Theory-of-Mind and Language in Children

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“Theory-of-Mind”

• Theory-of-Mind (ToM) = Understanding of the Nature, Causes, Consequences & possibilities of Regulation of:
  • Emotions (Affects, Feelings, Moods, etc.) & Cognitions (Ideas, Beliefs, Thoughts, etc.)
  • Self & Others
“ToM”

• ToM = “Cognition about Cognition & Emotion”

• Other terminologies = “Social cognition”, “Emotion Understanding”, Metacognition”, “Consciousness”, “Mind Mindedness”, etc.

What is the impact of language on children’s Theory-of-Mind?
Answer

- In Developmental Psychology
- Partial & Cacophonic answers

- Today’s Lecture
- Attempt to have a more Representative & Organized answer
- Illusion!?

Theoretical Interest

- Identification of one of the Origins (Causes, Conditions) of ToM Development & Individual Differences
- Discussion of the Nature of ToM and more generally of the Mind & Language relation
Applied Interest

- Participation to the construction of **Language based Intervention Programs** promoting ToM (in Education & Clinical Psychology)

- ToM **correlates +/- directly** (causes, consequences) with:
  - Pro-social competences
  - Psychological well-being
  - School achievement

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**Applied Interest**

<table>
<thead>
<tr>
<th>ToM</th>
<th>(Reflective competence)</th>
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<tbody>
<tr>
<td><strong>Intra-psychological Well-Being</strong></td>
<td>(Self-esteem, Anxiety, Depression, Anger, Attachment, Emotion regulation, etc.)</td>
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<tr>
<td><strong>Inter-personal Social Competences</strong></td>
<td>(Friendship, Popularity, Cooperation &amp; Conflict resolution, Empathy, Anti-social behaviours, etc.)</td>
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<td><strong>School Achievement</strong></td>
<td>(Cognitive Development)</td>
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Development & Individual ≠

- Since middle of the 70’ (40 years) =
  – Clear Development of ToM in children
  – Clear Individual differences in this development

- Precursors (in the 20-30’) = Piaget & Vygotsky

Illustration of this Development & these Individual Differences
- Test of Emotion Comprehension (TEC) (Pons & Harris, 2000)
- Theory-of-Mind Test (TMT) (Pons & Harris, 2002)
Development & Individual ≠

• Chronological Ages are relative:
  – Individual ≠
  – Cultural differences ≠
  – Methods ≠ (Success / Justification, Verbal / Non-verbal, Recognition / Production, etc.)

Verbal Recognition of (basic) emotions: Happy, Sad, Angry, Scared, Surprised, Disgusted
• Denham, 1986; Baron-Cohen, 2002
• From 2-3 years
• Ind. ≠ 1-4 years
• Before & After
• Experience & Understanding
**Development & Individual ≠**

- **Understanding of 1st order Perspective Taking**
  - Flavell & Flavell, 1977
  - From 3-4 years
  - Ind. ≠ 2-5 years
  - Before & After
  - Experience & Understanding

A: Dog!
B: Cat!

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**Development & Individual ≠**

- **Understanding of the Impact of Situational Causes on emotions**
  - Barden et al., 1980; Vikan et al., 1992
  - From 3-4 years
  - Ind. ≠ 2-5 years
  - Before & After
  - Experience & Understanding

A
B
C
D
Development & Individual

- **Understanding of the impact of Memories on emotions**
  - Harris et al., 1985; Lagattuta et al., 2001
  - From 5-6 years
  - Ind. ≠ 4-7 years
  - Before & After
  - Experience & Understanding

- **Understanding of 1st order False-Beliefs**
  - Wimmer & Perner, 1983; Astington & Gopnik, 1988
  - From 5-6 years
  - Ind. ≠ 4-7 years
  - Before & After
  - Exp. & Understanding

A: “There is food in the fridge!”
B: “There are shoes in the fridge!”
Development & Individual ≠

• Understanding of 1st order False-Beliefs
  • Perner et al., 1988; de Rosnay et al., 2004
  • From 4-5 years
  • Ind. ≠ 3-6 years
  • Before & After
  • Experience & Understanding

