

Theory of Mind: What? Why? How do you know??

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Theory of Mind

Multi-dimensional construct

- Cognitive and Affective dimensions
- Interpersonal (between individuals) and intrapersonal components (within individuals)

-Each dimension has different neurophysiological and neuroanatomical foundations
-Individuals can have differing patterns of strengths and weaknesses in ToM abilities

Stage I: Pre-theory of mind, Engagement

Birth – 18 months

Underpinnings for affective ToM begin with engagement:

From birth

- babies share emotions of caregivers and mirror their expressions
 - emotional sharing with others

By 6 months, respond to joint attention

- babies follow the line of regard others

Engagement

By 8 to 12 months

- babies use joint attention to get desired objects or actions
- initiate social joint attention for the sake of interaction
(Mundy & Newell, 2007)

Engagement

- Babies are referencing those they are interacting with
 - borrow the perspective of another person
 - use others' reactions as a reference point to resolve uncertainty

- determine the effect of their behaviors on others
- recognize if someone is fearful or angry, responding by moving away, or if someone is happy, by moving closer

Engagement

- Simple joint attention – looking at the same object the caregiver is looking at
- *Social referencing – interpreting the intents and emotions of the caregiver
- After infants and toddlers are engaging in initiating joint attention, they begin to coordinate with others by taking turns in interactions

Affective ToM deficits in children who are D/HH

High levels of awareness and responsiveness between caregivers and children develops an emotional resonance that influences sensitivity to each other's minds. A lack of effective communication can affect this relationship building and attunement can be disrupted

- Deaf children are less likely to follow the line of regard of others and hence may be less likely to engage in activities requiring joint attention (Scott, Russell, Gray, Hosie, & Hunter, 1999)

Communication in Stage I 6-9 MONTHS

- Calls to get attention
- Shows face / acts shy
- Reaches, extends arms to request

Communication in Stage I

10-12 MONTHS

- Affectionate to familiar people
- Begins directing others (pushes, pull, tugs)
- Repeats actions that are laughed at
- Resists removal of a toy

- Vocalizes with gestures to: protest/reject; request object; request action; call; express feelings; notice/recognize; respond to others

Communication in Stage I 10-12 MONTHS

- Uses play routines [give and take]
- Responds appropriately to intonation and facial expressions
- Takes first conversational turns
- Turns head in response to attention getting behaviors (ex: hand waving, lights on and of, or foot stomping)
- Expresses excitement and displeasure

Communication in Stage I 12-15 MONTHS (1-1:3 yrs)

- Imitates other children
- Initiates routines
- Uses more signs/words in turn-taking
- Uses signs/words to: protest/reject; greet/call; respond to others; label/notice; request object/action; express feelings/wants

Communication in stage I 15–18 MONTHS (1:3-1:6 yrs)

- Controls behavior of self and others
- Responds to adult conversational attempts, but often not contingent
- Uses signs/words to: request information; initiate pretend play; comment/tell info; acknowledge/answer
- Points to self and objects in his/her environment

Stage I Strategies

- Amplify emotions
- Keep visual attention always in mind, regardless of modality

- Hold back some materials, using parallel play and proximity to focus on communication
- Imitate the child's behaviors and get the child to imitate your behaviors

Stage 2: Pre-theory of mind, Sense of Self
18 months – 4 years

A foundation for ToM:

- Begin to realize that they are separate from others, and that they might have different likes and desires from others
- Begin pretending
 - Cognitive intrapersonal ToM: intertwined with a sense of self and pretending; reflecting consciously on the representations they have of their appearance and behavior (Perner, 1993)
- Begin to intentionally attempt to help or comfort another demonstrating conscious affective empathy or altruism (Thompson & Newton, 2013)

Sense of Self

- Essential for interpersonal and intrapersonal affective ToM, children learn to identify nonsocial emotions: *happy, sad, mad/angry, surprised, disgusted, afraid*
- By 5 years, children are usually accurate in recognizing these emotions and associating them with particular events and experiences
ex: The girl is ___ because _____. (Michalson & Lewis, 1985; Pons et al., 2004)

Sense of Self

- Develop a variety of mental state words: *think, know, guess, remember* when those words of reflection are used
- Some evidence suggests that children who are exposed to more mental state words develop ToM earlier (Stanzione & Schick, 2014)

Sense of Self

Begin to develop the foundations for autobiographical memory for experiences when adults discuss and evaluate their experiences with them (Fivush, 2011)

- Remembering or *experiencing* oneself in the past, not just remembering facts about the event
- This furthers sense of self, which further develops their intrapersonal ToM (Prebble, Addis, & Tippett, 2013)
- Cognitive ToM Deficits in children who are D/HH

Intrapersonal ToM: A conscious awareness of one's own plans

Self-awareness is the beginning of metacognitive development

Executive Functions:

- ✓ Awareness of what one knows and doesn't know about a topic
- ✓ Strategies for doing tasks
- ✓ Knowledge of when to use the strategies
- ✓ How to plan, monitor, and evaluate one's learning

Cognitive ToM deficits in children who are D/HH

- D/HH readers are less aware of when they comprehend and do not comprehend a passage
They have been shown to use fewer strategies to construct meaning, monitor, and evaluate their own comprehension (Schirmer, Bailey, & Lockman, 2004)
- Executive functioning deficits and behavioral difficulties have been found in D/HH students compared to typically hearing peers (Hintermair, 2013)

Communication in stage 2

18 – 21 MONTHS (1:6-1:9 yrs)

- Responds verbally to adult initiations
- More topically contingent in conversation

21 – 24 MONTHS (1:9-2 yrs)

- Uses 2- to 3- word/sign phrases to express intentions: protest/reject; greet/call; respond to others; label / notice; request object/action; express feelings; request information; initiate pretend play; comment/tell info; acknowledge/answer
- Practices schema and familiar conversational frames

Communication in stage 2

24 – 30 MONTHS (2-2:6 yrs): CONVERSATION

- Uses signs/speech to announce intentions
- Takes 2 turns in conversations
- Verbally introduces and changes topic
- Begins to give descriptions to aid listener
- Clarifies by repeating
- Requests clarification
- Uses pre-narrative heaps

Communication in stage 2

30 – 36 months (2:6-3 yrs)

- Converse in sentences – 3/4 words/signs
- Attempt to control situations verbally
- Use polite/"nice" intonation patterns
- Respond to requests to clarify (attempts to describe/explain)
- Apologize by saying "I'm sorry"

Communication in stage 2

36 – 42 months (3-3:6 yrs)

- Takes 4-5 conversational turns
- Uses fillers to acknowledge (uh-huh, yeah, ok)
- Begins to shift register with younger children
- Requests permission (May/Can I...)

Communication in stage 2

36 – 42 months continued (3-3:6 yrs)

- Uses language for teasing/jokes/fantasies
- Consistently uses descriptions to clarify
- Corrects others
- Uses primitive narratives (event chains)
- Uses pronouns to mark old information
- Requests using yes/no questions

Communication in stage 2

2- and 3-year-olds

- Use words to express emotions, wants, some mental states, begin connecting desire to emotion
 - *sad, happy, excited, mad, angry, upset, surprised, afraid*
 - *imagine, idea, dream, think, know, guess, forget, remember, wonder, expect, curious*
 - *want, hope, wish, love, like*
 - *negatives: don't like, don't know, not-yet*

Communication in stage 2

42 – 48 months (3:6-4 yrs)

- Has long detailed conversations
- Tells 2 events in correct order
- Tells story, mixing real and unreal
- Uses pronouns across sentences to mark object

Stage 2 Strategies

- Narrate your world: What? Why. How do I know. What do I do? Why. How do I know. What is the result? Why. How do I know. What do I feel? Why. How do I know.
- Narrate their world: What? Why. How do you know. What do you do? Why. How do you know. What is the result? Why. How do you know. What do you feel? Why. How do you know.
- Conflict resolution: I noticed that... I see... Look... How does he/she feel?... Look at his/her face.... His/her face is... His /her body is... Maybe... Do you know?... What do you think?... I think... you think... agree... disagree... compromise

Pretend play

Skills change from 18 months to 4 years:

Pretend on oneself about familiar everyday themes with concrete props pretend on dolls or stuffed animals (first, acting on and talking to the dolls and then talking for the dolls) taking on familiar, observed roles with more abstract themes or no props

- When a new theme is introduced, adults can act as directors or coplayers, scaffolding the play, modeling dialogue, and expanding children's utterances (Westby, 2000)

Read books with an emphasis on the emotional state of characters, focus on vocabulary, interactions and perspectives that can later be played out with props. Have conversations about personal experiences. Share your thoughts and feelings. Ask the children if they have experienced the same, or different, thoughts and feelings.

Use photographs and videos and create storyboards to reminisce about experiences. Discuss what they did, evaluate the experience, remembering behaviors and thoughts, feelings, interpretations. Highlight different perspectives of the same event.

Stage 3: First Order ToM 4 - 5 years

Reflecting on what someone is thinking or feeling

- Understand that someone can think something differently from them, and that a false belief is possible
- ToM tasks are typically passed at 4 and 5 years, but they are highly dependent on language skills (Hale & Tager-Flusberg, 2003)
 - mental state and emotion words
 - comprehension of sentential complements,

Using communication verbs: The baby bird *asked*, "Are you my mother?"

Using mental state verbs: Baby bird didn't *know* that his mother flew to find food.

