Babies brainier than many imagine

May 6 2009

A new study from Northwestern University shows what many mothers already know: their babies are a lot smarter than others may realize.

Though only five months old, the study's cuties indicated through their curious stares that they could differentiate water in a glass from solid blue material that looked very much like water in a similar glass.

The finding that infants can distinguish between solids and liquids at such an early age builds upon a growing body of research that strongly suggests that babies are not blank slates who primarily depend on others for acquiring knowledge. That's a common assumption of researchers in the not too distant past.

"Rather, our research shows that babies are amazing little experimenters with innate knowledge," Susan Hespos said. "They're collecting data all the time."

Hespos, an assistant professor of psychology at Northwestern, is lead author of the study, which will appear in the May 2009 issue of *Psychological Science,* a journal of the Association for Psychological Science.

In a test with one group of infants in the study, a researcher tilted a glass filled with blue water back and forth to emphasize the physical characteristics of the substance inside. Another group of babies looked at a glass filled with a blue solid resembling water, which also was moved back and forth to demonstrate its physical properties.

Next all the infants were presented with test trials that alternated between the liquid or solid being transferred between two glasses.

According to the well-established looking-time test, babies, like adults, look significantly longer at something that is new, unexpected or unpredictable.

The infants who in their first trials observed the blue water in the glass looked significantly longer at the blue solid, compared to the liquid test trials. The longer stares indicated the babies were having an "Aha!" moment, noticing the solid substance's difference from the liquid. The infants who in their first trials observed the blue solid in the glass showed the opposite pattern. They looked longer at the liquid, compared to the solid test trials.

"As capricious as it may sound, how long a baby looks at something is a strong indicator of what they know," Hespos said. "They are looking longer because they detect a change and want to know what is going on."

The five-month-old infants were able to discriminate a solid from a similar-looking liquid based on movement cues, or on how the substances poured or tumbled out of upended glasses.

In a second experiment, the babies also first saw either liquid or a similar-looking solid in a glass that was tipped back and forth. This time, both groups of infants next witnessed test trials in which a cylindrical pipe was lowered into either the liquid-filled glass or the solid-containing glass.

The outcomes were similar to those of the previous experiment. Infants who first observed the glass with the liquid looked longer in the subsequent test when the pipe was lowered onto the solid. Likewise, the infants who looked at the solid in their first trials stared longer when

later the pipe was lowered into the liquid.

The motion cues led to distinct expectations about whether an object would pass through or remain on top of the liquid or solid, the Northwestern researchers noted.

"Together these experiments provide the earliest evidence that infants have expectations about the physical properties of liquids," the researchers concluded in the Psychological Science study.

Hespos primarily is interested in how the brain works, and, to that end, her research on babies' brand new, relatively uncomplicated brains provides invaluable insights. She also is doing optical imaging of babies' brains, in which the biological measures confirm behavioral findings.

"Our research on babies strongly suggests that right from the beginning babies are active learners," Hespos said. "It shows that we perceive the world in pretty much the same way from infancy throughout life, making fine adjustments along the way."

More information: Psychological Science, "Five-Month-Old Infants Have Different Expectations for Solids and Liquids"

Source: Northwestern University (news : web)