

Emergence of pointing

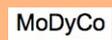
Two case studies



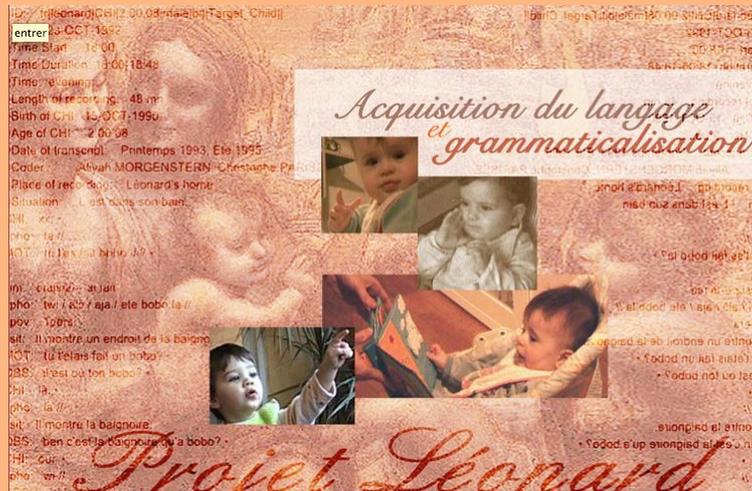
Marie Leroy

Emmanuelle Mathiot

Aliyah Morgenstern



Framework: the Leonard project

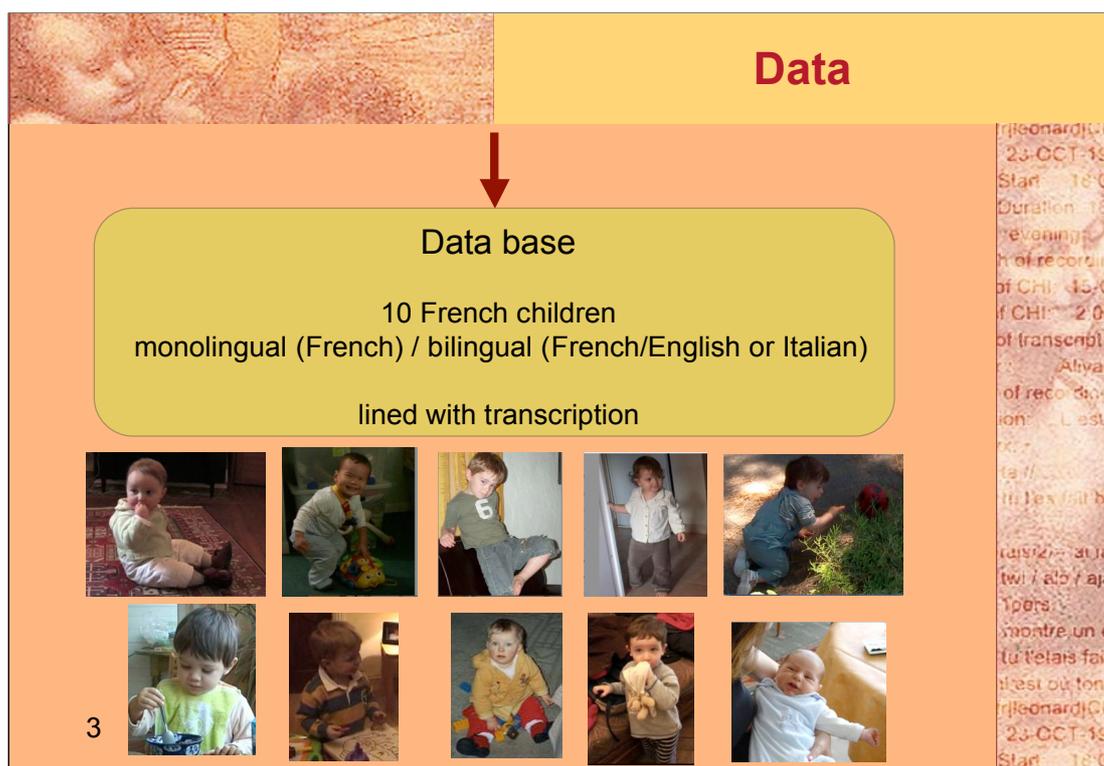


The poster for the Leonard project features a central image of a young child with a large, stylized 'L' in the background. The text 'Acquisition du langage et grammaticalisation' is written in a cursive font across the top. Below this, there are several small photographs of children in various settings. The title 'Projet Leonard' is written in a large, elegant cursive font at the bottom. On the left side, there is a list of technical details in French:

- Identifiant: CH2003rdiazlod; Target: Chadli
- Centre: CCT 1302
- Time Start: 14:00
- Time Duration: 1:00:18.4s
- Time of language: 0:00:00
- Length of recording: 48 min
- Birth of CHI: 15 OCT 1990
- Age of CHI: 2;00:58
- Date of transcription: Printemps 1993, Ete 1995
- Coder: Abigail MORGENSTERN, Christophe PA...
- Place of recording: Leonard's home
- Situation: L'est dans son bain.
- CHI: xxz
- pho: la /i/
- NOT: it, le, val, bain, /a/
- int: enregistreur
- pho: ten / a/ / a/ / e/ te boba / a /
- poV: / o/ b/ a /
- sit: il montre un endroit de la baigno...
- NOT: la tetaie fai un bobo?
- BS: a'est ce ton bobo?
- CHI: / a /
- pho: / a / i /
- sit: il montre la baignoire.
