

# How to construct a Minimal Theory of Mind

s.butterfill@warwick.ac.uk



A black and white photograph of two young children, a boy and a girl, standing close together against a dark background. The boy, on the left, has light-colored hair and is wearing a patterned long-sleeved shirt under dark overalls. He is smiling and looking towards the camera. The girl, on the right, also has light-colored hair and is wearing a dark top with small patterns. She is also smiling and looking towards the camera. They appear to be in a playful or happy mood.

# challenge

Explain the emergence, in evolution or development, of full-blown theory of mind cognition.

A black and white photograph of two young children, a boy and a girl, standing close together and smiling. The boy is on the left, wearing overalls, and the girl is on the right, wearing a patterned dress. They appear to be in a joyful mood.

# challenge

Explain the emergence, in evolution or development, of full-blown theory of mind cognition.

# conjecture

We need to understand how theory of mind cognition could come in degrees.

“chimpanzees understand ... intentions ... perception and knowledge ... Moreover, they understand how these psychological states work together to produce intentional action”

(Call & Tomasello 2008:191)



“chimpanzees understand ... intentions ... perception and knowledge ... Moreover, they understand how these psychological states work together to produce intentional action”

(Call & Tomasello 2008:191)



“chimpanzees probably do not understand others in terms of a fully human-like belief–desire psychology”

(Call and Tomasello 2008)

A black and white photograph of two young children, a boy and a girl, standing close together and smiling. The boy is on the left, wearing overalls, and the girl is on the right, wearing a patterned dress. They appear to be in a joyful mood.

# challenge

Explain the emergence, in evolution or development, of full-blown theory of mind cognition.

# conjecture

We need to understand how theory of mind cognition could come in degrees.

A black and white photograph of two young children, a boy and a girl, standing close together and smiling. The boy is on the left, wearing overalls, and the girl is on the right, wearing a patterned dress. They appear to be in a joyful mood.

# challenge

Explain the emergence, in evolution or development, of full-blown theory of mind cognition.

# conjecture

We need to understand how theory of mind cognition could come in degrees.

# obstacle

Grasp of everyday psychological concepts like belief, desire, knowledge and intention is all-or-nothing.

“chimpanzees understand ... intentions ... perception and knowledge ... Moreover, they understand how these psychological states work together to produce intentional action”  
(Call & Tomasello 2008:191)



“chimpanzees probably do not understand others in terms of a fully human-like belief–desire psychology”  
(Call and Tomasello 2008)

“chimpanzees understand ... intentions ... perception and knowledge ... Moreover, they understand how these psychological states work together to produce intentional action”

(Call & Tomasello 2008:191)



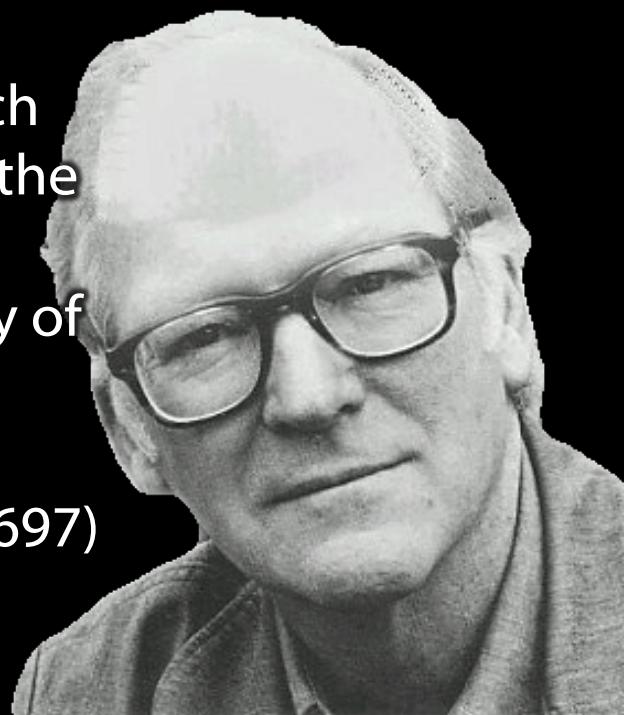
“our [typical adult humans’ ] fundamental conception of what it is to know that P is itself an explanatory conception [...] we think of S’s knowledge that P as something that can properly be explained by reference to what S has perceived or remembered or proved or ...”

