

Theory of Mind & Language

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Today

- Discuss what is language
- Review the role language plays in theory of mind
- Discuss empirical studies
- Group discussion

Readings for this week:

- de Villiers, J. G. (2008). The interface of language and theory of mind, *117*(11), 1858-1878.
- Newton, A. M., & de Villiers, J. G. (2007). Thinking While Talking, *18*(7), 574-580.
- San Juan, V., & Astington, J. W. (2011). Bridging the gap between implicit and explicit understanding: How language development promotes the processing and representation of false belief. *The British Journal of Developmental Psychology*, *30*(Pt 1), 105-22.

IMPLICIT

versus

EXPLICIT

Theory of Mind

Same level of representation needed?

Implicit ToM

: when you do not actively try to learn or even report that you have learned it (automatic)

Learning through observation:

- ✓ About actions
- ✓ About objects
- ✓ About places
- ✓ About agents

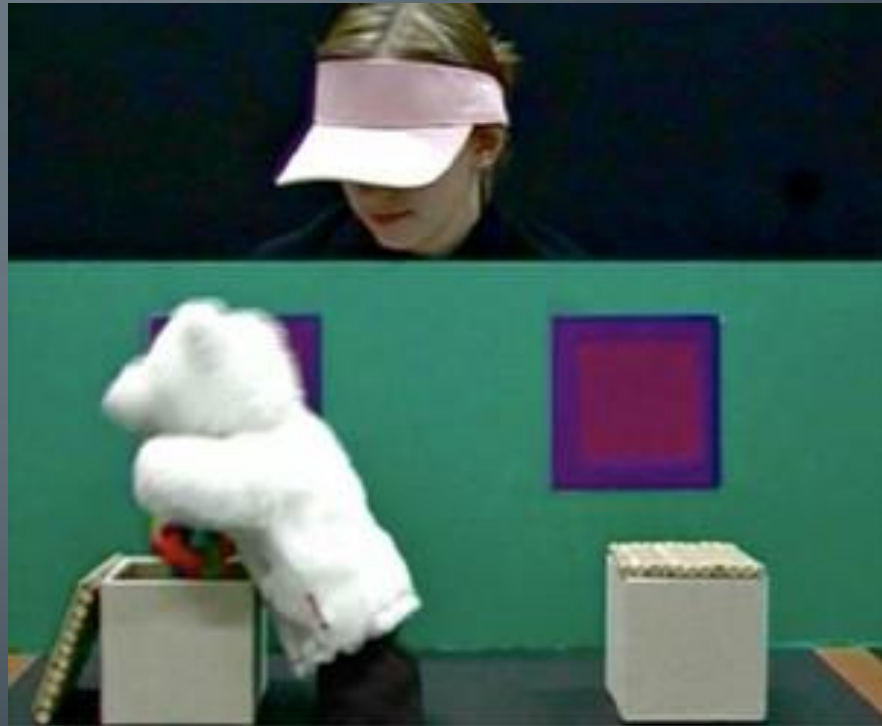
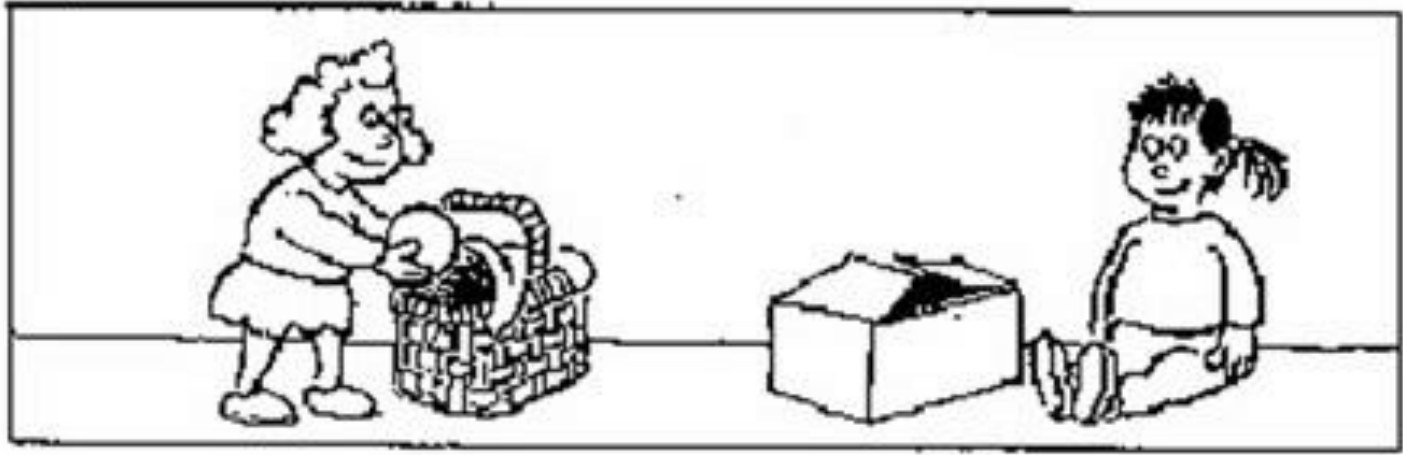
(Frith & Frith, 2012)

