

TO APPEAR IN: N. J. SALKIND (ED.) *THE ENCYCLOPEDIA OF HUMAN DEVELOPMENT*.

Laurie R. Santos
Department of Psychology
Yale University
Box 208205
New Haven, CT 06520
USA
laurie.santos@yale.edu
Phone: 203-432-4524
Fax: 203-432-7172

THEORY OF MIND
Word count: 887

Like all social animals, human children develop in a complicated social world, filled with numerous events involving the actions of other social agents. The ability to reason about the behaviors of these social agents is one of the most essential tasks in all of human cognition. For this reason, the question of how children come to reason about their social world has been a hot topic in the field of developmental psychology for some time. Much of this developmental work surrounds the question of how and when children develop a *theory of mind*. A theory of mind (ToM) can be defined as the capacity to represent the mental states— the beliefs, thoughts, perceptions, desires, and intentions— of oneself and others. The term “theory of mind” was originally coined by Premack and Woodruff in the 1970’s, who examined whether a chimpanzee was able to reason about the intentions of others. Their original study of ToM in chimpanzees sparked a flurry of interest in the development of these capacities in humans.

Beginning in the 1980’s, developmental psychologists devoted considerable empirical effort to the question of how and when children develop an understanding of one aspect of the mind of others: the ability to represent *beliefs*. This work led to the now classic test of belief understanding known as the “false belief task”. In this type of task, children are asked to predict what another individual believes about an event in situations where that individual’s belief differs from their own. In one version, children are asked what they think is inside a box of Smarties candy. Most participants answer that they think Smarties candy is inside the Smarties box. The experimenter then reveals that the participant is wrong; something unexpected (e.g., pencils) is actually inside the box. The experimenter then asks children what another person who has not looked inside the box will think is inside. Children four years of age and older correctly respond that another person will have a false belief about the contents of the box; a person who has not yet looked in the box will mistakenly think that there are Smarties inside. Children younger than four years of age, however, answer that another person

will think that pencils are inside the box; they incorrectly reason that other people will have the same belief about the contents of the box as they do.

These data and others suggest that children undergo a developmental shift in their ability to represent the false beliefs of others sometime between three and four years of age. The exact nature of this developmental change, however, is still the subject of much debate in the field of cognitive development. Some researchers have argued that children learn to represent the beliefs of others through the development of simulation mechanisms, techniques for imagining the mental states of others (a hypothesis sometimes referred to as the “simulation theory”). Others, like Alison Gopnik and her colleagues, have advanced the view that children’s developing knowledge of beliefs emerges through a process of conceptual change, much like process of theory change in science (i.e., the “theory theory”). Still others champion the view that children’s developmental shift in representing beliefs results from the emergence of innate structures for reasoning about the minds of others.

More recent work on the development of ToM abilities has focused on the question of when children come to understand mental states other than beliefs. This newer work suggests that children successfully represent mental states such as *desires* and *intentions* long before they pass false belief tests; even infants seem to think of the actions of others in terms of goals and intentions. Before the second year of life, infants expect human hands and other agents to move in goal-directed ways and correctly reason about the intention behind an unsuccessful action— when shown an action that an adult attempts but fails, such as trying to hang a loop on a metal prong, infants typically imitate the intended action, even though they have never directly witnessed this action. Infants also use their expectation that humans act in goal-directed ways when acquiring other knowledge, such as the meaning of words. Similarly, infants recognize that adults have *perceptions*, and pay specific attention to where other individuals are looking when reasoning about action. Fourteen-month-olds, for example, expect human adults to act on objects at which that they are looking. Dare Baldwin and her colleagues have shown that infants of this age also use information about where human experimenters are looking when inferring the referent of a new word and the meaning of a negative emotional expression

Although most work in theory of mind has focused on human children, comparative psychologists have also investigated whether non-human animals— particularly primates— share out mind-reading capacities. Much of the classic work on this subject has suggested that non-human primates know little about the mental states of others. Chimpanzees, for example, typically fail to take into account what human experimenters see and know when choosing whom to ask for food. More recent evidence from Michael Tomasello and his colleagues using different paradigms has indicated that chimpanzees may know about what other individuals see and know in the context of competition. Like work on the development of ToM, these new primate studies continue to be the subject of much controversy and debate in the field.

References

- Bloom, P. (2004). *Descartes' Baby: How The Science of Child Development Explains What Makes Us Human*. New York: Basic Books.
- Gopnik, A. & Meltzoff, A. N. (1997). *Words, Thoughts, and Theories*. Cambridge: MIT Press.
- Perner, J., Leekam, S., & Wimmer, H. (1987). Three-year-olds' difficulty with false belief: The case for conceptual deficit. *British Journal of Developmental Psychology*, 5, 125-137.
- Premack, D. & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences*, 4, 515-526.
- Saxe, R., Carey, S., & Kanwisher, N. (2004). Understanding other minds: Linking developmental psychology and functional imaging. *Annual Review of Psychology*, 55, 87-124.
- Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development*, 72, 655-684.
- Michael Tomasello's work on primate theory of mind:
<http://email.eva.mpg.de/~tomas/public.html#No3>
- Josef Perner's work on children's developing false belief understanding:
<http://www.sbg.ac.at/psy/people/perner/recent.htm>