

Psychologists report that a gender gap in spatial skills starts in infancy

December 9 2008



Infant in the UCLA Baby Lab

(PhysOrg.com) -- Men tend to perform better than women at tasks that require rotating an object mentally, studies have indicated. Now, developmental psychologists at Pitzer College and UCLA have discovered that this type of spatial skill is present in infancy and can be found in boys as young as 5 months old.

While women tend to be stronger verbally than men, many studies have shown that adult men have an advantage in the ability to imagine complex objects visually and to mentally rotate them. Does this advantage go back to infancy?

"We found the answer is yes," said Scott P. Johnson, a UCLA professor

of psychology and an expert in infant perception, brain development, cognition and learning. "Infants as young as 5 months can perform the skill, but only boys — at least in our study."

"We've known for approximately 30 years that men and women can see an object from one perspective and then recognize that object after it has been rotated in space into a new position," said David S. Moore, professor of psychology at Pitzer College and Claremont Graduate University, both in Claremont, Calif., and an expert in the development of perception and cognition in infants. "In addition, while we have known that all people can do this, it turns out that men are quite a bit faster at it than women are. Previous studies have shown that this sex difference can be detected in children as young as 4 years of age, but our study is the first to have successfully found a way to assess the situation in young infants.

"Although we did not expect to find any sex differences in babies this young, our results suggest that the 5-month-old boys in our study used mental rotation to complete our task while the 5-month-old girls in our study did not," Moore said.

However, with most psychological characteristics, Johnson and Moore note, there are no differences between groups of men and groups of women.

Mental rotation involves taking a mental representation of a three-dimensional object and imagining it in a different orientation — basically rotating the object in your mind.

Moore and Johnson will report their findings in the Dec. 12 issue of the journal *Psychological Science*.

The psychologists tested 20 boys and 20 girls in the study, each 5 months

old.

They used a common method in infant perception research: They had the infants look at something repeatedly until their amount of looking waned to less than half its original level. The researchers showed them a computer-generated image of a 3-D object that resembled an "L," constructed of multicolored cubes. Once the infants were bored with the object, the researchers showed them the same object from a different vantage point, and then the mirror image of the object.

"We're requiring the infants to rotate mentally in three dimensions," Johnson noted.

The 5-month-old boys looked at the mirror image about 1.5 seconds longer than they looked at the more familiar image, a "statistically robust difference" (although girls looked at both images longer than boys did), Moore and Johnson report. The 5-month-old girls looked at the mirror image for slightly less time than they looked at the familiar image.

The boys looked longer at the mirror image, the researchers said, because they recognized that the mirror image was completely new and that the other object was simply the original L-shaped image they had become bored with, shown from a different vantage point — a task that required them to rotate the remembered original object mentally.

"We don't know why men are better than women at this task or why boys are better than girls at this, but we do now know that this difference extends all the way back to 5 months of age," Johnson said. "We have shown that this gender difference is present in a pre-verbal population, a population too young to have learned it from manual experience with objects or from extensive learning processes, although learning certainly could be involved."

"We are interested in this question because the visual-spatial skills of male and female adults, on average, are different, and as developmentalists, we are interested in exploring the origins of these differences," Moore said. "While we believe we have found a phenomenon worthy of additional study, good science entails a circumspect approach to our conclusions; it would not be prudent to draw particularly strong or wide-ranging conclusions from the results of this single study."

Provided by University of California - Los Angeles

Citation: Psychologists report that a gender gap in spatial skills starts in infancy (2008, December 9) retrieved 23 April 2024 from <https://medicalxpress.com/news/2008-12-psychologists-gender-gap-spatial-skills.html>

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