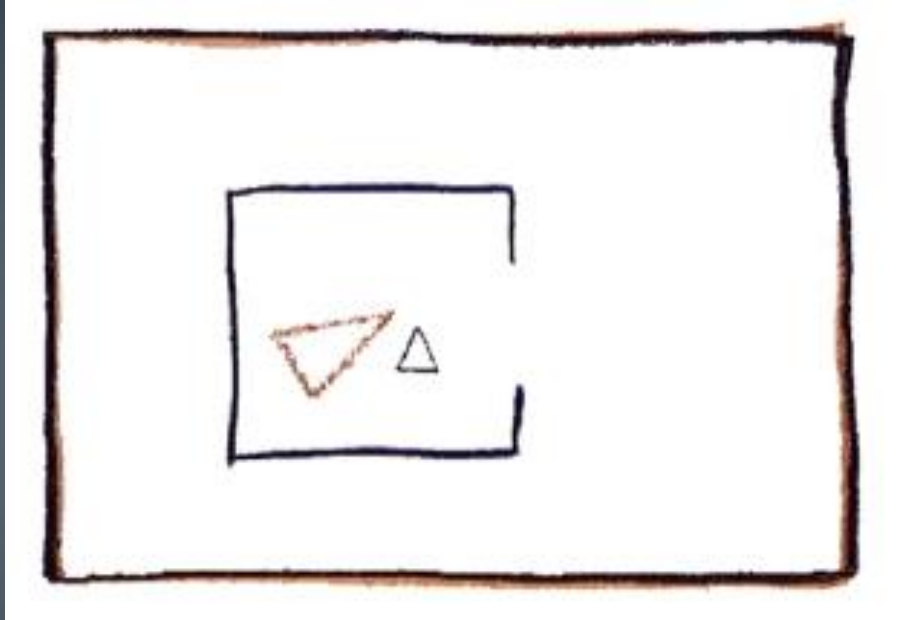
Explicit ToM

: Able to think and reflect about what you have learned (conscious)

- ✓ Elicited response selection
- ✓ Formation of metarepresentational understanding

(de Villiers, 2008)

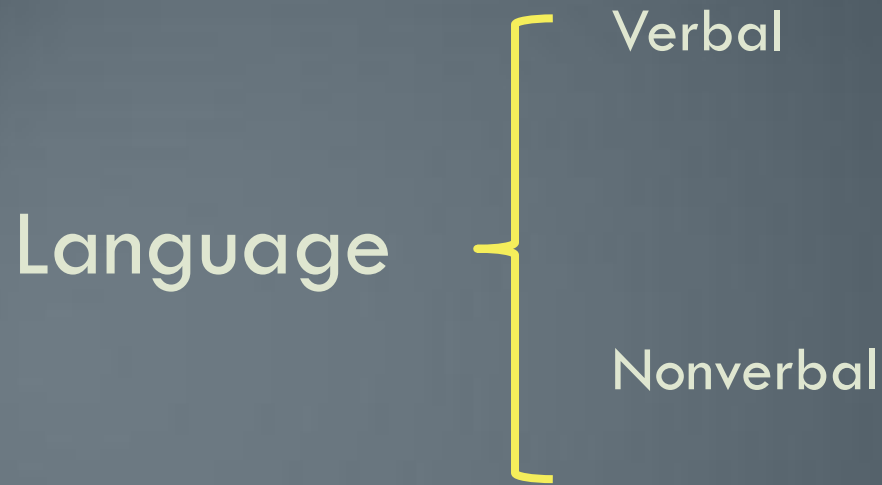




What is language?

