



**University of
Zurich** ^{UZH}

Department of Economics – Neuroeconomics Seminar

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Compositionality and Culture

Compositionality and cumulative culture are two key aspects of human intelligence that have been separately referred to as being the "singular" factor that differentiates us from other animals and AI. While these two phenomena are usually studied in isolation, I will explore the role that compositional reasoning plays in allowing us to innovate in an additive and cumulative cultural fashion. I first present an experiment where participants navigate through compositionally generated mazes. Because the cognitive costs and mechanisms of compositionality are still poorly understood, we use time pressure to manipulate the availability of cognitive resources during hypothesis generation. While time pressure led to more random errors, it did not impair a preference for testing compositionally simpler hypotheses, suggesting it is more robust and cheap than previously expected. I then introduce the representational exchange framework for social learning, which provides theoretical guidance about how information is exchanged across minds and across different representational formats within one's mind. This framework makes important predictions about i) how we arbitrate between different social learning mechanisms to balance a cost-benefit tradeoff and ii) how directed cultural innovation is possible by inferring hidden causal structure from socially observations—even if the observed behavior was performed on the basis of habit (i.e., model-free) or conformity to social norms, absent any causal knowledge. I finish the talk by presenting ongoing experimental work testing how people arbitrate between different social learning mechanisms as a function of task complexity, and gesture towards future work studying the cumulative cultural transmission of compositional knowledge.