Thinking about ‘thinking’

How children learn to talk
about mental states

Micha Elsner (Department of Linguistics)

Why think about ‘think’? To learn:

- How linguists study infant development
- What we still don’t know…
  - And what we’re still arguing about!
- Why words like ‘think’ are so complicated
- Infants know more than you think…
- But even school-age children still fall short of adult behavior

This is Anne, and this is Sally...

Let’s watch a 3-year-old do something stupid:

https://www.youtube.com/watch?v=oazK2fkRU1A


DO NOT ANTHROPOMORPHIZE
THE BABY
memegenerator.net

It’s not just a vocabulary issue

- 3-year-olds know thousands of words
- The infant isn’t *confused* by the task
  - She *acts* like she knows what she’s doing
- So, what’s gone wrong?

“Where does Sally think the block is?”

Semantics (Theory of Mind)

Child doesn’t understand how other people’s minds work

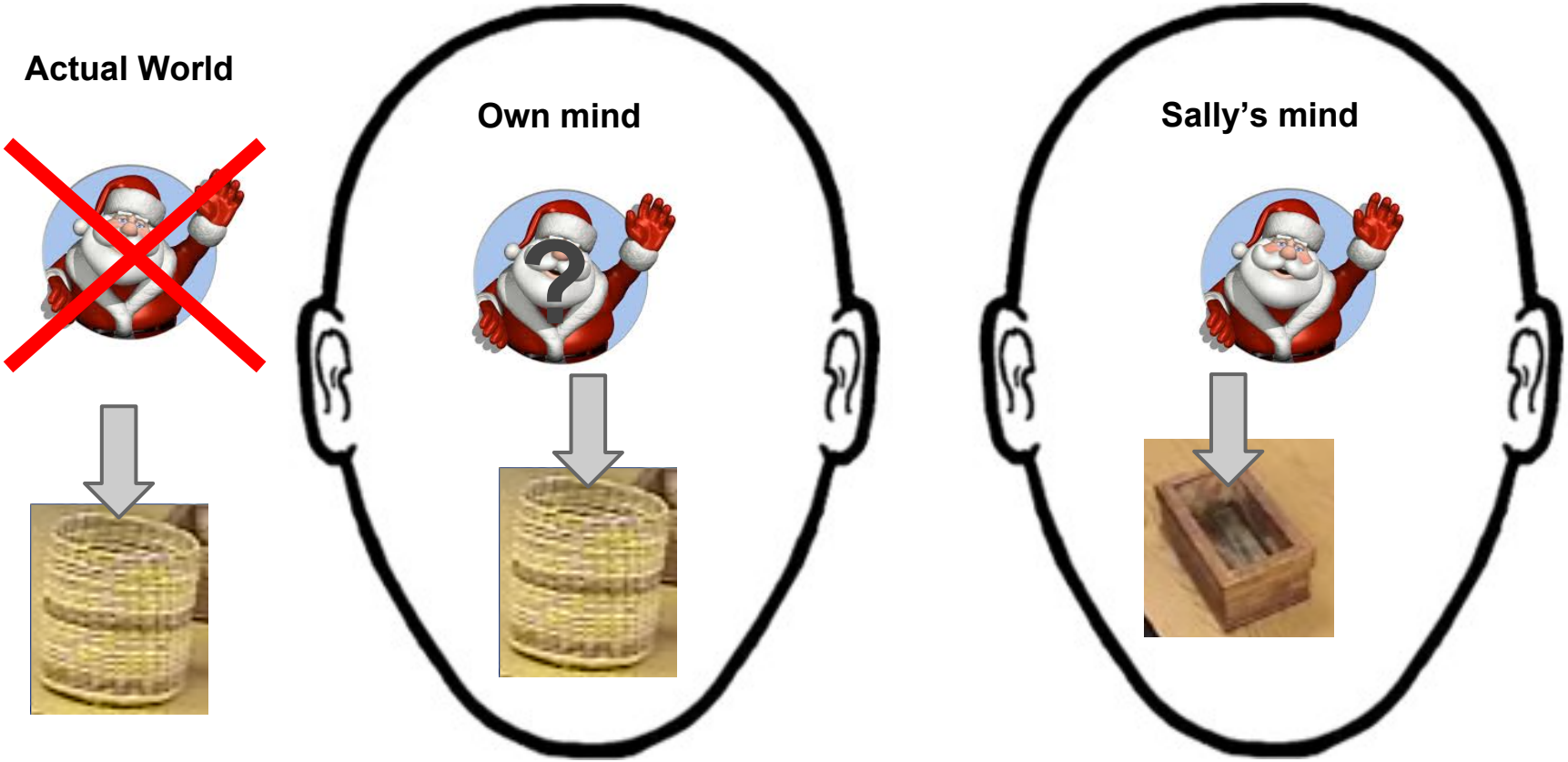
Syntax

Child doesn’t understand how ‘think’ relates to ‘the block’

Pragmatics

Child isn’t sure when ‘think’ means ‘think’ versus ‘maybe’

Adult-like Theory of Mind



Three-year-old Theory of Mind?