Semantic, syntactic and pragmatic abilities, *internal* to the child and also the *external* socio-linguistic environment in which development occurs.

(Astington & Baird, 2005)



ENHANCES the value of social interactions

HOW????


EFFICIENCY
ACCURACY

Could language be the key difference that makes social cognition in humans unique?



Language

- Merely reflection that most tasks are language loaded thus younger children fail (e.g. Bloom & German, 2000)
- Causal role of language in Theory of Mind (e.g. de Villiers, 2005)



Dispute about the precise role language plays (Astington & Baird, 2002)

Current arguments:

- Role of language is very limited as infants already have a fully formed internal representations as shown in eye-gaze studies (Baillargeon et al, 2010)
- Structure of infants false belief representations is qualitatively different from that of older children (Perner, 2010; Perner & Ruffman, 2005)
- **Language plays a critical role in the development of EXPLICIT false belief understanding (Astington & Jenkins, 1999, de Villiers, 2007)**

LANGUAGE

IMPLICIT → EXPLICIT

THEORY OF MIND



?? CAUSAL role of language in False belief understanding???

Correlational findings: between semantic, syntactic and pragmatic aspects of language and explicit FB reasoning.

Semantic: the meaning expressed through language

Syntactic: rules and principles regarding sentence structure

Pragmatic: the context that contributes to meaning in language

How/ what to test?

- Longitudinal studies

Mary *THINKS* that the ball is in the basket

I wonder...

Sentential complement: tensed subordinate clause that is embedded under a mental or communication verb to form a complex sentence (indicates desire, intention, perception)

Evidence for CAUSAL relationship...

LONGITUDINAL STUDIES:

Astington & Jenkins, 1999

Syntax not semantics predicted
unique variance in FB scores

De Villiers & Pyers, 2002

Bi-directional

Slade & Ruffman, 2005

Ruffman et al 2003

Semantic NOT syntax predicted FB scores

TRAINING STUDIES:

Lohmann & Tomasello, 2003

Language → FB

META-ANALYSIS:

Milligan, Astington & Dack, 2007 (n= 8891)

What direction is the relationship?

Milligan, Astington & Dack, 2007 (n= 8891)

- Examined strength of relationship between language and ToM in under 7s.
- Also examined potential moderators that may account for variability across studies
- Findings:
 - Receptive vocabulary had weaker relations than measures of general language
 - Stronger effects for EARLIER language to FB than later language
 - Applicable across different languages
 -

We have talked about language WITHIN a child but what about the language EXTERNAL to the child?

= SOCIAL LINGUISTIC **ENVIRONMENT**

MOTHER'S use of mental state terms (Ruffman, Slade & Crowe, 2002)

Motherese

SO **HOW** DOES LANGUAGE INFLUENCE ToM?

http://www.ted.com/talks/mark_pagel_how_language_transformed_humanity.html?quote=1023

Evidence of this?

Medium for representing thoughts

1. Complex language affects FB reasoning by allowing representation of false contents of others minds. The complement forms: functionality of linguistic recursions.

Mental state verbs fall into a special class of verbs in that they take a kind of grammatical argument structure called a **complement**.



Complements...

Complements can be irrealis referring to states not yet achieved or hypothetical, as in:

- Bill said he would come tomorrow.
- Frieda wanted to see the carnival.