First Order ToM

Understanding of emotions expands beyond nonsocial emotions to social emotions

- Basic emotions require only the awareness of one's own emotional state: *happiness, sadness, anger*
- Social emotions require the representation of the mental states of other people: *embarrassment, guilt, shame, pride*
- Children as young as 2-3 years can express emotions resembling guilt and remorse
- 5 yo children can imagine situations in which nonsocial emotions would be felt (Harris, Olthof, Terwogt, & Hardman, 1987)

First Order ToM

Children begin to exhibit mental time travel

- ability to think about themselves in the past
- ability to think about themselves in the future (Atance & O'Neill, 2005)

First Order ToM

Mental time travel requires and promotes sense of self

- Future mental time travel may involve the ability to think about alternatives to reality (counterfactual reasoning)
 - “if - then” forms: “if” relates to personal action, “then” relates to the goal
If you are good, then Santa will bring you what you want.
- Role play promotes counterfactual reasoning because they must consider what is reasonable/unreasonable or possible/not possible in a particular role

Cognitive ToM deficits in children who are D/HH

Interpersonal ToM

Ability to attribute false belief – recognize that others can have beliefs about the world that are not true and that their actions are based on these false or mistaken beliefs

- Numerous studies have documented first-order cognitive interpersonal ToM deficits in children who are D/HH, particularly those of hearing parents (Peterson & Wellman, 2009)
- Deaf children of deaf parents perform markedly better than the deaf children of hearing parents on ToM tasks (Courtin, 2000; Schick, de Villiers, de Villiers, & Hoffmeister, 2007)

Cognitive ToM deficits in children who are D/HH

- Delays and deficits have been attributed to their reduced interaction language experiences
- Better performance of deaf children of deaf parents is explained by their higher quality communicative interactions with their parents
- The frequency and quality of communicative interaction between deaf children and their hearing parents are much more limited
 - even those who sign with their deaf children use significantly fewer mental state words than hearing parents of hearing children
 - frequency of exposure to mental state words has been correlated

with children's ToM skills
(Moeller & Schick, 2006)

Affective ToM deficits in children who are D/HH
Interpersonal and Intrapersonal ToM

- Children who are D/HH have delays/deficits in inferring the affective states of others and recognizing and regulating their own affective states (Dyck, Farrugia, Shochet, & Holmes-Brown, 2004; Ludlow, Heaton, Rosset Hills & Deruelle, 2010; Wiefferink et al., 2012)
- Both oral and signing deaf children, ages 6 to 16 years, were less successful than hearing children in labeling photos and human and nonhuman cartoon faces as happy, sad, or angry.

Affective ToM deficits in children who are D/HH
Possible explanations:

- In efforts to lipread and hear, oral deaf children may not give sufficient attention to other facial features, particularly the eyes, to interpret emotions correctly
- Signing deaf individuals are used to observing the face for linguistic cues; this attention may affect processing of emotional cues (Ludlow, et al, 2010)
- Students who are D/HH show greater attention to peripheral locations, whereas hearing individuals focus more on the center of the visual field (Dye, Hauser, and Bavelier, 2008)

Affective ToM deficits in children who are D/HH

- Preschool CI recipients exhibited more difficulty on all aspects of emotional understanding than hearing preschoolers, even when language was not involved
 - sorting faces the expressed emotion, in both positive versus negative expressions and sad versus angry
 - matching positive or negative emotional expression to pictures of situations that might trigger that emotions(Wiefferink et al., 2012)

Affective ToM deficits in children who are D/HH

- Deaf children give different rationales for the occurrence of emotions than their hearing peers
 - For negative outcome situations, they concentrate more on loss of the desired state, while hearing peers focus more on the condition that lead to the negative outcome
 - They ignore the controllability of the situation which affects the way they attempt to regulate their emotions in situations, and they have more difficulty thinking of strategies to regulate their emotions in situations that trigger sadness or anger
(Rieffe, Terwogt, and Smit, 2003)
 - They misinterpret the types and causes of emotions of characters in stories
(Gray, Hosie, Russell, Scott, & Hunter, 2007)

Communication in stage 3

48 – 54 months (4-4:6 yrs)

- Uses wh-questions as indirect requests
- Correctly changes reference with this/that, here/there, go/come
- Uses unfocused chains for narratives
- Ends conversations appropriately

Communication in stage 3

54 – 60 months (4:6-5 yrs)

- Uses hints as indirect requests
- Uses apposition as cue to listeners (Mary, my friend's sister)
- Uses this/that/these/those from listener's perspective
- Initiates conversation easily
- Politely interrupts adult conversation

Stage 3 Strategies

- Use verbs of perception: hear, see, smell, taste, feel
- Use verbs of intention/desire: want, need, like, hope
- Use verbs of communication: say, tell, ask

Use verbs of cognition: know, don't know, think, believe, guess, remember, forget, predict, expect