Actual World

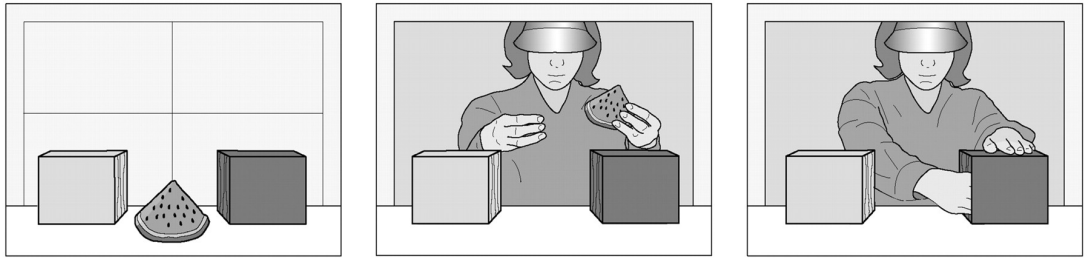
(Do not anthropomorphize the baby)

Let’s watch pets do something stupid:

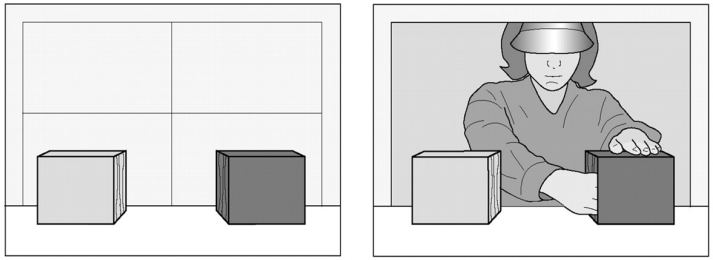
https://www.youtube.com/watch?v=kG_QhttG6jo

But wait! (Kristine Onishi and Renee Baillargeon, 2005)

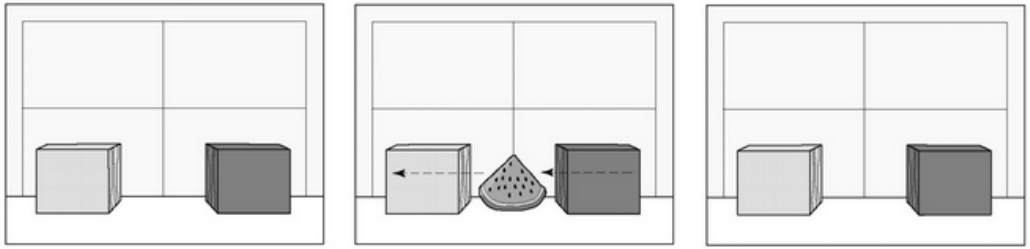
A Familiarization trial 1



B Familiarization trials 2 and 3

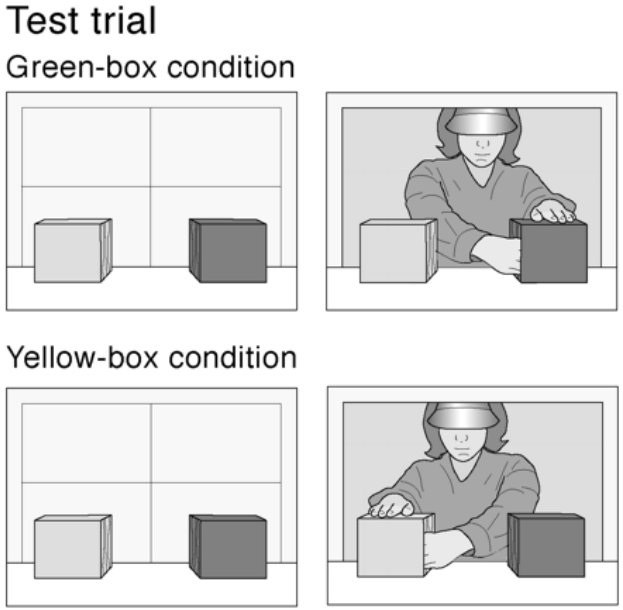


Then, the toy sneakily moves...



