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Reading as Acquisition of Orthographic Productivity

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Abstract

We propose a model that learns the orthographic rules of English. The central component of the model is the Tolerance Principle (Yang, 2016), a general principle of learning that specifies a precise threshold of supporting evidence sufficient for rule formation, one which has been extensively validated in language acquisition. Adapting to orthography, the model learns context-sensitive orthography-to-phonology mapping rules that are deemed productive by the Tolerance Principle and can thus be used to generate the pronunciation of novel words. When tested on a corpus of English words, the rules automatically induced by our model achieve considerably higher coverage than previous computational models of reading, including those that rely on handcrafted rules (Coltheart et al., 2001). The model also provides a simple and interpretable alternative to neural network methods for sequence learning. We suggest that our model constitutes a new foundation for the psychological and computational studies of reading.