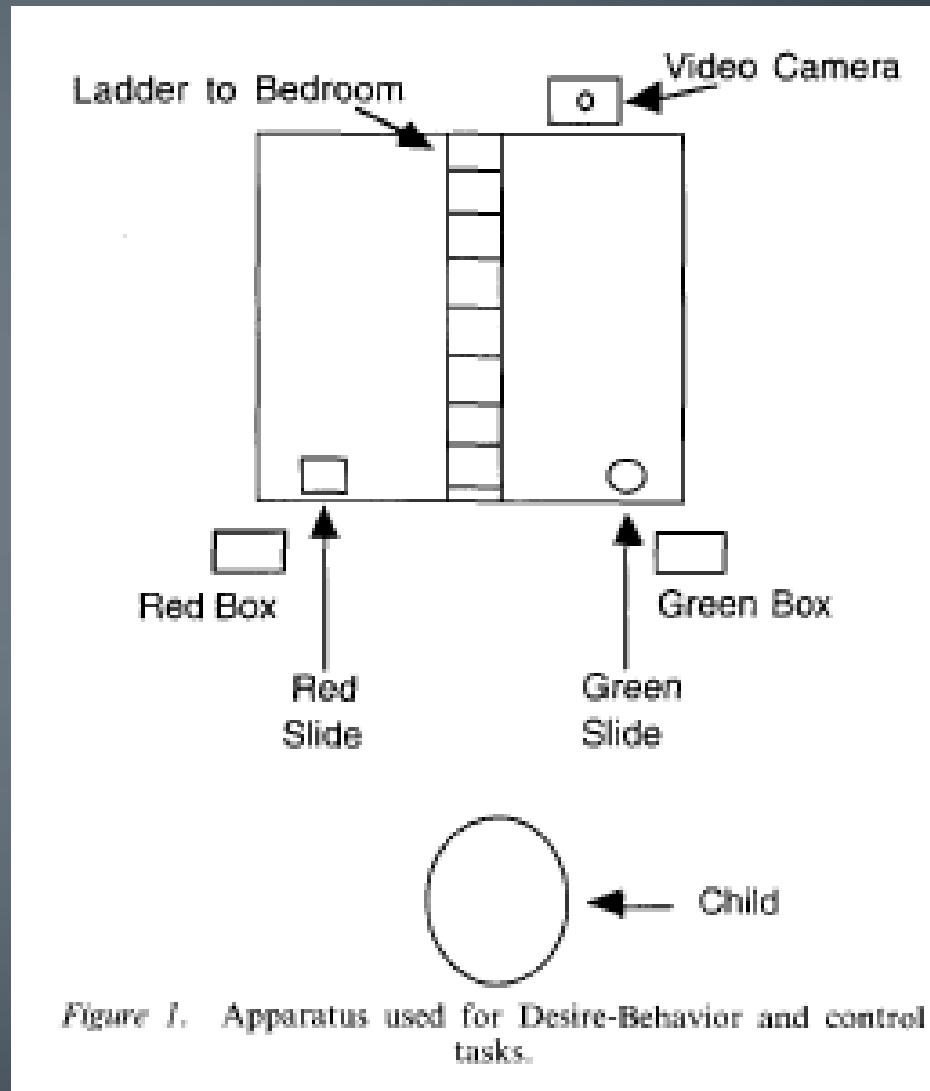
OR

realis (usually clauses with an overt present or past tense) and refer to states of affairs that are true or false.

- Marge said that her chair collapsed.
- Marge said that her chair giggled.

Ruffman, Garnham & Rideout, 2001

“I wonder...”



Con't

- 2. Language provides the child with abstract concepts: involvement in control mechanisms in EF (inhibit prepotent responses). Having verbal LABELS help keep two things in mind at once and help remember instructions.

“Want” precedes learning of ‘think’ and ‘believe’ (develops in 3rd year of life)

I/You/he/she/here/there = helps switch reference

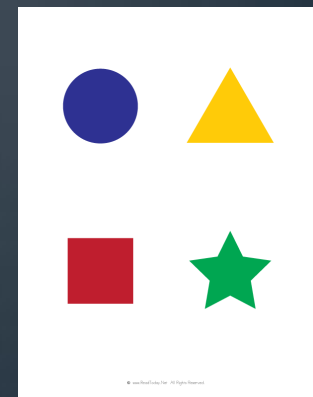
Look/see/touch- sensory words

3. Assists in representational redescription of knowledge (Karmiloff-Smith, 1992) Implicit knowledge is redescribed into linguistic symbols to make it available for explicit decision-making (Bloom, & Keil, 2001). Allows *reflective* thinking.

