

Multimodal explanations in French children: gesture as a window into abstract thought ?

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Explanation behaviour

Veneziano & Sinclair, 1995

Dubost, 1998

Veneziano & Hudelot, 2002

Adam, 1992

- **The child's first explanations occur before the end of the second year of age**
- **Early verbal explanation behaviour occurs in the dialogal frame of conversations and is context dependant**
- **Later and written forms of explanations fill discourse properties**
- **Discourse is language built not only at the sentence level, but also at the textual level**
- **Discourse displays coherence and cohesive properties**
- **Discourse is language relying on reference displacement, decontextualization and cognitive decentration**

Simple and complex forms of explanations

- Simple explanation contains either one proposition, or a few which are not bound logically or chronologically :
 - « **parce qu'**elle est punie »
 - « **parce que** c'est rouge **et** ça sent la fraise »
- Complex explanation contains two or more propositions which are bound to each other logically or chronologically :
 - « **parce que si** tu lances en arrière ça tombe sur la tête **et après t'es mort** »

Hypothesis :

- **1. The age period from 3 to 11 should appear as a transition from simple to complex explanations, attesting the increasing ability to generate speech at the level of discourse**
- **2. If speech development really means multimodal development, the increasing ability to generate explanations should go hand in hand with an increasing use of coverbal gesture**

Method

Colletta, Simon, Vuillet & Prévost, 2004

Colletta, 2004

Colletta & Pellenq, 2004

- **Two empirical studies based on data collected in nursery and primary schools**
- **First study : video recorded interviews of children aged from 6 to 11 years, who had to give explanations about familial and social topics**
- **Second study : video recorded classroom interactions and activities whom teachers often use to elicit explanations from their young pupils (3 to 6 years)**
- **The data collected allowed us to build a video corpus of 500 explanations**
- **Every verbal explanation was identified and transcribed by at least two different persons. We measured the length of each explanation, as well as its verbal information content (syllables, propositions, connectives). Coverbal gestures were also identified and classified with similar care in method**

Main Results

	Ps 3-4	Ms 4-5	Gs 5-6	Cp 6-7	Ce 7-9	Cm 9-11
Time length (s)	2.10	4.43	4.05	7.00	9.38	10.56
syllables (n)	7.13	12.35	13.08	23.23	30.69	39.32
propositions (n)	1.13	1.44	1.61	2.37	3.28	3.70
connectives (n)	1.08	1.40	1.70	3.10	3.47	4.67
Coverbal gestures (n)	0.31	0.75	0.98	2.23	2.48	3.47

As complex explanations emerge...

Fréquences observ. pour ages 4 nvx, type d'explic.

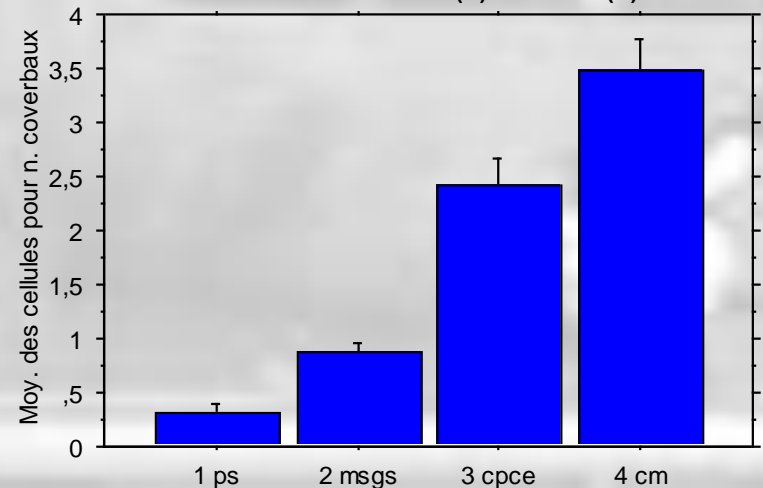
	complexe	simple	Totaux
1 (ps)	1	38	39
2 (ms.gs)	47	182	229
3 (cp.ce)	76	48	124
4 (cm)	90	18	108
Totaux	214	286	500

...The use of coverbal gesture increases

Diag. en bâtons

Variable(s) de groupe : age 4 nvx

Barres d'erreurs : ± 1 Erreur(s) standard(s)



Children's abstract gestures :



si moi chus fait - chus
bien fait par quelqu'un



'sque - les parents - les parents heu: - avant i's connaissent pas



Puisqu'i z'ont une mère
- elle s'appelle Martin



Et le père
Martinez



Et ben le nom d'
famille ce s'ra
Martinez

Abstract referential gestures (1)

