

## Theoretical perspective on the coevolution of teaching and learning strategies

Human survival and reproduction depend strongly on socially learnt information (*e.g.* locations of food sources, which food is safe to eat, how to build and use tools). Humans' traits increasing the accumulation of useful information (*e.g.* cognitive learning abilities, learning bias toward successful individuals) may thus enhance fitness and be promoted by natural selection. Several theoretical studies have focused on the evolution of learning strategies. However, these theoretical studies often assume a passive role of demonstrators during the transmission of social knowledge. Here, we investigate the evolution of within-family teaching. We develop a mathematical model to investigate the co-evolution of learning and teaching strategies. We show that natural selection can promote teaching because it increases the transmission of adaptive information to kin. We show that natural selection shapes trait associations within individuals characterised by lineages that (1) produce more new adaptive information, learn more within the family and teach more ("knowledge producer"), and others that (2) produce less new adaptive information, learn more outside the family and teach less ("knowledge scrounger").