Where will she look for it?

Even 15-month-olds look *longer* if she looks in the yellow box



New consensus on developing ToM

A suite of related skills that develop smoothly from birth to adulthood

Even imitation is a basic Theory of Mind skill-
image from
Andrew Meltzoff and Keith Moore, 1977

Can ToM still explain Sally-Ann?

- Less popular explanation nowadays…
- But, perhaps infants lack *executive function*
  - Ability to do two complex things at once
  - Can’t focus on beliefs *and* use language

(img: Kyle Peterson)

Does learning to talk help?

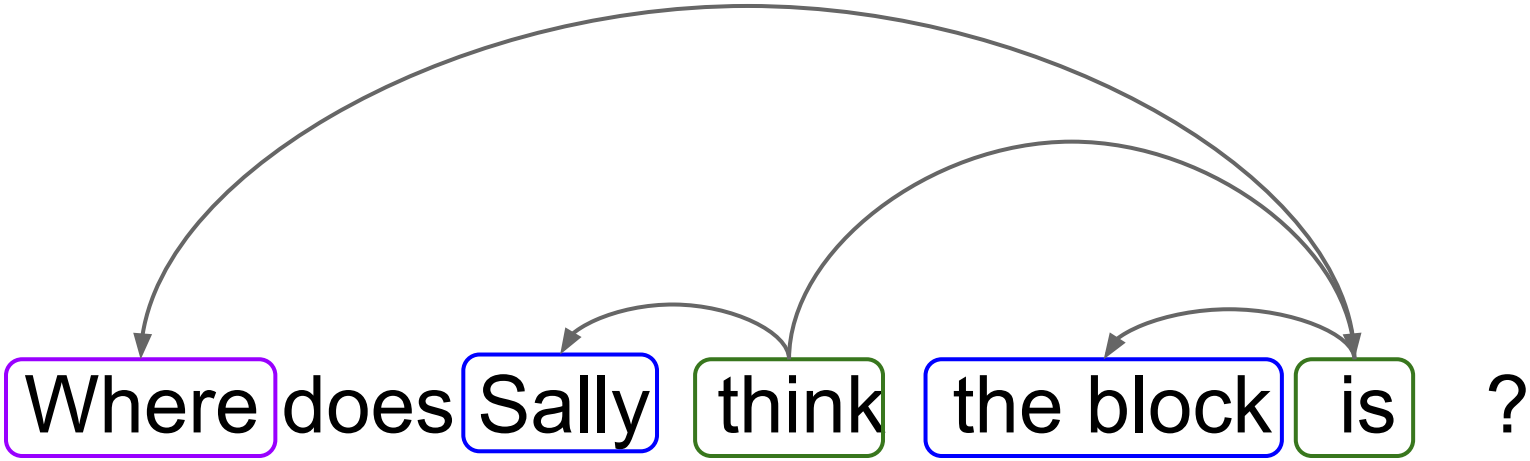
Jill de Villiers:

Language may provide “a satisfactory way to represent other’s knowledge, or the ‘possible world’ in someone else’s head”

But this kind of claim is controversial;
it implies language can alter your mind!

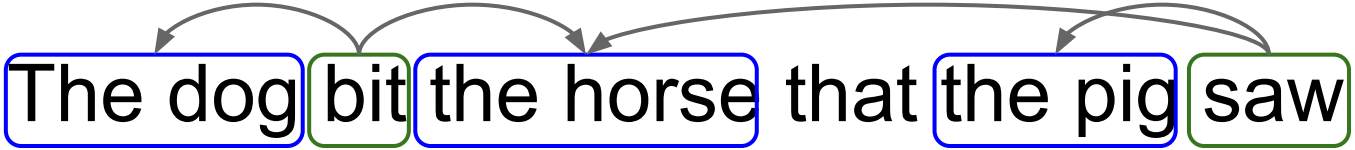
Theory 2: Syntax

It’s like two sentences in one!



Kids have trouble with ‘that’, too

Holger Diessel and Michael Tomasello, 2001



But they’re better at sentences like this:

So, maybe they lose track...

Sally thinks the block is in the basket

Sally thinks the block is in the basket

Sally thinks the block is in the basket

Blah blah the block is in the basket

A problem for the syntactic theory

Where does Sally think the block is?

Where does Sally think the block is?

Where does Sally think the block is?