4. Universal medium for combining and integrating the outputs of distinct modules in the mind (Spelke, 2003). For example:

“to the left of the blue wall”

Engagement of language in cross-modular thinking.



Other findings:

Kobayashi et al, 2007

Some aspects of language (e.g. grammar) may be independent of ToM but other aspects (e.g. pragmatics and reading communicative intentions) may profoundly affect ToM throughout development.

Let's revisit bilingualism:

Pros:

- Executive control- constant monitoring of the target language in order to minimise interference from the competing language. Strengthens executive control system
- Better performance in FB tasks (precocious success- as young as 3, Goetz, 2003)

Cons:

- Smaller vocabulary than monolingual counterpart
- Underperform in word retrieval tasks (partly due to interference from other language)



- Pat Kuhl (TED Talks) from approx 5:33

http://www.ted.com/talks/patricia_kuhl_the_linguistic_genius_of_babies.html

hola - hello
por favor - please
gracias - thanks
friend - amigo
how are you - cómo está

Bilingual children need to develop an early sociolinguistic sensitivity to the language knowledge of their interlocutors because they must use their language accordingly.



DISCUSS

Now how about INNER language?

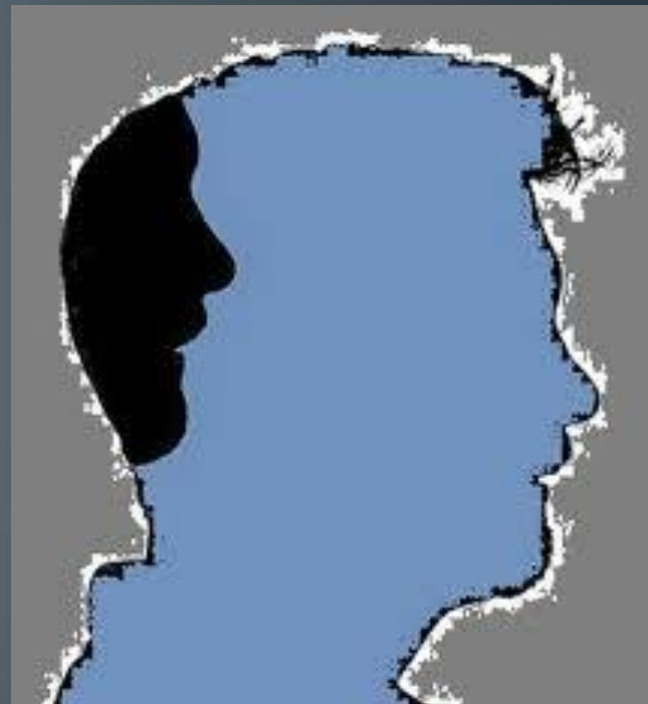
What is it?

Do we have it?

Do we use it?

When do we use it?

How do we test if someone is using it?



What is inner speech?

Silent, verbal self-talk that goes on in our heads. Your inner chatterbox.

Charles Fernyhough distinguishes between:

