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# Hierarchical Models of Individuals Engaged in Statistical Learning

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### Abstract

Our ability to learn statistically regular patterns present in our environment is central to many cognitive processes. There are many competing theories about what kind of mechanisms could explain this ability. While different theories make slightly different predictions about the kinds of patterns that can be learned, they often make very different predictions about the process of learning. One way to constrain the set of possible theories is to measure the shape of learning curves as people learn new patterns. To do this, we gathered response time data as people learned new patterns. We fit probabilistic models to individual-level data using a hierarchical Bayesian nonlinear regression. Our results suggest the learning curves at the level of individual items tend to have strong inflection points, which is inconsistent with cognitive models that are based purely on associative and error-driven learning.