- BS: ben c'est la baignoire ou a bobo?
- CHI: Gu /
- pho: / m / i /



We have worked on this paper in the framework of the Leonard Project financed by the French National Research Agency.

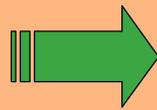


One of the aims of the Leonard project is to collect, computerize and analyze several longitudinal follow-ups of monolingual and bilingual French children. The videos will be lined up with the transcriptions.

We are presently recording 10 children in France, among which one is in Belgium (monolingual French), one is in Dublin (bilingual French/English).

Aim: analysis of free grammatical morphemes

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Prepositions

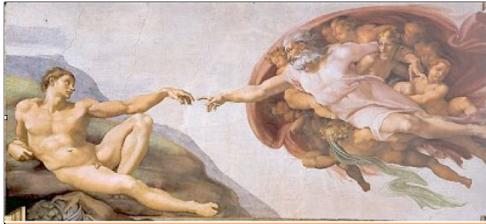
connectors

pronouns

determiners

4

Our aim is to study the appearance and development of grammatical tools used by children between one and three years old, which we will compare to the use of the same tools in adult speech, thanks to our collaboration with experienced researchers in our three laboratories. We will try to establish the order in which these markers appear and their link to the pragmatic context (requests, narratives, explanations...).



Why study the emergence of pointing?

- 1) AFLICO Congress: focussed on gesture and sign language
- 2) Our data: 7 months to about 18 months
- 3) Link with our project: a precursor of grammatical tools

