Joint Attention, Joint Action and Language Development in a Child’s Second Year

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General framework: development of symbolic communication (Werner & Kaplan, 1963)

- in the course of development there is progressive **distancing** of e.g. the symbolic vehicle and object
- **reference arises in** its initial **nonrepresentational** form within a primordial sharing situation
- understanding representational relation > comprehending that the symbolic vehicle represents its object
  - distancing occurs in joint attention and joint action

pointing “introduces” reference into communication (Brinck, 2003)
determining of referent > redirection of addressee’s attention

...
Joint attention (JA)

- triadic interactions, in which participants coordinate their attention to an object of mutual interest (Bakeman & Adamson, 1984)
  - alignment of adult’s and infant’s attention, e.g. gaze-following, pointing:
    protoimperative (requests, BR),
    protodeclarative (DP), protoinformative (IP)

- JA and language > JA plays a crucial role in children’s acquisition of language (Bruner, 1983; Tomasello, 2008)

- example of research (Mundy et al., 2007): ESCS (12, 18 mths) and language (24 mths)
  > RJA (12 mths) and IJA (18 mths) correlated with lang. comprehension
Joint action (JAc)

- any form of social interaction whereby two or more individuals **coordinate their actions** in space and time to bring about a change in the environment (Sebanz et al., 2006)
- JAc creates a "perceptual common ground" in JAc

- particularly important > complementary forms of JAc ("meshing" of actions)
- JAc and language? "language use is a form of joint action" (Clark, 1996)
- but does JAc play a role in language acquisition?
Conducted research – aims:

Specifying developmental relations between different manifestations of early child communication

Extending conducted research by adding JAc and measurement of language production in the laboratory

Expected relations:

1. Responding to JA (gaze following) is related to language comprehension

2. Initiating JA, producing pointing are related to language production

3. Effectiveness of coordination of JAc is related to use of language
Subject and methods

- subjects (N = 252; girls = 120) 
  (M=52.3; SD=1.52; M=80; SD=1.79; M=104.3; SD=1.75)
- measurement

T1 (12 mths) ESCS, pointing
T2 (18 mths) pointing, joint action
T3 (24 mths) lang. (comprehension and production)
1. Responding to JA and language comprehension - methods

**Early Social Communication Scales (Mundy et al., 2003):**
- Initiating JA (IJA)
- **Responding to JA (gaze following) (RJA)**
- Behavioral Requests (BR)
- **Responding to Behavioral Requests (RBR)**

**12 mths**

**Comprehension – Picture Vocabulary Test:**
- Comprehension (Haman & Fronczyk, 2012)
  - measures comprehension of words (pronouns, verbs and adjectives scales; total result)

**24 mths**
1. Predictors of language comprehension - results

_language comprehension_ 24 mths

**IJA**

**RBR**

beta = .167*

beta = .163*

F(4, 248) = 5.81**

RJA

BR
2. Initiating JA, pointing and language production -
methods

ESCS:  
- Initiating JA (IJA)
- Responding to JA (gaze following) (RJA)
- Behavioral Requests (BR)
- Responding to Behavioral Requests (RBR)

• Protodeclarative pointing (DP)

12 mths
2. Initiating JA, **pointing** and language production – **methods**

- Protoinformative pointing (IP) two toys (horse and sheep) and illustration depicting them
- E presents the third toy (cow) – lack of illustration

Test – illustrations appear (two phases):
1. E doesn’t see illustration > measurement of informing (IP I)
2. E sees wrong illustration > measurement of correcting (IP II)
2. Initiating JA, pointing and **language production – methods**

Language production – spontaneous expression of child during tasks in the laboratory

- Expressions classified into categories: word, two words, sentence, question
- + aggregated result
2. Predictors of language production – results

$IJA \rightarrow \text{aggregated language prod. 24 mths}$

$RJA \rightarrow \text{aggregated language prod. 24 mths}$

$RBR \rightarrow \text{aggregated language prod. 24 mths}$

$F(4, 248) = 3.80^{**}$

$\beta = 0.174^{*}$
2. Protodeclarative pointing (PD) and language -
results

12 mths

- production (24 mths)
  - words ($p = .054$)
  - questions **
  - aggregated *

18 mths

- words *
- aggregated

* $p < .05$; ** $p < .01$
2. Protoinformative pointing (IP) and language - results

18 mths

**Informing** (E doesn’t see)

**Correcting** (E sees wrong)

**Production (24 mths)**

- Words ($p = .066$)
- Sentences *
- Aggregated ($p = .061$)

**Comprehension sum** *

* $p < .05$; **$p < .01$
3. **Coordination of joint action (JAc) and language – methods**

pretending game – drinking tea

E picks up her cup and *without saying anything* stops her hand midway waiting for the child’s reaction. We code the child’s accurate coordination and *completion* of E’s action.
3. Joint action and language - results

18 mths

production 24 (mths)

non-verbal coordination

words **

sentences *

aggregated **

comprehension

* $p < .05$; ** $p < .01$
Language production and language comprehension – results

\[ r_s = .292^{**} \]
Development of language production is more related to pointing/request production than to gaze/point/request following.
To sum up – language comprehension

Development of language comprehension is more related to gaze/point/request following and pointing, which require comprehension of the situation, than to pointing to share interest.
To interpret

- production of pointing, joint action and language as progressively more advanced manifestations of motivation to **share, inform** (à la Tomasello)
- gaze-following, comprehension of situation and language as progressively more advanced manifestations of **alignment** of attention, situational requirements and minds
- developmental continuity in distancing: **in production**: pointing < JAc < speech
  **in comprehension**: gaze-following < comprehension of situation < comprehension of language

BUT weak relation between production and comprehension
Methodological challenges

Limitations: selective registration of early communication

Need for more detailed registration of development of children’s communication ("distancing")

1. Multimodal approach
   • different forms of expression are produced under guidance of a single aim (Kendon, 2004)
   • micro-analyses of face-to-face interaction and communication: analysis of gaze, facial expression, full body movement, vocalizations, gestures and speech

2. Ethological approach (Blurton Jones, 1972)
   • importance of starting with a thorough descriptive study
   • derive all psychologically meaningful variables from observational data
   • inductive approach
Methodological challenges

• thorough description of behaviour (taking advantage of motion capture, audio recording and eyetracking technology) and identification of regularities

Are these processes precursors of language development?

• **contingencies** (Jaffe et al., 2001) in infant’s and caregiver’s diadic actions and expressions

• early manifestations of:
  – **bidirectionality** (lack of reciprocity in chimpanzees [Matsuzawa, 2010])
  – **alignment of** attentions
  – **complementary** actions in joint action
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