COPYING FROM OBSERVING A MODEL VS. LISTENING TO LINGUISTIC INSTRUCTIONS: COMPARING CHILDREN VS. ADULTS, AND CAUSALLY RELEVANT VS. IRRELEVANT ACTIONS

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Cultural transmission and evolution depend crucially on copying fidelity [1]. Humans tend to over-imitate: they not only copy causally-relevant actions, which contribute to achieving a goal, but also causally-irrelevant actions, which do not contribute [2-5]. We know that adding verbal input to observational, visual modelling improves copying fidelity for complex tasks [5]. However, we do not know how linguistic and visual input independently contribute to copying actions. By investigating this question, the present study suggests a possible functional factor posing selection for the evolution of language, as language would have been adaptive because it enhanced the fidelity of cultural transmission.

We investigate how transmission mode – observation (seeing someone perform an action) versus linguistic instructions (listening to how someone performed an action) – affect the probability that actions in a sequence will be copied. In addition, we compared 6 – 8-year-old children with adults, and we manipulated the actions' causal relevance.

We allocated 120 participants to 40 chains, half of children and half of adults, with 3 generations per chain. Each participant either watched silent video or listened to audio input about an action sequence leading to the extraction of a reward from a box [2]. Half of the actions were causally relevant, and half causally irrelevant. The input for each participant was the video footage or audio description of the actions in the previous participant in the chain (or the experimenter). A control group interacted with the box to determine which actions they performed spontaneously.

Apart from expected results that relevant actions are copied more than irrelevant actions, we found a significant 3-way interaction between transmission mode, relevance and age (figure 1): when it comes to causally irrelevant actions, adults overimitate in higher degrees in the Demonstration condition. However, contrary to our hypothesis, children overimitate in higher degrees in the Verbal condition. In addition, we found that both children and adults imitate more causally relevant actions in the Demonstration condition than in the Verbal condition.

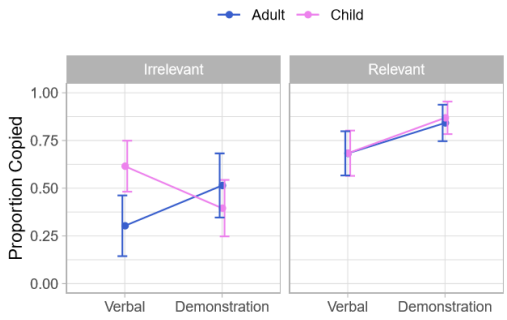

Figure 1: Here we present the 3-way interaction between transmission mode, age and relevance. Relevant actions are generally copied more in the Verbal condition, while overimitation is more common in the Demonstration condition for adults and in the Verbal condition for children..

Our results show that, amongst children, language leads to overimitation and, therefore, high fidelity transmission of behaviour. On the other hand, adults overimitate more when a model demonstrates the behaviours. We conclude that there is a point in developmental evolution of humans when language is the most efficient tool used to faithfully transmit information. After that point, however, humans learn better by observing others, i.e. in the absence of any linguistic input.

Apart from the above, we found that children mutate significantly more actions than adults do and, generally, more actions are mutated in the Demonstration condition than in the Verbal condition. Finally, there was a significant association between innovation and action relevance, with most innovations being causally relevant actions, and innovation and condition, with most innovations happening in the Verbal condition.

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