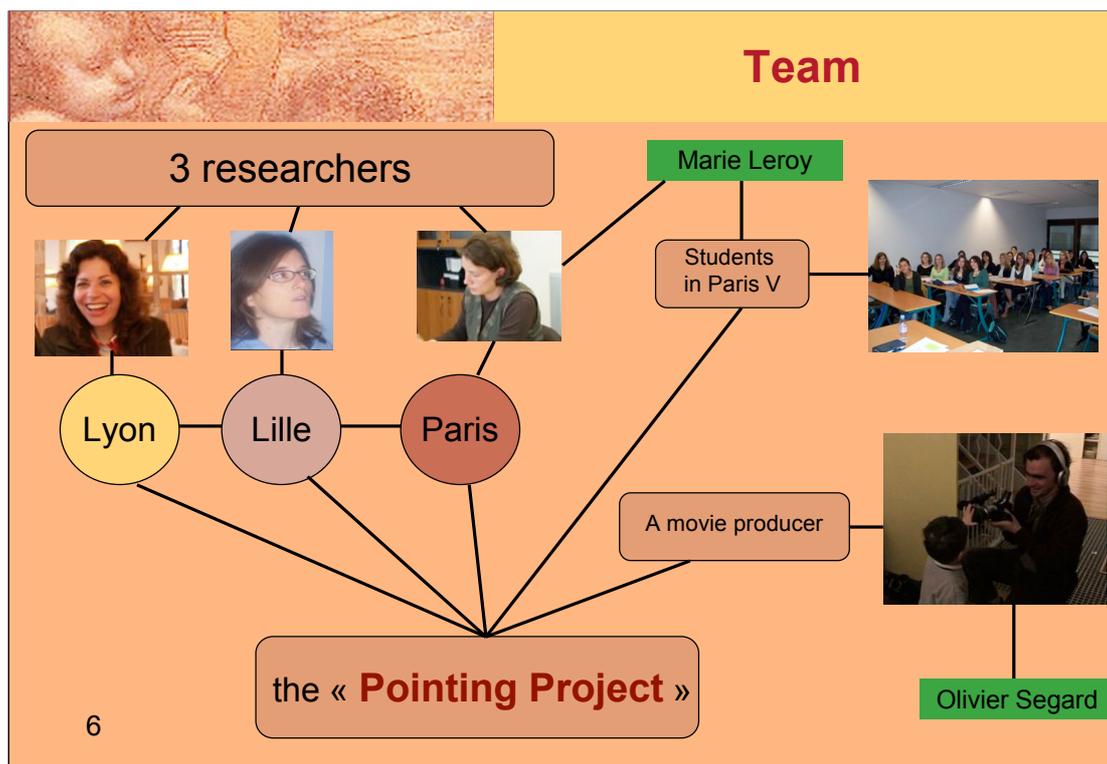


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However, we have chosen to present work in progress on pointing today, despite the fact that we are well aware of the amount of work that has been done on the topic and of the prestigious researchers who have made considerable contributions.

We decided to work on pointing for three main reasons:

- 1) We were eager to participate in the Aflico Congress and we saw it was focussed on gesture and sign language.
- 2) At the time of the call the children we are filming were about 18 months and did not produce many vocal grammatical markers
- 3) Pointing can be considered as a precursor of grammatical tools or maybe even as one of children's first grammatical tools.
- 4) We had each already worked on pointing for our Phd theses: Marie had worked on preverbal prosody and gestures, Emmanuelle on pointing in a pre-psychotic child (???) and Aliyah on personal pronouns in French, English and French Sign language, pointing therefore as part of the grammar of signed language, and « gestural » pointing.



This is our team, Marie Leroy (who is not mentioned in the program) has joined us on this project with the help of her students of the University of Paris 5.

Olivier Segard, a young film-director works with Aliyah, and edits the recordings with her in order to make a documentary on language development.

Characteristics of pointing

- Specific to human beings**
- A Precursor of verbal naming**
 - « Linguistic representation emerges from, and is rooted in, nonlinguistic forms of representation » (*Werner & Kaplan, 1963, p. 66*)
 - « Its object-distinguishing function may be a crucial precursor of verbal naming and it could be considered as the best predictor of early linguistic performance » (*Bates et al 1979*)
 - « Pointing allows visual objects to take on auditory qualities, and this is the royal road (but not the only route) to language. » (*Butterworth 2003, p. 29*)
- Role in the transition from one to two word speech**
(Goldin-Meadow 2003)

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a) Butterworth among others, shows that pointing is a uniquely human gesture, if we consider the cognitive and symbolic operations involved in pointing rather than the gestural form that is produced by chimpanzees in certain conditions. Just like language, pointing is specific to the human race. (But pointing may be characteristic of Western Cultures and more research needs to be done on cultures where pointing wouldn't be used by the adult community, we already know that the functions of pointing vary from culture to culture, I was also told by Jacqueline Rabain-Jamin that even though Wolof adults might not point to children, the children's first attempts at pointing are interpreted by adults as requests for joint attention).