- **Substitution pointing** [CE1.3.Van.3408 \(Rsubst\).mov](#)
- **Representing absent referents** [CE1.3.Yv.3006 \(Rfig\).mov](#)
- **Anaphoric pointing** [CM2.3.Mad.0148 \(Ranaph\).mov](#)
- **Localization of abstract referents** [CP1.Flo.3048 \(Rfig\).mov](#)
- **Oppositions** [CM1.1.Ja.0047 \(Rfig\).mov](#)

Abstract referential gestures (2)

- **Metaphoric content** [CE1.3.Yv.3006 \(Rfig\).mov](#)
- **Representing time and aspect** [CM1.1.Ja.1828 \(Rfig\).mov](#)
- **Representing abstract actions** [CM2.3.Mad.0145 \(Rfig\).mov](#)
[CM2.3.Emi.1438 \(Rfig\).mov](#)
- **Representing quantities** [CM1.1.Ja.1828 \(Rfig\).mov](#)
[CM2.3.Jér.2022 \(Rfig\).mov](#)
- **Representing negation and other modal attitudes** [CM1.3.Lau.1207 \(Rfig\).mov](#) [CE1.5.Si.1845 \(Rfig\).mov](#)

Explanation's gesture in nursery school and primary school

	Direct pointings and gestures of the concrete	Gestures of the abstract	Expressive gesture
Nursery school	88.50	8.00	3.50
Primary school	18.00	53.00	29.00

Typical explanation's gestures in nursery school

Pointing gestures :



Representational gestures :

1. « elle penche la tête comme ça »
2. « et le chien i' fait comme ça »

1

2



Age and explanation's gesture

- **Those results show a tremendous difference in the use of gesture between younger and older children :**
 - **Direct pointing vs indirect and abstract pointing**
 - **Gestures to represent concrete objects and actions vs gestures to represent abstract concepts**
- **Do these differences point to a developmental evolution in the semiotic use of gestures through childhood ?**
- **Then, would it point to the developmental evolution towards abstract thought in children ?**

About « abstraction » and « abstract thought »

- **The word comes from philosophy** (Aristote, Kant, Hume, Hegel, Russell...)
- **In the psychological field, abstraction is linked with perception** (Barsalou, 1999), **memory** (Bartlett,), **categorisation** (Piaget, 1967) and **language** (Rosch, Gentner,)
- **Abstraction can be defined as the cognitive operation of extracting an object, a property or a relationship from the physical world or from a mental representation**
- **Abstraction also refers « to the abstractness of concepts, ranging from concrete (e.g. hat) to abstract (e.g. courage) »** (Barsalou, 2003)

What does « abstract pointing » mean ?

- **Direct pointing is indexation of an object or a location (Leslie,), therefore, direct pointing relies on the perceptual properties of abstraction, those linked with selective attention**
- **Direct pointing is a joint attentional device**
- **Abstract concepts are expressed in gestural languages as well as in oral languages** (Armstrong, Stokoe & Wilcox, 1995 ; Emmorey & Reilly, 1995 ; Bloom & al., 1999)
- **Relying on metaphors and image schemata, representational gestures are useful to express abstract concepts** (Johnson, 1987 ; Kendon, 1992 ; McNeill, 1992 ; Calbris, 2003)

Abstract concepts, analogy and spatial cognition

- **According to Barsalou (1999), abstract cognition is grounded in perception and abstract concepts are embodied**
- **Abstract concepts involve analogical reasoning and spatial cognition** (Lakoff & Johnson, 1985 ; Johnson, 1987 ; Fauconnier, 1997, 2001 ; Gentner, Holyoak & Kokinov, 2001)
- **Abstract concepts are expressed in gestural languages as well as in oral languages** (Armstrong, Stokoe & Wilcox, 1995 ; Emmorey & Reilly, 1995 ; Bloom & al., 1999)
- **Relying on metaphors and image schemata, representational gestures are useful to express abstract concepts** (Johnson, 1987 ; Kendon, 1992 ; McNeill, 1992 ; Calbris, 2003)

Conclusion

- **By the age of cp (6-7), one gesture out of two is a gesture of the abstract**
- **The observation of gesture renders visible abstract thought which accompanies the complex discourse use of language**
- **Next step is to check multimodal and discourse evolutions attested here on a larger scale, and to investigate multimodal communication abilities in deaf children and children with SLI**

**Thanks
for your
attention**

