ADAPT

Kick-off meeting

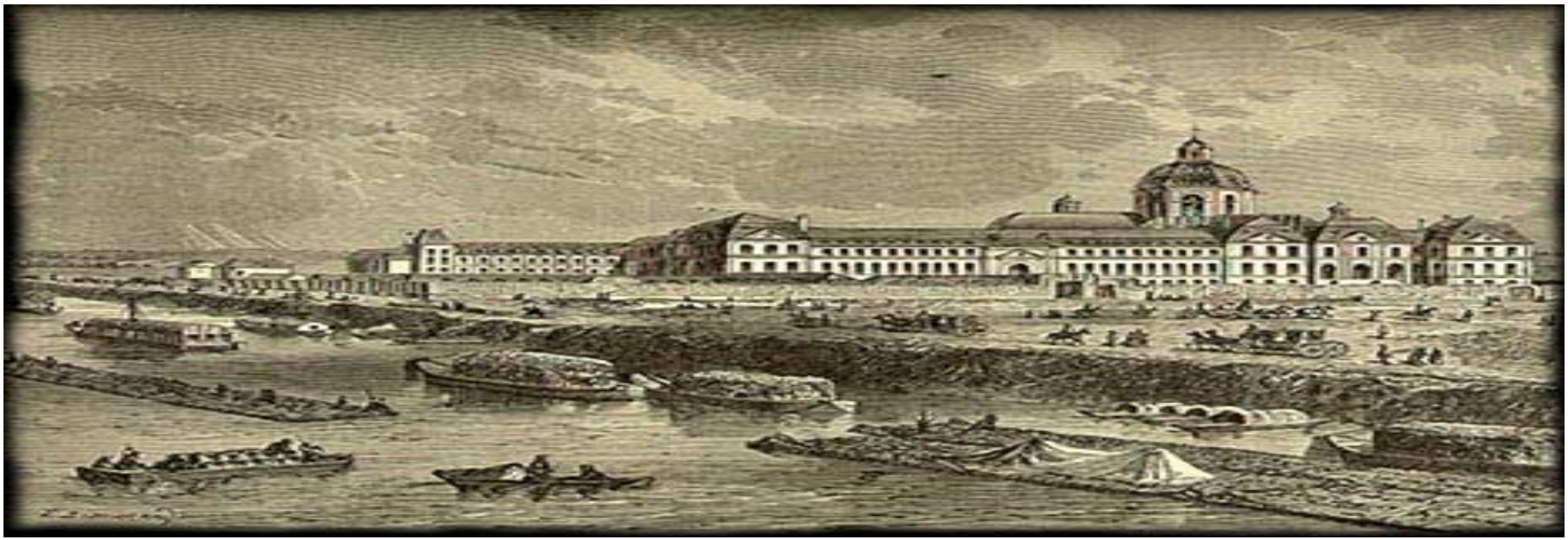
January 20-21, 2003

The rise of expectancies for social contingency

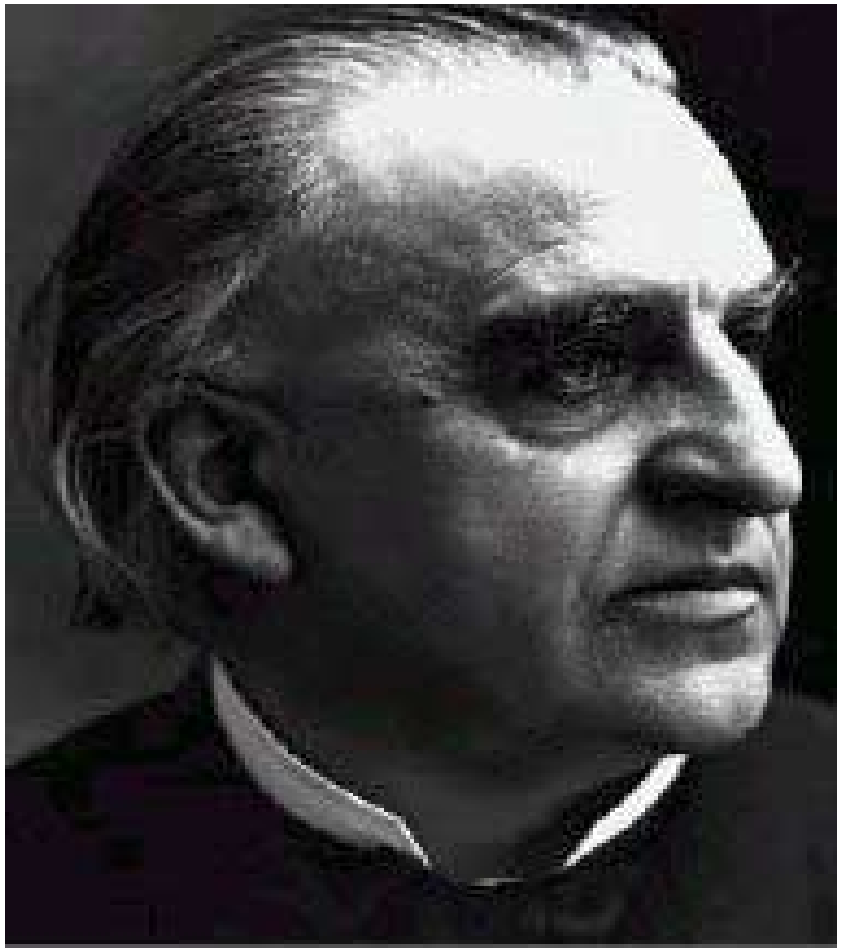
Jacqueline Nadel, CNRS, Hôpital La Salpêtrière, Paris

