Young children have intuitions of great teachers

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Human are incredible learners, in part because they are also accomplished teachers. Even at a very early age, people are adept at instructing others. But while there has been a lot of research into how

people teach, there has been much less research on how they decide what to teach in the first place—a critical piece of the educational puzzle.

Now, new research from Stanford scientists reveals that even young children consider what their students will find most useful or rewarding when deciding what to teach. A team led by Hyowon Gweon, assistant professor of psychology, showed that 5- to 7-year-olds decide to teach things that will not only be rewarding but also challenging for their students to learn on their own, maximizing what the student gets out of the interaction.

"People have to be choosy about what they teach, because it is impossible to teach everything; our results suggest that even young children are able to reason about the expected reward and the cost of learning from the learner's perspective to determine what is best to teach," Gweon said. The study, published Oct. 14 in *Nature Human Behavior*, shows that even young children know what is useful to the learner.

To find out how children think about what to teach, the researchers had children explore two toys on their own before deciding which toy to teach someone else to use. The toys differed in how interesting they were to play, how hard they were to learn, or both.

Prior to the experiment, Gweon's team had worked out that toys consisting of an orb that emitted different light colors were generally more interesting to kids than toys that played music. They also knew that toys became harder to learn depending on the number of buttons and the combination involved in making the toy work. Using this information, the team developed a computational model that predicts what children might choose if they understood how to maximize the learner's benefit.

After having children explore the pair of toys, the experimenter told

children that a friend would need help learning to play with the toys later. The experimenter then asked children which toy they wanted to teach someone to use. Across six different conditions, the researchers found that children's decisions about which toy to teach minimized the difficulty of learning while maximizing the fun of the toy, consistent with the computational model.

"Children prioritized to teach both the harder toy and the cooler toy," said doctoral student Sophie Bridgers, lead author of the study. "This shows that children not only think about what is fun for others to learn, but also what is challenging." Julian Jara-Ettinger, assistant professor of psychology at Yale University, was also a co-author on the study.

Two of the older participants actually chose the opposite of what the researchers found more generally; they wanted the learner to explore the harder toy, rather than teaching the learner how to use it. When the experimenters asked them why they made this decision, the children said they wanted to give the learner the chance to figure out a challenging problem. In other words, they knew that discovering something costly could be rewarding, "which is an intuition that great teachers have, but exactly when we perceive the cost of learning as a negative or a positive is something we cannot fully explain yet," Gweon said.

The development of such intuitions very early on might explain why humans have always been incredible learners, able to adapt to their environment. "The content of what is helpful to teach others has changed over time, but the key factors that determine what is helpful are the same," Gweon said. "If I can only teach you one thing, I want it to be something useful; that is, something that brings you reward and saves you from trouble."

More information: Sophie Bridgers et al. Young children consider the expected utility of others' learning to decide what to teach, *Nature*

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