Children Learn by Monkey See, Monkey Do. Chimps Don't.

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Published: December 13, 2005

I drove into New Haven on a recent morning with a burning question on my mind. How did my daughter do against the chimpanzees?

A month before, I had found a letter in the cubby of my daughter Charlotte at her preschool. It was from a graduate student at Yale asking for volunteers for a psychological study. The student, Derek Lyons, wanted to observe how 3- and 4-year-olds learn. I was curious, so I got in touch. Mr. Lyons explained how his study might shed light on human evolution.

His study would build on a paper published in the July issue of the journal Animal Cognition by Victoria Horner and Andrew Whiten, two psychologists at the University of St. Andrews in Scotland. Dr. Horner and Dr. Whiten described the way they showed young chimps how to retrieve food from a box.

The box was painted black and had a door on one side and a bolt running across the top. The food was hidden in a tube behind the door. When they showed the chimpanzees how to retrieve the food, the researchers
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retrieve candy inside after seeing a human do so. But seeing the same prize inside a clear box, top, Umugezi figured out the fastest way to the candy.

added some unnecessary steps. Before they opened the door, they pulled back the bolt and tapped the top of the box with a stick. Only after they had pushed the bolt back in place did they finally open the door and fish out the food.

Because the chimps could not see inside, they could not tell that the extra steps were unnecessary. As a result, when the chimps were given the box, two-thirds faithfully imitated the scientists to retrieve the food.

The team then used a box with transparent walls and found a strikingly different result. Those chimps could see that the scientists were wasting their time sliding the bolt and tapping the top. None followed suit. They all went straight for the door.

The researchers turned to humans. They showed the transparent box to 16 children from a Scottish nursery school. After putting a sticker in the box, they showed the children how to retrieve it. They included the unnecessary bolt pulling and box tapping.

The scientists placed the sticker back in the box and left the room, telling the children that they could do whatever they thought necessary to retrieve it.

The children could see just as easily as the chimps that it was pointless to slide open the bolt or tap on top of the box. Yet 80 percent did so anyway. "It seemed so spectacular to me," Mr. Lyons said. "It suggested something remarkable was going on."

It was possible, however, that the results might come from a simple desire in the children just to play along. To see how deep this urge to overimitate went, Mr. Lyons came up with new experiments with the transparent box. He worked with a summer intern, Andrew Young, a senior at Carnegie Mellon, to build other puzzles using Tupperware, wire baskets and bits of wood. And Mr. Lyons planned out a much larger study, with 100 children.

I was intrigued. I signed up Charlotte, and she participated in the study twice, first at the school and later at Mr. Lyons's lab.

Charlotte didn't feel like talking about either experience.
beyond saying they were fun. As usual, she was more interested in talking about atoms and princesses.

Mr. Lyons was more eager to talk. He invited me to go over Charlotte's performance at the Yale Cognition and Development Lab, led by Mr. Lyons's adviser, Frank C. Keil.

Driving into New Haven for our meeting, I felt as if Charlotte had just taken some kind of interspecies SAT. It was silly, but I hoped that Charlotte would show the chimps that she could see cause and effect as well as they could. Score one for Homo sapiens.

At first, she did. Mr. Lyons loaded a movie on his computer in which Charlotte eagerly listened to him talk about the transparent plastic box.

He set it in front of her and asked her to retrieve the plastic turtle that he had just put inside. Rather than politely opening the front door, Charlotte grabbed the entire front side, ripped it open at its Velcro tabs and snatched the turtle. "I've got it!" she shouted.

A chimp couldn't have done better, I thought.

But at their second meeting, things changed. This time, Mr. Lyons had an undergraduate, Jennifer Barnes, show Charlotte how to open the box. Before she opened the front door, Ms. Barnes slid the bolt back across the top of the box and tapped on it needlessly. Charlotte imitated every irrelevant step. The box ripping had disappeared. I could almost hear the chimps hooting.

Ms. Barnes showed Charlotte four other puzzles, and time after time she overimitated. When the movies were over, I wasn't sure what to say. "So how did she do?" I asked awkwardly.

"She's pretty age-typical," Mr. Lyons said. Having watched 100 children, he agrees with Dr. Horner and Dr. Whiten that children really do overimitate. He has found that it is very hard to get children not to.

If they rush through opening a puzzle, they don't skip the extra steps. They just do them all faster. What makes the results even more intriguing is that the children understand the laws of physics well enough to solve the puzzles on their own. Charlotte's box ripping is proof of that.

Mr. Lyons sees his results as evidence that humans are
hard-wired to learn by imitation, even when that is clearly not the best way to learn. If he is right, this represents a big evolutionary change from our ape ancestors. Other primates are bad at imitation. When they watch another primate doing something, they seem to focus on what its goals are and ignore its actions.

As human ancestors began to make complicated tools, figuring out goals might not have been good enough anymore. Hominids needed a way to register automatically what other hominids did, even if they didn't understand the intentions behind them. They needed to imitate.

Not long ago, many psychologists thought that imitation was a simple, primitive action compared with figuring out the intentions of others. But that is changing. "Maybe imitation is a lot more sophisticated than people thought," Mr. Lyons said.

We don't appreciate just how automatically we rely on imitation, because usually it serves us so well. "It is so adaptive that it almost never sticks out this way," he added. "You have to create very artificial circumstances to see it."

In a few years, I plan to explain this experience to Charlotte. I want her to know what I now know. That it's O.K. to lose to the chimps. In fact, it may be what makes us uniquely human.
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