Babies can learn that hard work pays off

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A handoff: Either the infant hands the toy to the parent or throws the toy to the ground. Credit: Julia Anne Leonard

If at first you don't succeed, try, try again. A new study from MIT reveals that babies as young as 15 months can learn to follow this advice. The researchers found that babies who watched an adult struggle at two different tasks before succeeding tried harder at their own difficult task, compared to babies who saw an adult succeed effortlessly.

The study suggests that infants can learn the value of effort after seeing just a couple of examples of adults trying hard, although the researchers have not studied how long the effect lasts. Although the study took place in a laboratory setting, the findings may offer some guidance for parents

who hope to instill the value of effort in their children, the researchers say.

"There's some pressure on parents to make everything look easy and not get frustrated in front of their children," says Laura Schulz, a professor of cognitive science at MIT. "There's nothing you can learn from a laboratory study that directly applies to parenting, but this does at least suggest that it may not be a bad thing to show your children that you are working hard to achieve your goals."

Schulz is the senior author of the study, which appears in the Sept. 21 online edition of *Science*. Julia Leonard, an MIT graduate student, is the first author of the paper, and MIT undergraduate Yuna Lee is also an author.

Putting in the effort

Many recent studies have explored the value of hard work. Some have found that children's persistence, or "grit," can predict success above and beyond what IQ predicts. Other studies have found that children's beliefs regarding effort also matter: Those who think putting in effort leads to better outcomes do better in school than those who believe success depends on a fixed level of intelligence.

Leonard and Schulz were interested in studying how children might learn, at a very early age, how to decide when to try hard and when it's not worth the effort. Schulz' previous work has shown that babies can learn causal relationships from just a few examples.

"We were wondering if they can do similar fast learning from a little bit of data about when effort is really worth it," Leonard says.

To do that, they designed an experiment in which 15-month-old babies

first watched an adult perform two tasks: removing a toy frog from a container and removing a key chain from a carabiner. Half of the babies saw the adult quickly succeed at the task three times within 30 seconds, while the other half saw her struggle for 30 seconds before succeeding.

Infants trying to activate the toy. Credit: Julia Anne Leonard

The experimenter then showed the baby a musical toy. This toy had a button that looked like it should turn the toy on but actually did not work; there was also a concealed, functional button on the bottom. Out of the baby's sight, the researcher turned the toy on, to demonstrate that it played music, then turned it off and gave it to the baby.

Each baby was given two minutes to play with the toy, and the researchers recorded how many times the babies tried to press the button that seemed like it should turn the toy on. They found that babies who had seen the experimenter struggle before succeeding pressed the button nearly twice as many times overall as those who saw the adult easily succeed. They also pressed it nearly twice as many times before first asking for help or tossing the toy.

"There wasn't any difference in how long they played with the toy or in how many times they tossed it to their parent," Leonard says. "The real difference was in the number of times they pressed the button before they asked for help and in total."

The researchers also found that direct interactions with the babies made a difference. When the experimenter said the infants' names, made eye contact with them, and talked directly to them, the babies tried harder than when the experimenter did not directly engage with the babies.

"What we found, consistent with many other studies, is that using those pedagogical cues is an amplifier. The effect doesn't vanish, but it becomes much weaker without those cues," Schulz says.

A limited resource

A key takeaway from the study is that people appear to be able to learn, from an early age, how to make decisions regarding effort allocation, the researchers say.

"We're a somewhat puritanical culture, especially here in Boston. We value effort and hard work," Schulz says. "But really the point of the study is you don't actually want to put in a lot of effort across the board. Effort is a limited resource. Where do you deploy it, and where do you not?"

The researchers hope to investigate how long this effect might last after the initial experiment. Another possible avenue of research is whether the effect would be as strong with different kinds of tasks—for example, if it was less clear to the babies what the adult was trying to achieve, or if the babies were given toys that were meant for older children.

More information: J.A. Leonard el al., "Infants make more attempts

to achieve a goal when they see adults persist," *Science* (2017). science.sciencemag.org/cgi/doi … 1126/science.aan2317

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