Where blah blah blah the block is?

Why block out those three words?

Using ‘think’ like adults is hard

Have to coordinate multiple tasks:

- Parse the sentence
- Use ToM to model Sally’s mind

- And it gets worse!
  - “Think” means more than one thing

img:W Mich. Burnerz

Theory 3: Multiple meanings of ‘think’

I think you should go to bed ⇨ Go to bed!

Do you think it’s a doggie? ⇨ Is it a doggie?

Q: Where’s Jim?

A: Anne thinks he’s sick ⇨ Jim is sick.

Sally thinks it’s in the box ⇨ It’s in the box

How do you decide which ‘think’?

Depends on topic of the conversation

Are we discussing:

- What is actually true?
- What someone *thinks*?

Linguistic study of topic is called **pragmatics**

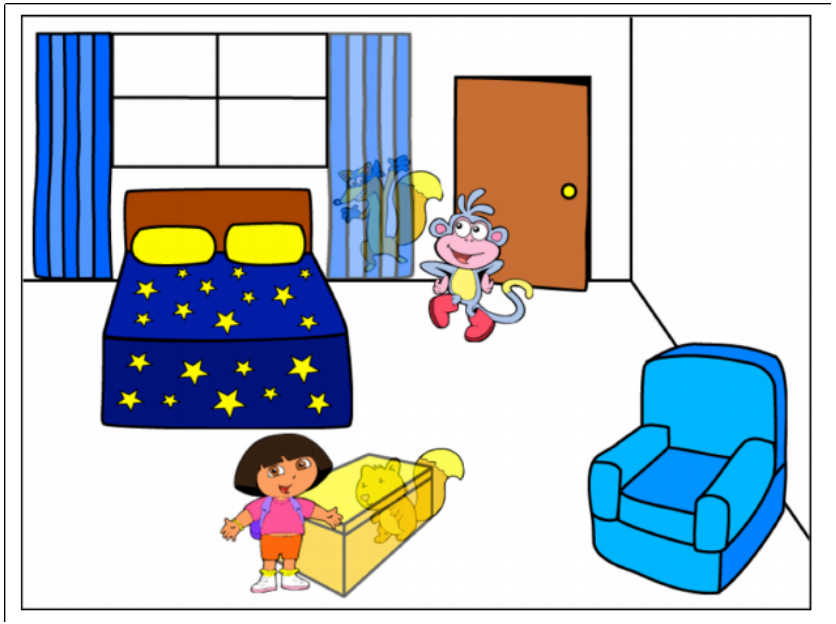
(Key research on “Question under discussion”: Craige Roberts )

Evidence for a pragmatic theory

Shevaun Lewis, Valentine Hacquard and Jeffrey Lidz, 2014

Dora and Boots are looking for Swiper the fox.

Dora thinks the fox is behind the box.



Q: Is the dragon right?

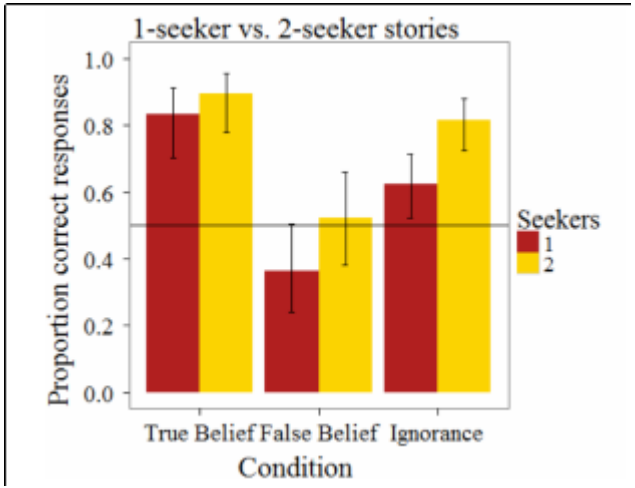
Children do better with two seekers

Topic changes from:

“Where’s the fox?”

to:

“Who’s right, Dora or Boots?”



When does ‘think’ mean ‘maybe’?

Marie-Catherine de Marneffe and Micha Elsner, 2014
Thanks to RAs, Paul Sandels, Eryn Ahlers, Tara Stout, Sharon Ross

Research assistants tagged 1281 utterances with ‘think’ or a few other verbs

MOT: what are you doing ?
CHI: sweep broom .
MOT: sweep broom .
MOT: is that a broom ?
CHI: yep .
MOT: I **thought** **it was a brush** .
MOT: okay .
CHI: I get that brush that brush .
CHI: hi Bunny Rabbit .
CHI: my screwdriver .