b) The pointing gesture has received particular attention in the field of language acquisition. According to Werner & Kaplan (1963), « linguistic representation emerges from, and is rooted in, nonlinguistic forms of representation » (p. 66) and pointing is one of them). According to Bates et al 1979, « its object-distinguishing function may be a crucial precursor of verbal naming and it could be considered as the best predictor of early linguistic performance ». We know that autistic children hardly point, or at least do not have what is called proto-declarative pointing.

Butterworth (2003) ends his chapter with this magnificent declaration: « (...) pointing serves not only to individuate the object, but also to authorize the link between the object and speech from the baby's perspective. Pointing allows visual objects to take on auditory qualities, and this is the royal road (but not the only route) to language. » (p. 29)

c) For Goldin-Meadow (2003) pointing has a crucial role in the transition from one-to two word speech. Gesture-word combinations help trigger the onset of two-word speech. (In a certain way, this phenomenon could be put in parallel with the role of reduplication which helps infants lengthen their verbal production on the phonological and morphological level).

Assertions

1) Discontinuity between the pointing gesture and points (personal pronouns) in Sign Languages

2) The role of gaze

- shared attention
- an interactional/dialogical device

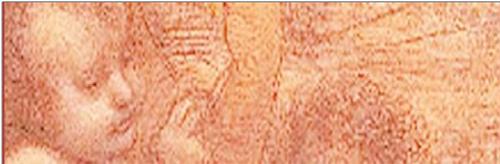


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As we made our review of the literature, it seemed to us that there were some assertions about pointing, some characteristics repeated by several authors

1) Laura Petitto in particular stresses the fact that there is a discontinuity between the pointing gesture and points used as personal pronouns in Sign Language. We won't have time to discuss this, but Helena Pizzuto has not noted the same phenomenon in her data (Italian signed language) nor have I observed a discontinuity in pointing of people in my own recordings of children using French Sign Language.

2) The role of gaze: the child is said to look at the adult when pointing in order to check on shared attention and that reinforces the fact that pointing is an interactional device set in dialogue. However Helena Pizzuto differentiates pointing gestures with the gaze on the target, and linguistic pointing in sign language with the interlocutor himself looking at the locutor rather than at the location pointed at. The role of gaze seems fundamental and is a parameter we decided to focus on in our research.



Functions of pointing

3a) Two categories

- proto-imperative
- proto-declarative

3b) Two origins for pointing



« an abbreviated grasp movement » (Wundt 1912)
pointing develops out of prehension (Vygotsky 1988)



index-finger extension → index pointing
(Masataka 2003)

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3) Many authors distinguish

- proto-imperatives (children point in order to obtain something, the referent if translated into a syntactic category would be a direct object)
- proto-assertives (children point to show an object that is therefore topicalized as an object on which a comment is being made). Some authors find that proto-imperative pointing does not have the same symbolic status, especially since there are often replaced by gestures of reaching. Proto-assertive pointing enables the child to share his/her surprise in front of unusual phenomena or objects.

This puts the origin of pointing in question. For Wundt (1912) pointing is « nothing but an abbreviated grasp movement » (quoted by Werner & Kaplan 1963, p. 78). Vygotsky (1988) also explains that pointing develops out of prehension: unsuccessful grasping movements are interpreted by the adult as a request, and the adult then converts the movement into a meaningful gesture addressed to others (a plea for help) which gives it its imperative function.

On the other hand, other authors, such as Masataka (2003) explain the specific shape of the hand by the fact that pointing emerges from index-finger extension to explore objects, to touch, to press, to feel... This then develops into pointing for the self, children direct their own attention when exploring an object that interests them. Arm extension is added when the object is at a distance and enables children to share their interest with others.

