Theory of Mind (ToM)

Read: Wikipedia article on Theory of Mind

ToM: interpersonal understanding of mental states

- Theory of mind is the ability to attribute mental states--beliefs, intents, desires, pretending, knowledge, etc.--to oneself and others.
- It enables one to understand that mental states can be the cause of--and thus be used to explain and predict--others' behavior.
- One must be able to conceive of the mind as a "generator of representations" and to understand that others' mental representations of the world do not necessarily reflect reality and can be different from one's own.
- It is a 'theory' of mind in that such representations are not "directly observable".
- Many other human abilities--from skillful social interaction to language use--are said to involve a theory of mind.

Sally-Anne (false belief) task

- The child is shown two dolls, Sally and Anne, playing with a marble.
- The dolls put away the marble in a box, and then Sally leaves.
- Anne takes the marble out and plays with it again, and after she is done, she puts it away in a different box.
- Sally returns and the child is then asked where Sally will look for the marble.
- The child fails the task if she answers that Sally will look in the second box, where the child knows the marble is hidden
- In order to pass the task, the child must be able to understand that another's mental representation of the situation is different from their own, and the child must be able to predict behavior based on that understanding.
- Children younger than 3 or 4 fail this task.

Smarties (appearance-reality) task

- Experimenters ask children what they believe to be the contents of a box that looks as though it holds a candy called “Smarties.”
- After the child guesses (usually) “Smarties”, each is shown that the box in fact contained pencils.
- The experimenter then re-closes the box and asks the child what she thinks another person, who has not been shown the true contents of the box, will think is inside.
- The child fails the task if she responds that another person will think that the box contains pencils.
- Gopnik & Astington (1988) found that children pass this test at age four or five years.

Matsui et al. 2006

- Matsui, Tomoko, Taeko Yamamoto, Peter McCagg. 2006. “On the role of language in children’s early understanding of others as epistemic beings.” *Cognitive Development* 21.158-173.
- Japanese epistemic modality:
  - Certainty:
    - Particles: *yo* vs. *kana*
    - Verbs: *shitteru* (‘know’) vs. *omou* (‘think’)
  - Evidentiality
    - Particles: *yo* vs. *tte*
    - Verbs: *miru* (‘see’) vs. *kiku* (‘hear that’)

- Certainty
  - *Yo* strongly commmits the speaker to the truth of whatever is asserted.
  - *Kana* encodes information that the speaker cannot make a judgment as to the truth or falseness of the statement.
  - *Shitteru* (‘know’) communicates that the speaker has evidence for the information to be true, and it expresses that the speaker presupposes the truth of the proposition.
  - *Omou* (‘think’) does not presuppose the truth of the proposition; it merely communicates that the speaker is presenting her own thought on her own judgment.
- Evidentiality
  - *Yo* suggests that the speaker has compelling evidence for his or her beliefs.
  - *Tte* is a hearsay particle, indicating that the proposition expressed is not based on the speaker’s direct experience.
  - *Miru* (‘see with one own’s eyes’), direct evidence.
  - *Kiku* (‘hear from someone else’), indirect evidence.

Corpus study: Tai, 1;5-3;2

Table 2
Frequency counts for certainty and evidentiality markers in the Tai corpus

		Child	Mother
Certainty			
Verb	*shitteru (know)*	34	70
	omou (think)	12	51
Particle	*yo*	3317	3955
	kana	145	970
Evidentiality			
Verb	*miru (see)*	109	410
	kiku (hear)	6	34
Particle	*tte*	270	1603

Procedure

- Child watches an animation of of a thief ambiguously hiding four different objects in four separate containers.
- “Let’s ask the rabbit and the frog where the car is.”
- Rabbit: “the one the car is in is in the red box *dayo*.”
- Frog: “the one the car is in is in the blue box *kana*.”
- “Which container is the car in”
- Child is “correct” if he or she picks the red box (adults do this).