Tagging scheme

MOT: I **thought it was a brush** .

Truth: **Is it a brush?**

- Certainly true (CT+), probably true (PR+), unknown (Uu), probably not (PR-), certainly not (CT-)
- Wh-question (“what do you think it is?”, “you know who that is”)

Intent: **Why say ‘think’?**

- Assertion (“maybe it’s a brush”)
- Conversational interaction (“what do you think that is?”)
- Talk about beliefs (“he thought it was a brush, isn’t that silly?”)

What parents say

	Assertion	Belief	Interaction	Clarification
CT+	16.9	5.2	1.0	0.8
PR+	10.5	3.0	1.2	0.5
CT-	8.9	3.4	0.5	0.0
PR-	3.7	2.1	0.2	0.3
Uu	0.6	1.4	0.3	0.2
Wh-C	0.0	23.3	10.9	1.1
	40.6	38.2	14.1	2.9

True statements mostly assertions

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Belief reports mostly wh-questions

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Kids learn from parents that ‘think’ marks assertions

But why do parents talk this way?

- Uncertainty: “I think maybe it’s from your basket”
- Politeness: “I think that’s too large to go in the window”
- Prompt child to respond: “You think Daddy needs a heater?”

Might kids learn faster in cultures that don’t use ‘think’ this way?

Tibetan Evidentials

follows Jill de Villiers, Jay Garfield, Harper Gernet-Girard, Tom Roeper, Margaret Speas 2009

- Direct evidence:

  rtsi rtsi pha gir ***‘dug***

  “(I see) there is a mouse over there”
- Inferred from evidence:

  rtsi rtsi pha gir ***yod sa red***

  “(I can tell) there is a mouse there”
- Inferred from other sources:

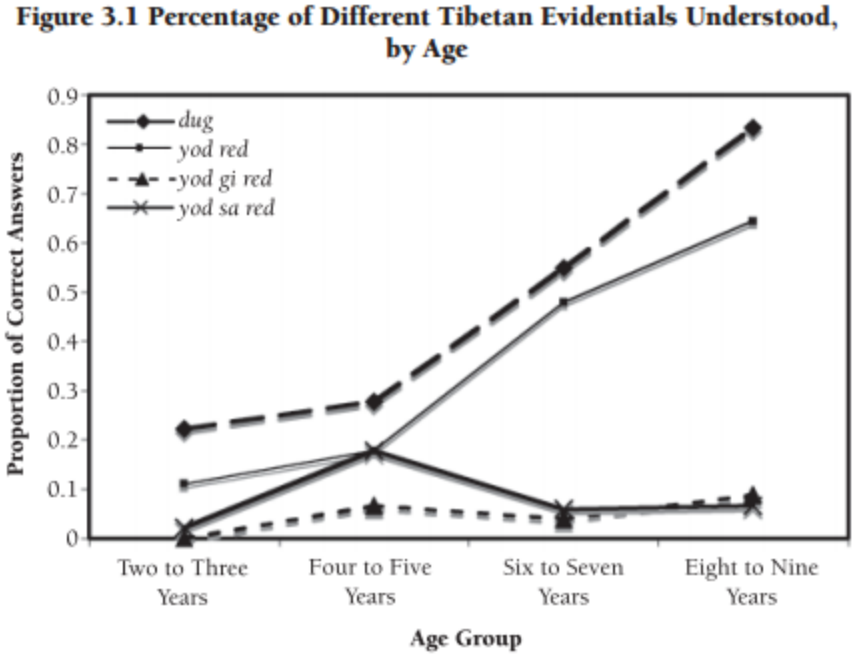
  rtsi rtsi pha gir ***yod kyi red***

  “(I heard / I know) there is a mouse over there”

