Scientists show that children think like scientists

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Even preschoolers approach the world much like scientists: They are convinced that perplexing and unpredictable events can be explained, according to an MIT brain researcher's study in the April issue of *Child Development*.

The way kids play and explore suggests that children believe cause-and-effect relationships in the world are governed by fundamental laws rather than by mysterious forces, said Laura E. Schulz, assistant professor of cognitive science and co-author of the study "God Does Not Play Dice: Causal Determinism and Preschoolers' Causal Inferences."

"It's important to understand that kids are approaching the world with deep assumptions that affect their actions and their explanations and shape what they're able to learn next," Schulz said. "Kids' fundamental beliefs affect their learning. Their theoretical framework affects their understanding of evidence, just as it does for scientists."

While previous research had suggested that children do not accept the idea that physical events occur spontaneously, Schulz took that concept one step farther: Would young children accept the idea that physical causes might only work some of the time?

Schulz and colleague Jessica Sommerville of the University of Washington tested 144 preschoolers to look at whether children believe that causes always produce effects. If a child believes causes produce effects deterministically, then whenever causes appear to work only

some of the time, children should think some necessary cause is missing or an inhibitory cause is present.

In one study, the experimenters showed children that a switch made a toy with a metal ring light up. Half the children saw the switch work all the time; half saw that the switch only lit the ring toy some of the time. The experimenters also showed the children that removing the ring stopped the toy from lighting up. The experimenters kept the switch, gave the toy to the children and asked the children to stop the toy from lighting up.

If the switch always worked, children removed the ring. If the switch only worked some of the time, children could have removed the ring but they didn't--they assumed that the experimenter had some additional sneaky way of stopping the effect. Children did something completely new: they picked up an object that had been hidden in the experimenter's hand (a squeezable keychain flashlight) and used that to try to stop the toy. That is, the children didn't just accept that the switch might work only some of the time. They looked for an explanation.

Schulz said she believes this is the first study that looks at how probabilistic evidence affects children's reasoning about unobserved causes. The researchers found that children are conservative about unobserved causes (they don't always think mysterious things are happening) but would rather accept unobserved causes than accept that things happen at random.

"We sometimes think that preschoolers are very concrete and work just with what they see," said Schulz, but this research suggests that preschoolers actually have quite abstract beliefs about causal relationships. "Four-year-olds have more sophisticated reasoning than adults tend to give them credit for," she said.

Source: MIT