(Cassam 2007:356)



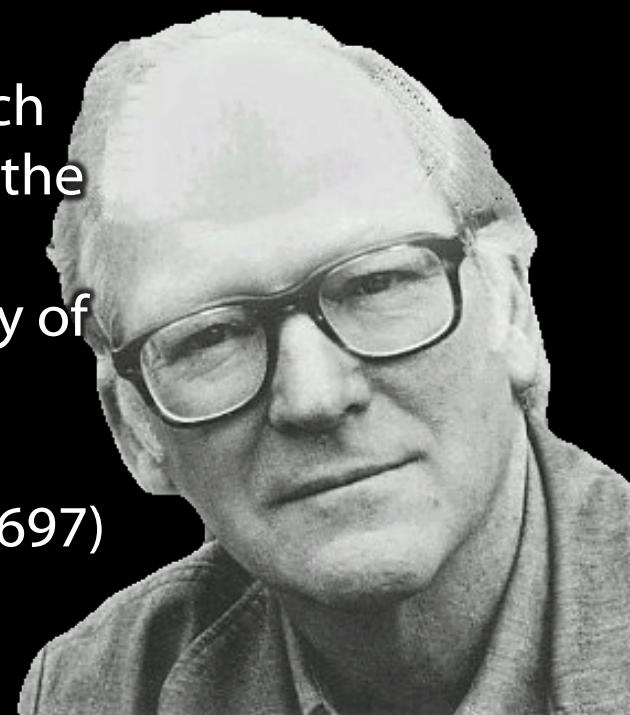
“We are stuck with our two main ways of describing and explaining things, one which treats objects and events as mindless, and the other which treats objects and events as having propositional attitudes. I see no way of bridging the gap by introducing an intermediate vocabulary.”

(Davidson 2003:697)



“We are stuck with our two main ways of describing and explaining things, one which treats objects and events as **mindless**, and the other which treats objects and events as having **propositional attitudes**. I see no way of bridging the gap by introducing an intermediate vocabulary.”

(Davidson 2003:697)



A black and white photograph of two young children, a boy and a girl, smiling and looking at each other. The boy is in the foreground, wearing overalls, and the girl is behind him, wearing a patterned top.

# challenge

Explain the emergence, in evolution or development, of full-blown theory of mind cognition.

# conjecture

We need to understand how theory of mind cognition could come in degrees.

# obstacle

Grasp of everyday psychological concepts like belief, desire, knowledge and intention is all-or-nothing.

puzzle

Theory of mind *abilities* are widespread



Theory of mind *abilities* are widespread

**18-month-olds** point to inform, and predict actions based on false beliefs

(Liszkowski et al 2006)

(Onishi & Baillargeon 2005;  
Southgate et al 2007)

Theory of mind *abilities* are widespread

**18-month-olds** point to inform, and predict actions based on false beliefs

**Scrub-jays** selectively re-cache their food in ways that deprive competitors of knowledge of its location

(Liszkowski et al 2006)

(Onishi & Baillargeon 2005;  
Southgate et al 2007)

(Clayton, Dally & Emery 2007)

Theory of mind *abilities* are widespread

**18-month-olds** point to inform, and predict actions based on false beliefs

**Scrub-jays** selectively re-cache their food in ways that deprive competitors of knowledge of its location

**Chimpanzees** conceal their approach from a competitor's view, and act in ways that are optimal given what another has seen

(Liszkowski et al 2006)

(Onishi & Baillargeon 2005;  
Southgate et al 2007)

(Clayton, Dally & Emery 2007)

(Hare, Call & Tomasello 2006)

(Hare, Call & Tomasello 2001)

