

# How one-year-olds can recognize beliefs of others

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The question as to when children become able to attribute mental states such as beliefs and desires to others is answered differently by different tests. A new model by Bochum's philosophers now integrates seemingly contradictory empirical findings.

Prof. Dr. Albert Newen and Dr. Leon de Bruin from the Institute of [Philosophy II](#) at the Ruhr-Universität explain their [theory](#) in the journal *Cognition*. In the first year of life, [children](#) already have a basic "theory of mind", that is, they are capable of distinguishing their own beliefs from those of others. At the age of four, this capacity is fully developed. According to the Bochum model, this development is guided by two interacting systems.

## Contradictory results: "false belief" test with and without language

The test: Sally puts her ball into a basket and goes for a walk. Now Anne appears, takes the ball from the basket, and places it in a box. Then Sally comes back. Where will she look for the ball - in the box or in the basket? The results of the "false belief" test have so far shown that four-year-old children are able to put themselves into Sally's shoes and give the correct answer: "in the basket". Younger children, by contrast, simply attribute their own belief to Sally and answer incorrectly: "in the box". However, non-verbal versions of the false belief test indicate that they expect Sally to look for the ball in the basket. For example, seven to

twelve month-old infants look reliably longer when Sally looks in the box instead of the basket.

## **Bochum dual-system theory**

Newen and de Bruin postulate two "theory of mind" systems. Newen explains: "We assume that infants initially establish an association between Sally, the object, and the location of the object, which is based on the observation of Sally's activity". According to the model, this is enabled by the association module. An operating system then allows the infant to update this association in the light of new information. When Sally returns, the operating system inhibits the infant's own belief that the ball is in the box, and selects another belief that is based on her former perception of Sally putting the ball in the basket. As a result, she expects that Sally will look for the ball in the basket.

## **Interacting Systems**

According to the Newen and de Bruin's dual-system theory, the association module and the operating system interact from the beginning of life. This allows young children to form increasingly complex associations by observing the actions of others. The theory distinguishes three kinds of associations. Young infants initially develop action-based associations; they understand others in terms of their movements towards objects. Afterwards, perception-based associations emerge: Children become capable of understanding another agent on the basis of his or her visual perspective. Finally, they learn to understand others in terms of symbol-based associations. Children are only capable of passing verbal versions of the false belief test when they have mastered this last stage. Before this point, however, they may already succeed on non-verbal versions of this test, as these only require simpler association formats. "We developed the details of this theory while keeping a close eye on

recent empirical findings", said Newen. "We have also advanced the philosophical discussion by presenting a fundamental theory about a basic capacity - namely, the understanding of other people."

**More information:** L.C. de Bruin, A. Newen (2012): An association account of false belief understanding, *Cognition*, [doi: 10.1016/j.cognition.2011.12.016](https://doi.org/10.1016/j.cognition.2011.12.016)

Provided by Ruhr-University Bochum

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