We therefore decided that it was important to look at arm extension and index-finger extension before the emergence of pointing in our recordings.



The data for this study



Théophile

filmed by Aliyah Morgenstern
and Olivier Segard



Madeleine

filmed by Martine Sekali

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We chose to work on two of the ten children that are being presently recorded, a girl and a boy, Théophile and Madeleine, from 7 months to 1;09.

The two children are from middle-class two parent families. They live in Paris and Levallois (a suburb very close to Paris). Théophile is an only child, Madeleine has an older sister 10 years older. The children have been videotaped in their homes in spontaneous situations, once a month for an hour, over a period of 15 months and the filming is still in progress.

Madeleine is filmed with her mother on Wednesday mornings, her sister is there at moments but not for the whole recording. Théophile is filmed in the evening with both his parents, just when he is brought back from his nanny's, from around 7 to 8 PM.



First observations

1) Mostly gaze on the target + vocalizations

2) Decrease in pointing

3) Several Functions of pointing?

4) Monologic pointing



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Emmanuelle and I got together in Lille and decided to watch two video recordings of Théophile together, in order to make our first observations. We first checked that at 7 months there were no pointings in the data, and decided on an age for which we thought the pointings would be frequent enough to start categorizing them: 1;02 and the last recording we had at the time: 1;08.

We made three observations:

-We were struck by the fact that T. did not seem to gaze at his interlocutor when he pointed but kept his gaze on the target. He almost always vocalized when he pointed.

-There was much less pointing at 1;08 than at 1;02.

-It seemed really difficult to assign specific functions to the child's points: they were given meaning by the parents response or reaction and by extra-linguistic context but the child's intention seemed often ambiguous, not clear...

-We were struck by the fact that at 1;02, T. seems to perform a type of pointing that is not frequently mentioned in the literature, what we called **monologic pointing**. It was quite frequent at 1;02, there were still one or two occurrences at 1;08. We were quite excited with this observation even though we know that it is hard to prove that the child could be in monologue despite the presence of observers and cameras!

Method: coding grid

Sample of grid

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-We decided to go back home and test these three observations on all the other recordings. Marie had her students code all pointings and we did the same work in parallel and little by little conceived a coding grid, which we now know ideally needs to be enriched with extra parameters.

-We were not able to make very efficient use of the students' observations but their work helped us redefine our own and we now know what grid we want next year's students to fill out on the other 8 children.



Quantitative analysis

Charts for Madeleine and Théophile

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Charts of the quantitative results

Qualitative results

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Quantitative results are not clear yet, since it is so difficult to categorize according to functions or values of pointing, we went back to our observations and intuitions while coding the data and tried to draw some sort of narrative of the emergence of pointing, as if we were writing a chronological journal on that theme linking it to the child's development.



The emergence of pointing in a diary

« First the baby began to use her forefinger tip for specially close investigations ; at the same time she had a habit of stretching out her hand toward any object that interested her-by association, no doubt, with touching and seizing movements. Combining these two habits, she began to hold her forefinger separate from the other (outstretched) fingers when she thus threw out her hand towards an interesting object ; then, in the second week of the month, she directed this finger alone towards what interested her ; and by the third week, the gesture of pointing was fairly in use »

(Shinn, 227, p.220).

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Very good descriptions of pointing are given in some of the diaries from the end of the XIXth and beginning of the XXth century. Werner and Kaplan quote Miss Shinn:

p. 79 (describing 9th to 10th month): « First the baby began to use her forefinger tip for specially close investigations ; at the same time she had a habit of stretching out her hand toward any object that interested her-by association, no doubt, with touching and seizing movements. Combining these two habits, she began to hold her forefinger separate from the other (outstretched) fingers when she thus threw out her hand towards an interesting object ; then, in the second week of the month, she directed this finger alone towards what interested her ; and by the third week, the gesture of pointing was fairly in use » (Shinn, 227, p.220).