MONOLOGIC



DIALOGIC

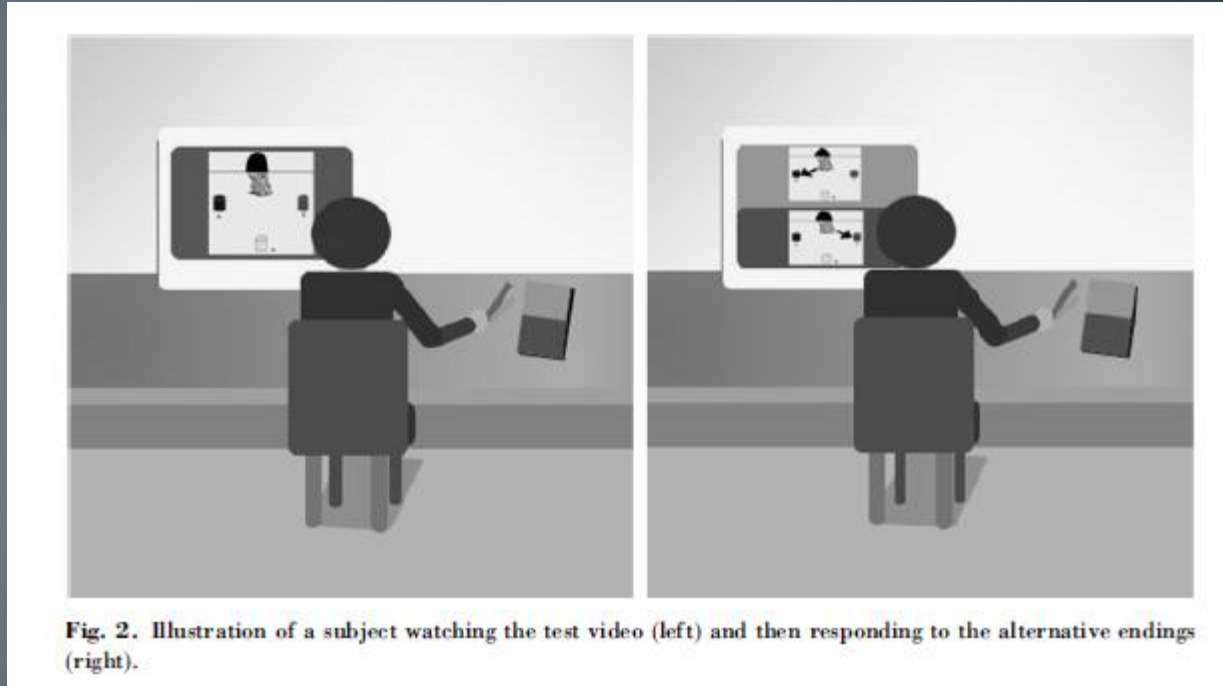
forms of inner dialogue

Inner speech and language

Articulatory Suppression: how?



Newton & de Villiers (2007)





However...

During a productive discourse, speakers will automatically tend to align their *posture*, their *speech rate*, their *choice of words*, and their *syntactic forms* (Garrod & Pickering 2009). This alignment enhances communication (e.g., Adank et al. 2010).

But language does not always have to be involved. Alignment has a similar advantage for any joint action, where two players need to coordinate their behavior (Sebanz et al. 2006).

(From Frith & Frith, 2012, p. 295)

Hearing impairment

If language is so important, what does it mean for people with hearing impairment?



Hearing impaired children born to native signing parents (deaf children with deaf parents)

- : no language delay (matched with TD hearing children)
- : matched with hearing children on ToM tasks (no delays in FB acquisition)



