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Using Real-Time Computational Modeling to Individually Optimize Speech Category Learning

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Abstract: Acquiring novel speech categories is necessary in spoken language learning. The dual-learning systems (DLS) approach posits that two competitive systems underlie the category learning process: an explicit hypothesis-testing system, and an implicit procedural system. DLS assumes that the explicit system dominates early and control is passed to the implicit system when optimal. Evidence from our work, including the finding that minimally informative feedback enhances speech learning relative to fully informative feedback, supports the claim that the implicit system optimally mediates speech learning in adulthood. Experiment 1 replicates this finding. Experiment 2 tests the DLS prediction that explicit processing dominates early by comparing performance across two conditions. The optimal condition includes full feedback early and minimal feedback later. The suboptimal condition includes minimal feedback early and full feedback later. In both conditions, real-time computational modeling individualized when feedback transitions occurred. As predicted from DLS, learning was superior in the optimal condition.