The emergence of pointing in our data

Diaries
Continuity

Films
Catastrophy

16

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Diaries had the extraordinary advantage of allowing the researcher, most often the parent of the baby, to make daily observations that they could use for their analyses. In our method, monthly video recordings that are very poor data according to Tomasello’s standards, we cannot follow the baby day by day or even week by week, but each recording is a surprise, and thanks to these breaks in time, we are able to point to salient developments that might not have been focused in the same way without this forced discontinuity. The processes we study in the children we film are just like the objects these same children point at: each represents a magnificent “catastrophy” (in the sense of René Thom’s catastrophe theory).

Instead of verbally narrating the emergence of pointing, for this presentation, we chose to show it in film with the video-recordings of Théophile. ([show film](#))



The emergence of pointing in our data

FILM

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Monologic pointing ?

Pointing = invitation to the other person

“to look at that thing over there with the expectation by the pointing individual that the other person will perceptually articulate this object in a way similar to his own.”

(Werner & Kaplan 1963, p.43).

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Our close observations gave us the certainty that monologic pointing is very important in the construction of the symbolic meaning associated to the gesture.

The literature alludes to the fact that babies might first point for themselves before they point for others, but this topic does not seem to be very well documented even though recent work takes up that idea to explain how pointing emerges from index finger extension for self (Masataka already quoted). It is mainly stressed by the majority of authors that referring to an object by pointing is an invitation to the other person « to look at that thing over there with the expectation by the pointing individual that the other person will perceptually articulate this object in a way similar to his own. » (Werner & Kaplan 1963, p.43).



Monologic pointing ?

The child might perform pointing for himself before he discovers its communicative value.

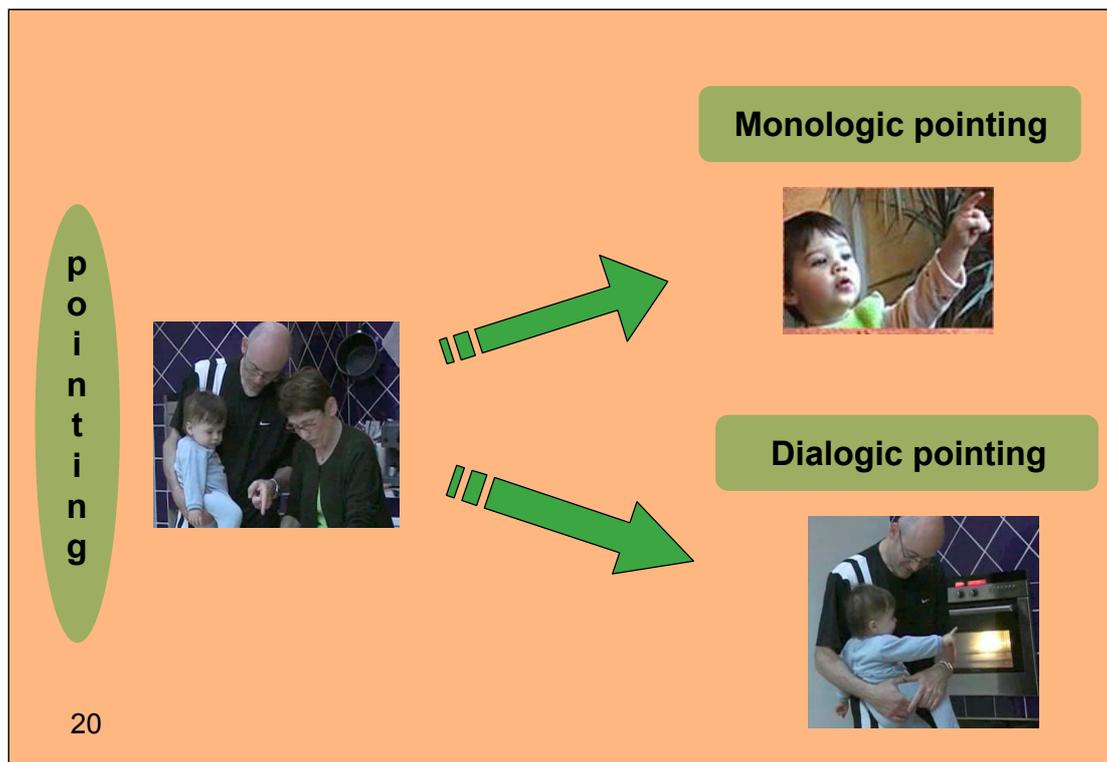
Reinforcing the « sense certainty » of the object (Tran-Duc Thao (1984)