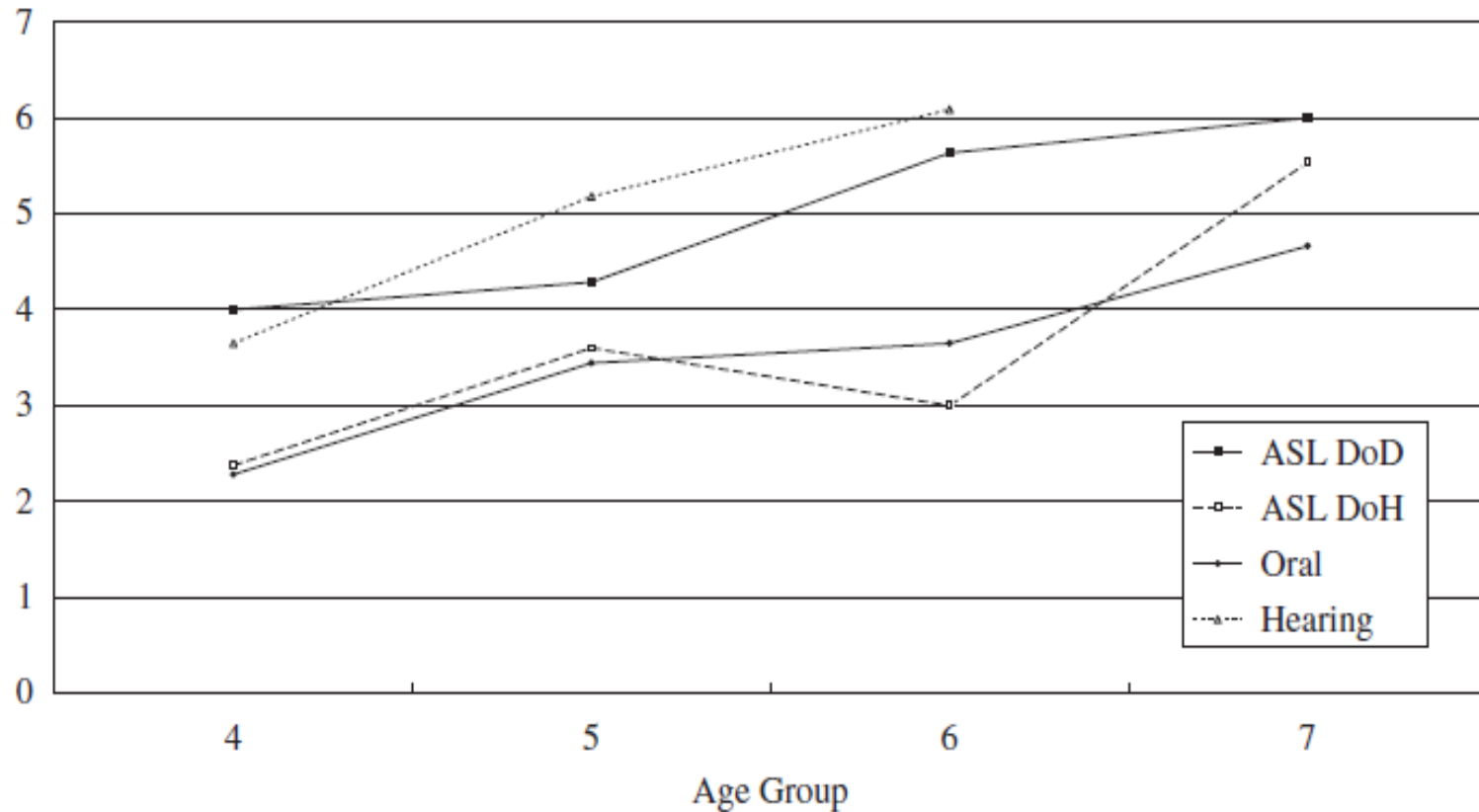
Hearing impaired children born to non-native signing parents (deaf children with hearing parents)

- : language delay
- : delayed in understanding about beliefs and knowledge states



