

# Babies can think before they can speak

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Credit: Anna Langova/public domain

Two pennies can be considered the same—both are pennies, just as two elephants can be considered the same, as both are elephants. Despite the vast difference between pennies and elephants, we easily notice the common relation of sameness that holds for both pairs.

Analogical ability—the ability to see common relations between objects, events or ideas—is a key skill that underlies human intelligence and differentiates humans from other apes.

While there is considerable evidence that preschoolers can learn abstract relations, it remains an open question whether [infants](#) can as well. In a new Northwestern University study, researchers found that infants are capable of [learning](#) the abstract relations of same and different after only a few examples.

"This suggests that a skill key to [human intelligence](#) is present very early in human development, and that language skills are not necessary for learning abstract relations," said lead author Alissa Ferry, who conducted the research at Northwestern.

To trace the origins of relational thinking in infants, the researchers tested whether 7-month-old infants could understand the simplest and most basic abstract relation—that of sameness and difference between two things. Infants were shown pairs of items that were either the same—two Elmo dolls—or different—an Elmo doll and a toy camel—until their looking time declined.

In the test phase, the infants looked longer at pairs showing the novel relation, even when the test pairs were composed of new objects. That is, infants who had learned the same relation looked longer at test pairs showing the different relation during test, and vice versa. This suggests that the infants had encoded the abstract relation and detected when the relation changed.

"We found that infants are capable of learning these relations," said Ferry, now doing post-doctoral research at the International School for Advanced Studies in Italy. "Additionally, infants exhibit the same patterns of learning as older children and adults—relational learning benefits from seeing multiple examples of the relation and is impeded when attention is drawn to the individual objects composing the relation."

Susan Hespos, a co-author of the study, and associate professor of psychology at Northwestern's Weinberg College of Arts and Sciences said, "We show that infants can form abstract relations before they learn the words that describe relations, meaning that relational learning in humans does not require language and is a fundamental human skill of its own."

Dedre Gentner, a co-author of the study and professor of psychology at Weinberg, said, "The infants in our study were able to form an abstract same or different relation after seeing only 6-9 examples. It appears that relational learning is something that humans, even very young humans, are much better at than other primates."

For example, she noted that in a recent study using baboons, those animals that succeeded in matching same and different relations required over 15,000 trials.

"Prelinguistic Relational Concepts: Investigating Analogical Processing in Infants" published online in the journal *Child Development*.

Provided by Northwestern University

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