NLL (March 2015)  ToM & Language in Children

Development & Individual ≠

• Understanding of the Impacts False-Beliefs on emotions
  • Harris et al., 1989; de Rosnay et al., 2004
  • From 5-6 years
  • Ind. ≠ 4-7 years
  • Before & After
  • Experience & Understanding

NLL (March 2015)  ToM & Language in Children
**Understanding of the possibility to Control the expression of emotions (Appearance & Reality)**
- Harris et al., 1986; Joshi et al., 1994
- From 5-6 years
- Ind. ≠ 4-7 years
- Before & After
- Experience & Understanding

**Understanding of 2nd order False-Beliefs**
- Perner & Wimmer, 1985; Glenn & al., 1993
- From 8-9 years
- Ind. ≠ 7-10 years
- Before & After
- Experience & Understanding
**Development & Individual ≠**

- **Understanding of Mixed emotions (Conflicting affects, Ambivalence)**
  - Harter et al., 1987; Arsenio et al., 1999
  - From 9-10 years
  - Ind. ≠ 8-11 years
  - Before & After
  - Experience & Understanding

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**Development & Individual ≠**

- **Understanding of 2nd order Lies (double-bluff)**
  - Happé, 1994; Flavell & Jarvis, 1986
  - From 9-10 years
  - Ind. ≠ 8-11 years
  - Before & After
  - Experience & Understanding

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**ToM & Language in Children**

A: “My treasure is the church!”
B: “My treasure is the castle!”
Development & Individual ≠

- Understanding of the possibility to regulate emotions (feelings)
  - Harris et al., 1981; Stegge et al., 2004; Vikan et al., 1996
- From 9-10 years
- Ind. ≠ 8-11 years
- Before & After
- Experience & Understanding

Summary I

- Clear Development & Typical Individual ≠ of ToM during Childhood (1-2 and 10-11 years)!
- ToM Development = Movements
  - Periphery → Center of the Mind (Self & Others)
  - Visible Mind → Invisible Mind
  - Non-Reflective Mind → Reflective Mind
Before & After

Infancy
• ToM in Action at 15 months!
• Joint attention, Social referencing, Symbolic games, Imitation, Self-recognition, Recognition of basic emotions, etc.

Adolescence & Adulthood
• 2\textsuperscript{nd} & 3\textsuperscript{rd} order ToM!
• Door to Heaven, 3 Bowls, 3 Prisoners, 3 Philosophers, Card Game, etc.

Open questions
• **Which one comes first?**
  – Understanding of Self (*Simulation Theory-of-Mind*)
  – Understanding of Others (*Theory Theory-of-Mind*)

• **Which one comes first?**
  – Understanding of Emotions
  – Understanding of Cognitions
Possible answer!

• Danish children from 5 to 7 years) (Bender et al., 2010)
• Understanding of 1st order false-belief and its impact on emotions.
• Gap between ToM & EU seems Universal:
  – Pygmy of Cameroon (Avis et al., 1991)
  – Children from UK (de Rosnay et al., 2004; Pons & al., 2003)
  – Quechua of Peru (Tenenbaum, et al., 2004)
  – Fongbé of Bénin (Pons et al., 2006)

Language & ToM

• Can Language explain the Development & Individual ≠ in Children’s ToM?
• Understanding of Self’s & Others’ Cognition & Emotion (ToM):
• Not only based on silent observations (facial expression, body posture & movement, prosody, etc.)
Language & ToM

• Also based on talking with people about what they see, want, think, feel: “If I want to know what you see, want, think, feel, I talk to you”

• Also based on talking to ourselves (i.e. inner / private speech): “(What do) I see, want, think, feel…?”