Schick et al, 2007, n = 176

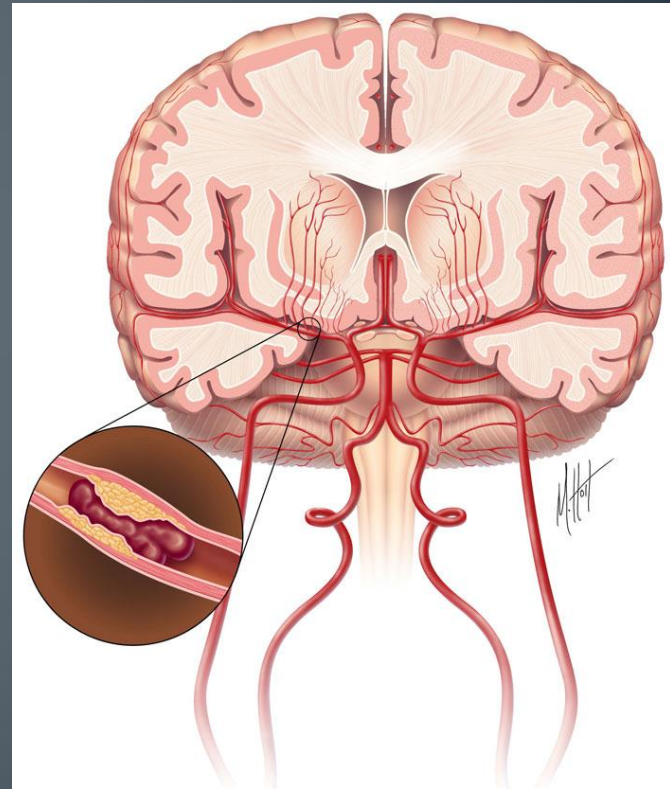
Language and Theory of Mind



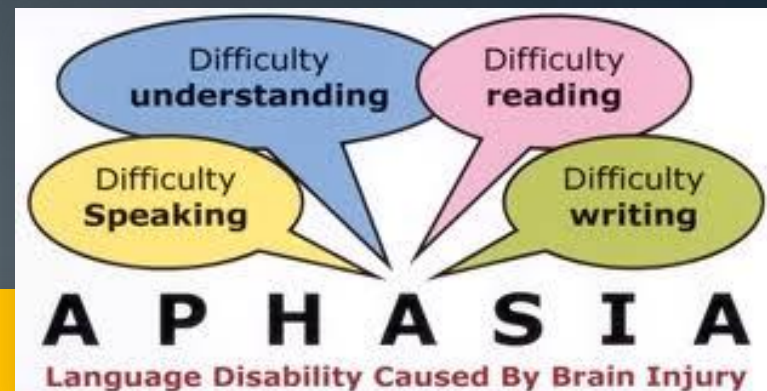
Hearing loss mediated by early social / conversational experiences (Woolfe et al, 2012)

APHASIA- language disorder

- Disturbance of comprehension and formulation of language caused by dysfunctions in specific regions of the brain
- Can be caused by:
 - Infection
 - Strokes
 - Brain tumours
 - Other forms of brain injury



Or people who suffer from aphasia?

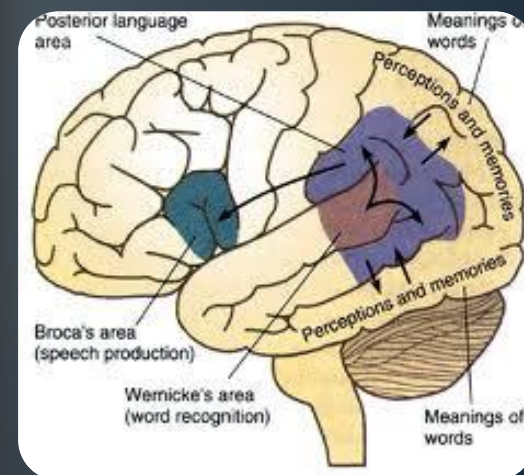


What is Aphasia?

Aphasia means problems with **communication** e.g. speaking, understanding, reading and/or writing

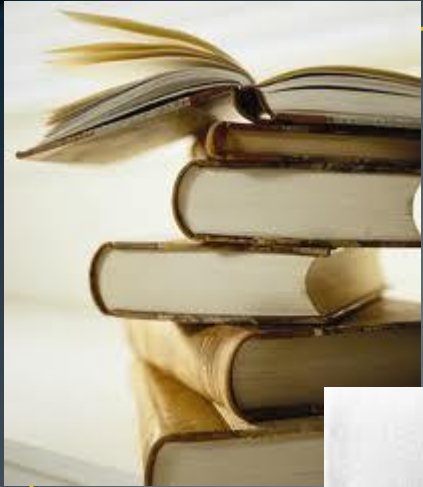
People with Aphasia can have:

- Difficulties getting their message across (some people lose their **speech** completely)
- Problems understanding everything that is being said to them
- Difficulties **reading** text e.g. books, newspapers, recipes or shopping lists
- Problems **spelling** and **writing** things they could easily **write** before
- Problems with **numbers** or handling **money**

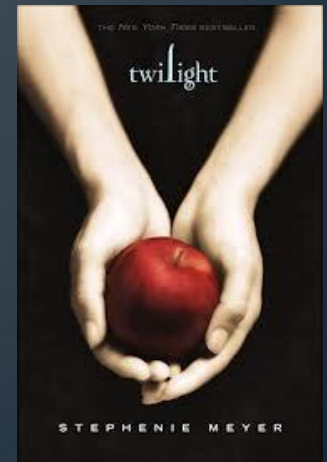


Grammar and ToM?

- Siegal and Varley (2006) found that grammar and competence in ToM were independent of each other



WHAT ABOUT
READING? Does reading
add value to our
development of ToM?



FOUR



Summary

Language components and its contributions:

- verbal
- non-verbal
- silent, inner self-talk
- reading
- bilingualism

Language is crucial for ToM – how?

What about people who can't see or hear and those with brain damage? How does this affect their ToM?