Results

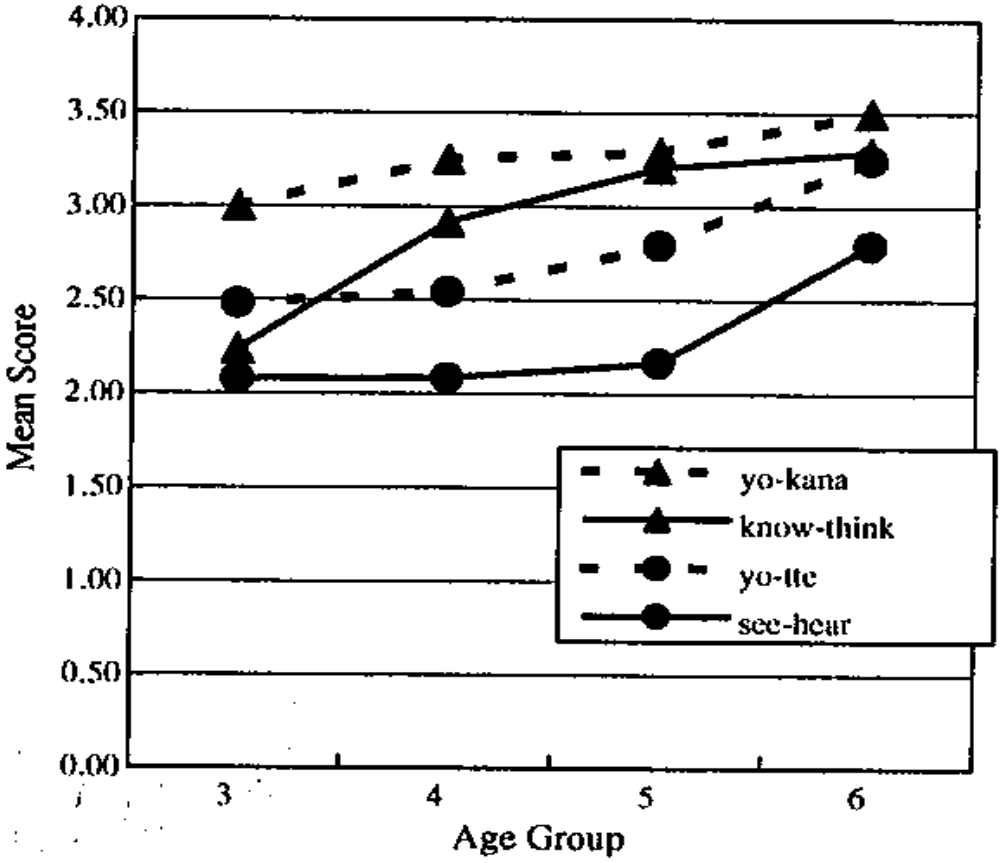

Fig. 1. Relative performances on the four tested contrasts.

- Modality study:
  - Evidentiality contrasts were significantly more difficult than certainty contrasts.
  - Verb contrasts were significantly more difficult than particle contrasts.
- Children also did Sally-Anne and Smarties tasks.
  - The comprehension of epistemic modality conveyed by verbs (*know-think*, *see-hear*) significantly relates to whether or not children pass the false-belief tasks.
  - Comprehension of modality as conveyed through particles has no significant relation with false-belief understanding.

Discussion

- Early understanding of the particles provides important information about children's understanding of other's epistemic mental states in general.
- Passing false-belief tasks involves explicit representational theory of mind.
- It has been reported that children who fail false-belief tasks do show procedural, unconscious grasp of another's mind.
- Japanese 3-year old's understanding of other's knowledge states may similarly be of an implicit kind, though the concept of implicit understanding itself requires further clarification.
- A consistent, working understanding of knowledge states precedes fully representational understandings of (false) beliefs.
- The early working understanding of others as epistemic beings is deeply situated in frequent, continuous, and largely verbal interaction.