

# Computational Foundations of Cultural Evolution: Modeling the Emergence of Systems from Higher-order Probabilistic Inference

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**Abstract:** Cumulative cultural evolution in humans is the process through which behaviours gain structure and complexity as they are transmitted from one generation of learners to the next. A central challenge in the cultural evolution literature is to understand how the unique computational principles of human cognition scaffold the emergence of complex behavioural systems. I explore how the human ability to make inferences at higher order levels of abstraction can lead to cultural complexity, in two ways: by allowing initially independent behaviours to gradually acquire group-like structure as new learners repeatedly impose an expectation for statistical dependence; and by allowing inferences in one domain to be rapidly transferred to new domains which share features at higher-order levels of abstraction. I model these processes in populations using a probabilistic cognitive model for the acquisition of vowel systems in human language.