

Investigating the effects of social information on individuals' ability at refining and understanding a physical system

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The tools essential for life in even the simplest foraging societies are very complicated artefacts with multiple interacting parts made of many different materials. A widely held view is that these tools evolve gradually through the aggregate efforts of generations of individuals. In theory, cultural evolution can give rise to these complex, highly efficient technologies even though individuals do not necessarily understand how they work. This prediction, however, has never been properly tested and it is not clear how the gradual improvement of tools affects individuals' understanding about how these tools work. Here we provide such a test by asking chains of participants to improve the configuration of a wheel going down on rails. The wheel was composed of 4 spokes and 4 weights that could be moved along these spokes. Two treatments were compared. In the first one, participants had 5 trials to improve their wheel before passing their last two configurations to the next participant in the chain. The second treatment was similar except that participants could also transmit their theory about what makes the wheel going fast to the next participant. At the end the experiment, participants' understanding was evaluated in isolation by presenting them with pairs of wheel and by asking them to predict which wheel would reach the bottom of the rails in the shortest amount of time. This experimental design allowed us to investigate the effects of various kinds of social information on individuals' ability at refining and understanding a physical system.