- Narrate the completion of a task or project and include the child in the process
 - We are going to make a _____. What do we need? Why do I need that? Where do I find it? What do I do with it?
 - Offer alternative strategies for the task of completion
 - Oh, you think we should _____. That could work, I think we could _____. How did it work? Was that successful?
- Support the development of strategies to regulate behavior/emotions
 - I notice you look _____. Are you feeling ____? What can you do? When I feel _____, I try _____.
 - I saw you/him/her grab that toy away. Look how the person [reacted]. What could you/him/her do instead?
- Ask questions using communication and mental state verbs:
 - What did the baby bird **say** to the cat?*
 - What did the kitten **think** when the baby bird walked away?*
 - Expand sentence structures to include when, where, why, how, how much and under what condition, to explain when and why person/characters' feelings occur

<u>Person/character</u>	<u>Feeling</u>	<u>When</u>	<u>Why</u>
the baby bird	confused, sad, afraid	he hatched	he doesn't know where his mother is

Stage 4: second-order ToM

7+ years

Comprehension of lies, sarcasm, figurative language or faux pas (causing unintended harm)

Multiple embeddings

Samantha *hoped* that they would *believe* that she *knew* what they *wanted*.

Stage 4: second-order ToM

7+ years

- Metacognitive Skills
 - learner's awareness of their own knowledge, emotions, and strategies for learning and managing emotions
- Self-regulation skills
 - Use of processes that motivate and sustain thoughts, behaviors, and affects to attain goals

(Zimmerman & Moylan, 2009)

Cognitive tom deficits in children who are D/HH

- Students who are D/HH demonstrate greater difficulty in comprehending both literal and inferential questions, and more significantly for inferential questions
 - students may not always be aware of how to find the answers to questions
 - students must monitor texts to determine the information that is explicitly provided and to recognize the situations in which they must infer information
- (Raphael, Highfield, & Au, 2006)

Cognitive tom deficits in children who are d/hh

- Students who are D/HH have deficits in working memory that can contribute to their difficulties with discourse-level comprehension
- (Hall & Bavelier, 2010)

Things to think about regarding literacy

- Written language is based on spoken language, not the other way around.
- Language the child does not know or use cannot be used for teaching the child to read the language the child does not know or use.
- We can only read to learn after we have learned to read.

Strategies

- Reflect: What do I know? What do I not know? What do I need to know?
- Use think-alouds to model what you are seeing or reading.
- State what you understand, or do not understand, how you are trying to make sense of what might be confusing; the inference you are making about the characters or situation, and what evidence you used to make these inferences

*be explicit about what we usually do in our heads
(Westby & Robinson, 2014)

- Reading: Questioning the author. Remind them the story/illustrations have been written/drawn by someone else. To understand the text, it can be helpful to try to figure out the author's intent. Look for evidence that the author/illustrator may have provided to support their ideas. (Beck & McKeown, 2006)
- Predicting: *"I think I will learn...because..."*, or *"I think...will happen because..."*
- Questioning: *"I wonder..."* who, what, when, where, why. Explain where answers are found in the text, or not.
- strategies
- Clarifying: Explain what you use what you want to figure out tricky or hard words or ideas. *I don't get...so I..."*
- Summarizing: *"So far..."*; *"This is mostly about..."*; *"First...next...then..."*
- strategies
- Language check-ins: *I just said _____. Do you know what that means? Why did I say that?*
- Use television and movies as your instructional set. Watch, pause, and discuss.
- Texting lingo...what does it mean???

Resources for the information presented

- Cottage Acquisition Scales for Listening, Language, and Speech (CASLLS), Sunshine Cottage School for the Deaf, 2001
<https://edproducts.sunshinecottage.org/store/>
- Visual Communication and Sign Language (VCSL), Simms, Baker & Clark, 2013
<http://v12.gallaudet.edu/resources/vcsl/>
- Summary of Social Interaction (Pragmatics) Development / Theory of Mind, compiled by Kathy Anderson, *Success for Kids with Hearing Loss*, 2013
www.successforkidswithhearingloss.com/wp-content/uploads/2014/02/Summary-of-Pragmatic-Development+-Theory-of-Mind.pdf

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*Westby, Carol, and Lee Robinson. "A Developmental Perspective for Promoting Theory of Mind." *Topics in Language Disorders*, vol. 34, no. 4, 2014, pp. 362–382.

*Westby, C., Wilson-Taber, D. (2016). Reading the World Supporting Theory of Mind Development in Deaf or Hard-of-Hearing Students, In Moeller, Mary Pat et al. (Eds.) *Promoting Language and Literacy in Children Who Are Deaf or Hard of Hearing* (pp. 297-328). Baltimore, Maryland: Brookes Publishing.

*Primary Sources for information in this presentation