Theory of mind *abilities* are widespread

**18-month-olds** point to inform, and predict actions based on false beliefs

**Scrub-jays** selectively re-cache their food in ways that deprive competitors of knowledge of its location

**Chimpanzees** conceal their approach from a competitor's view, and act in ways that are optimal given what another has seen

(Liszkowski et al 2006)

(Onishi & Baillargeon 2005;  
Southgate et al 2007)

(Clayton, Dally & Emery 2007)

(Hare, Call & Tomasello 2006)

(Hare, Call & Tomasello 2001)

Theory of mind *abilities* are widespread

**18-month-olds** point to inform, and predict actions based on false beliefs

(Liszkowski et al 2006)

(Onishi & Baillargeon 2005;  
Southgate et al 2007)

**Scrub-jays** selectively re-cache their food in ways that deprive competitors of knowledge of its location

(Clayton, Dally & Emery 2007)

**Chimpanzees** conceal their approach from a competitor's view, and act in ways that are optimal given what another has seen

(Hare, Call & Tomasello 2006)

(Hare, Call & Tomasello 2001)

Theory of mind *abilities* are widespread

Representing perceptions, knowledge states and beliefs is hard

**18-month-olds** point to inform, and predict actions based on false beliefs

**Scrub-jays** selectively re-cache their food in ways that deprive competitors of knowledge of its location

**Chimpanzees** conceal their approach from a competitor's view, and act in ways that are optimal given what another has seen

Theory of mind *abilities* are widespread

**18-month-olds** point to inform, and predict actions based on false beliefs

**Scrub-jays** selectively re-cache their food in ways that deprive competitors of knowledge of its location

**Chimpanzees** conceal their approach from a competitor's view, and act in ways that are optimal given what another has seen

Representing perceptions, knowledge states and beliefs is hard, for it requires

(a) conceptual sophistication

- takes years to develop
- development tied to acquisition of executive function and language
- development facilitated by training and siblings

Theory of mind *abilities* are widespread

**18-month-olds** point to inform, and predict actions based on false beliefs

**Scrub-jays** selectively re-cache their food in ways that deprive competitors of knowledge of its location

**Chimpanzees** conceal their approach from a competitor's view, and act in ways that are optimal given what another has seen

Representing perceptions, knowledge states and beliefs is hard, for it requires

(a) conceptual sophistication

- takes years to develop
- development tied to acquisition of executive function and language
- development facilitated by training and siblings

(b) scarce cognitive resources

- attention
- working memory

Theory of mind *abilities* are widespread

**18-month-olds** point to inform, and predict actions based on false beliefs

**Scrub-jays** selectively re-cache their food in ways that deprive competitors of knowledge of its location

**Chimpanzees** conceal their approach from a competitor's view, and act in ways that are optimal given what another has seen

Representing perceptions, knowledge states and beliefs is hard, for it requires

(a) conceptual sophistication

- takes years to develop
- development tied to acquisition of executive function and language
- development facilitated by training and siblings

(b) scarce cognitive resources

- attention
- working memory

Propositional attitudes ...

cause actions

resemble “intervening variables” linking environment to behaviour

have contents which may be true or false

have contents which may refer to non-existent entities

are involved in uncodifiably complex causal interactions

have contents which are individuated by senses, not only by referents

are associated with normative requirements

are individuated in terms of their interlocking roles in causal and normative explanations of thought and action

...

# puzzle

What could infants, chimps and scrub-jays represent that would enable them, within limits, to track others' perceptions, knowledge, beliefs and other propositional attitudes?

# puzzle

What could infants, chimps and scrub-jays represent that would enable them, within limits, to track others' perceptions, knowledge, beliefs and other propositional attitudes?



# challenge

Explain the emergence, in evolution or development, of full-blown theory of mind cognition.

# puzzle

What could infants, chimps and scrub-jays represent that would enable them, within limits, to track others' perceptions, knowledge, beliefs and other propositional attitudes?

# challenge

Explain the empirical evidence for evolution or development of the capacity of mind cognition.

# puzzle

What could infants, chimps and other primates know about the world? What would enable them, within limits, to learn about the world? How do they learn about the world? What are the limitations, if any, on what they can learn?