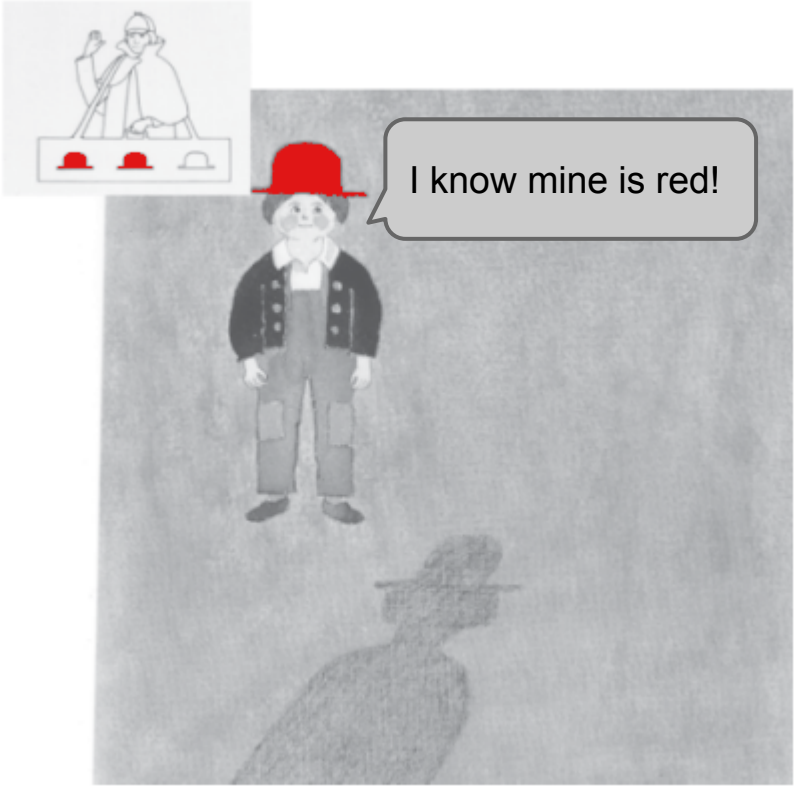
Like ‘think’, evidentials are hard

But maybe in a different way…

- Americans need to focus on topic
- Tibetans need to focus on source of evidence



Hat riddles test inferential ability



- Three hats
  - Two red, one white
- You wear one, Tashi wears one
- Tashi says: “I know mine is red!”
- What color is yours?

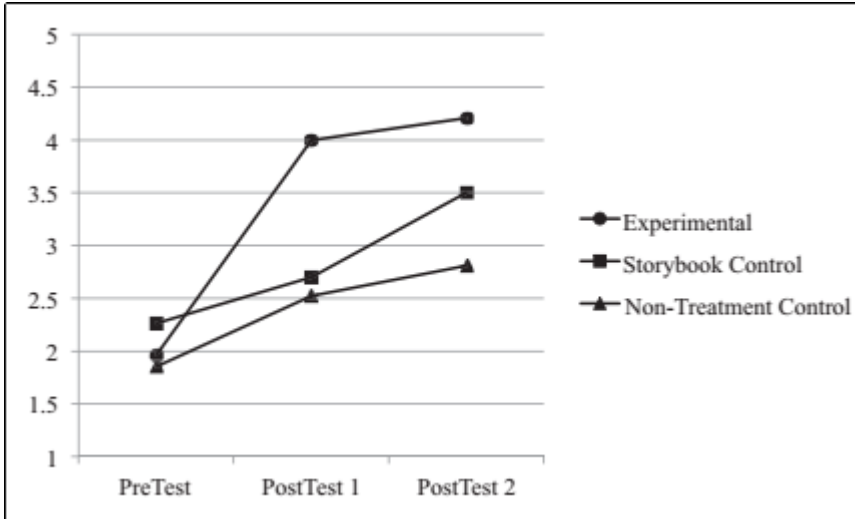
Hat riddles predict evidential use

- Children who can tell their hat is white are better at using ***yod sa red*** (“I can tell”)
- Tibetans are better at hat riddles overall
  - 6-10 year olds are **80%** correct
  - English-speaking 6-10 year olds only **34%** correct
  - (But it’s hard to tell whether this is language-driven)

Parent speech varies within English

- Parents with lower socioeconomic status (SES) use fewer mental state verbs
- Children with lower SES do worse on Sally-Anne tasks
- Reading storybooks with mental state verbs can help…
- Bias? *Probably* not...

results from Rachel Dudley and Valentine Hacquard 2015,
and Virginia Tompkins 2014



Can kids tell polite from uncertain?

Marie-Catherine de Marneffe, Micha Elsner, Laura Wagner, RA Marissa Granitto

http://www.ling.ohio-state.edu/~melsner/files/dragon1.wav
http://www.ling.ohio-state.edu/~melsner/files/dino-1.wav
http://www.ling.ohio-state.edu/~melsner/files/dino-2.wav

Which one was it?

Do cultures differ?

‘Think’ requires kids to coordinate:

- Theory of Mind
- Ability to parse complex sentences
- Understanding of context

Development takes a long time…

- Speeded or slowed by how parents talk

As adults, we're so good at this… we do it without even thinking!