

## Abstract

From finance to the stability of democracies, beliefs play a central role in our explanation of many phenomena. In the social sciences, these beliefs are often conceptualized as probabilistic assessments over states of the world. However, these beliefs are derived from systems of coherent beliefs that people hold in their minds, regarding how the world works. This view has been supported by recent work in cognitive science ?? **[something is missing to articulate the 2 sentences (before and after)]**. How do humans learn in simple and in complex systems? How efficiently do they explore the space of possible beliefs and how closely is the direction of exploration tied to experience?

Our work presents new experimental results on the rate at which people learn in more or less complex environments. We find that the rate of learning is much slower than it would be if learners were Bayesians, as had been proposed in older economic theories (??????).

Surprisingly, we found that the learning rate is identical when people build models about more or less complex systems, although accuracy is always higher when the system is structurally simpler because initial models are better. We then propose a theoretical framework to explain the consistently slow rates of learning. The problem seems to be linked to the well documented fact that humans are unable to generate truly random signals (?); they are pattern creators and pattern synthesizers. Our data suggests that we are justified in putting forth the following explanation: Once human reasoners have explored regions of the space that they seek to learn something about, they tend to return to patterns that they have already explored in the past and this becomes harder and harder as time goes on and as greater parts of the space have already been explored. Thus, learning becomes harder and slower over time.