly and accurately repair errors; (c) to learn to avoid errors in the future. We present the first simulations with the new model and conclude with speculation on the neural underpinnings of the proposed system.