But experiments go against the view that pointing is at first performed primarily for the self (Butterworth 2003)

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However, these same authors allude to the idea that the child might perform pointing for himself before he discovers its communicative value. Butterworth (2003) quotes Tran-Duc Thao (1984) a Vietnamese philosopher, who described such behavior as reinforcing for oneself the « sense certainty » of the object.

Experiments related by Butterworth 2003 in which the child outside the presence of an adult does not point, go against the view that pointing is at first performed primarily for the self.



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We don't think that the question is whether the child FIRST points for himself or for the other, in our data, the two are simultaneous and it is clear that pointing is mainly set in dialogue, is used by the parents and addressed to the children long before they point themselves, or even extend their index intentionally. The two children's pointing gestures seem to spring from dialogue and they appropriate the symbolic meaning as they develop the gesture once they are physiologically and cognitively ready to produce it.

But very intriguing occurrences in which pointing seems to have the same status as monologic vocal productions (// Emily's monologues in the crib) still caught our attention. The two children seem to "babble" with their pointing gestures just like they do with vocalizations, without gazing at anyone, without especially addressing themselves to another interlocutor and they do seem to make quite a lot of sense.



Here is an illustration of what struck us as a sign of the child's pointing for self. ([show film](#))

Concluding questions

Grasping
Wanting

~~or~~
and

Index-extension
Exploring

Proto-imperative

~~or~~
and

Proto-declarative

Dialogue

~~or~~
and

Monologue

22

As you see this is work in progress, scientific babbling. We are trying to combine our readings, fine observations, intuitions and to set up a coding method in order to make detailed analyses of the data.

However we already have questions about what we find in the literature:

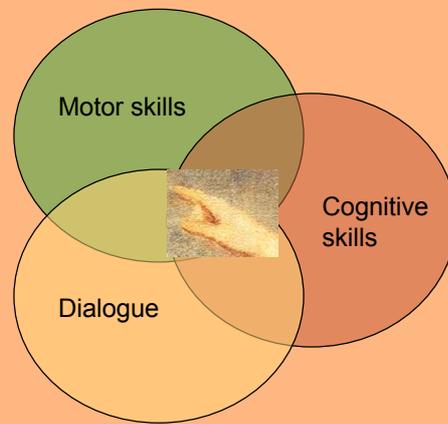
-why decide that pointing springs either from a) grasping and wanting or b) from index-extension and exploring? Why wouldn't it be a combination of the two motor and cognitive skills?

-Why decide that proto-imperatives are not as interesting as proto-declarative especially since proto-declaratives are imperative in a way since they are a request for shared attention, a desire to share, topicalize an object of contemplation?

-Why decide whether monologic pointing PRECEDES dialogic pointing or does not really exist which reminds us of the debate between innate and acquired devices...

The children's neurological maturation enables them to master their bodily movements and transform them into gestures thanks to finer motor skill. These gestures are assigned meaning by their interlocutors. At the same time the children develop cognitive prerequisites that allow them to take up symbolic gestures such as «the bye bye » gesture, or the « the itsy bitsy spider » gesture, from the environment. They also invent specific gestures whose meaning is co-constructed in dialogue in the restricted context of their own family. Pointing is part of the story, it emerges out of motor and cognitive prerequisites, out of the capacity to symbolize but also to take up symbolic forms used by adults and older children in dialogue.

Concluding questions



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Thank you !

Marie, Emmanuelle and Aliyah





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