• These public & private mental representations & communications are maybe one of the main ≠ between humans & non-humans

Language & ToM

• At least three reasons could explain the impact of Language on ToM (Enrichment Hypothesis)

• 1. Semantic enrichment: Child gains from acquiring a mental vocabulary

• Example of mental verbs: “I think it’s a cat”
2. Syntactic enrichment: Child gains from acquiring syntactic tools to connect one thought with another. Example of combination of a mental verb with a propositional complement: “I think it’s a cat”

3. Pragmatic enrichment: Child gains from communicating with Others in which different thoughts, feelings (discourses, narratives, conversations) are articulated. Example of enunciation of viewpoint endorsed or not by the Other to whom it is addressed: “I think it’s a cat”

Does empirical research support the Enrichment Hypothesis?
(1) Children’s level of language (semantic, syntax) correlates with ToM (e.g. Happé, 1995; Jenkins et al, 1999; Farina, et al. 2008; Pons, Lawson, Harris & de Rosnay, 2003)

(2) Children’s use of mental terms correlates with ToM (e.g. Bartsch & Wellman, 1995; Grazzani & Ornaghi, 2012; Ornaghi & Grazzani, 2012; Tardif & Wellman, 2000; Vinden, 1996)

(3) Deaf children born into non-signing families have a delay in their ToM development (e.g. Peterson & Siegal, 2000; Figueras-Costas & Harris, 2001; Woolfe, 2002).
Language & ToM

• (4) **Bilingual children** (circa 50% of the children in the World?) (Oral & Oral, Sign & Oral) have a better ToM (e.g. Siegal, 2007; Lecce & Pons, 2008)

• (5) **Alexithymic people** (having difficulties in verbally identifying & describing emotions in Self & Others) have:
  – An impaired ToM (Meins, 2008; Taylor, 2002):
  – Children with impaired ToM (Luminet & Lenoir, 2006)

Language & ToM

• (6) Do **Non-Human Primates** have a ToM (Premack, Povinelli, Tomasello, Coll, etc.)?

• (7) **Maternal conversations** correlate with children’s ToM (e.g. Meins, 2002; Ruffman, Slade & Crowe, 2002; de Rosnay, Pons, Harris & Morrell, 2004)

• (8) **Language-based interventions** promote children’s ToM (e.g. Lohmann & Tomasello, 2003; Hale & Tager-Flusberg, 2003; Ornaghi, Brockmeier & Grazzani, 2011; Pons, Harris & Doudin, 2002)
Summary II

• Research supports the Enrichment Hypothesis:
  
  • Language (semantic, syntax & pragmatic) has an impact on ToM!
  • In typical (mono- & bilingual) and non-typical children (e.g. deaf, alexithymic)
  • With or without typical parents (e.g. deaf, alexithymic)

Open Questions

• Is the Enrichment Hypothesis equally valid for Self & Others X Cognitions & Emotions?
  – Cross-situational studies!

• What about the reverse Hypothesis: ToM \( \rightarrow \) Language (most of the studies are correlational)?
  – Longitudinal studies!
  – Training studies!
Open Questions

• What is the specific impact of **Children’s Language** versus **Family Language** on Children’s ToM?
• de Rosnay et al., 2004
  – Clinical studies with Alexithymic parents/children!
  – Longitudinal Studies!
  – Training studies!

Open Questions

• Which aspect of Children’s Language is more important for their ToM: **Syntax, Semantic versus Pragmatic**
• Happé, 1999; Farina et al., 2008; Roquetas, 2009

• **HF & Asperger** = Good Semantic & Syntactic but often impaired Pragmatic (*Where is the salt? His heart is a stone*) → **“The Imitation Game”**
  – Clinical studies with Asperger & HF or SLI!
  – Training studies!
Open Questions

- What about the relation between Language and other factors (e.g. Executive functions, Non-verbal Intelligence)
- Mora et al., 2012
  - Correlation studies
  - Longitudinal studies
  - Training studies
- Vibeke Grøver & Veslemøy Rydland (Department of Pedagogy – UiO)
  \textit{Språklæring og tekstforståelse i barnehagen}

Theoretical Interest

Causalities

- Egg & Chicken as the main cause (Language \textsuperscript{1st} versus ToM \textsuperscript{1st})!
- Semantic & Syntax (Representation) versus Pragmatic (Communication) as the main cause
- Children’s versus Family’s Language as the main cause
- Language versus other Factors as the main cause
**Applied Interest**

**Intervention**
- Language versus ToM as the main target!
- Semantic, Syntax versus Pragmatic as the main target!
- Children’s versus their Family’s Language as the main target!
- Language versus other Factors as the main target!

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**References**
Thank You!

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