jnadel@ext.jussieu.fr

La Salpêtrière



A XVII° Century etching



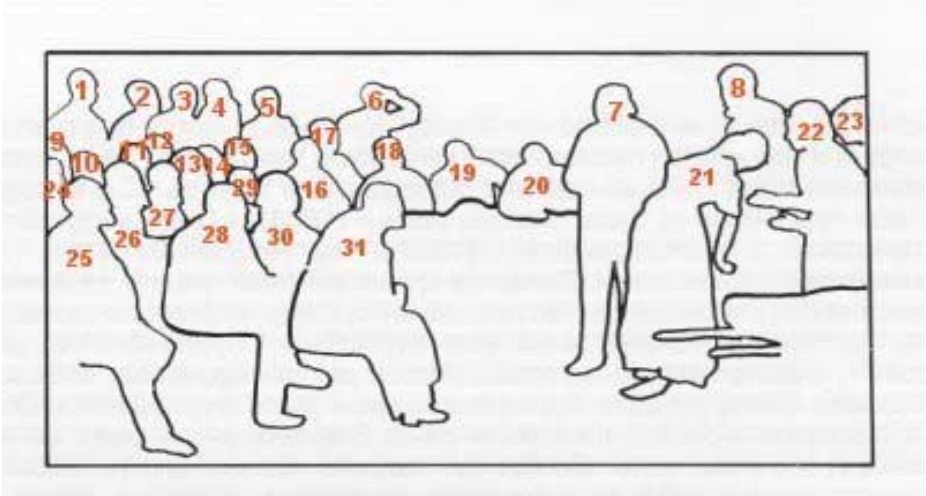
- **Dr Jean-Martin CHARCOT** (1825 - 1893)
- Foundator with Guillaume Duchenne of modern neurology, but more famous for his controversial work on hysteria

Hysteria

BERNHEIM was able to demonstrate that hypnosis as described by Charcot at La Salpêtrière, with its 3 phases of: lethargy, catalepsis and somnambulism was present only when the patient knew about these phases. Only suggestion and imitation make them occur, he said.

Présentation en 1886 d'un cas de "grande hystérie" par Charcot
Gravure de A. Lurat, réalisée d'après le tableau de A. Brouillet, intitulé "Une leçon clinique à la Salpêtrière"

1. Cornil
2. Philippe Burty
3. Debove
4. Mathias Duval
5. Jean Charcot
6. Joffroy
7. Jean-Martin Charcot
8. Babinski
9. ?
10. Lebas
11. Le Lorrain
12. Guinon
13. Bourneville
14. Ballet
15. H. Berbez
16. ?
17. Gombault
18. Pierre Marie
19. Charles Fere
20. Paul Richer
21. Blanche Wittmann (patiente)
22. Mlle Bottard (surveillante)
23. Mlle Ecary (infirmière)
24. Londe
25. P. Berbez
26. Jules Clarette
27. Alfred Naquet
28. Vigouroux
29. ?
30. Brissaud
31. Gilles de la Tourette



Lab Vulnerability, Adaptation & Psychopathology

Team: ***Early Processing of Human Stimuli and Precursors of intentionality***

Includes

- Jacqueline Nadel, Research Director at the CNRS, coordinator (ADAPT)
- Robert Soussignan, Associate Professor
- Pierre Canet, engeneery (ADAPT)
- Pierre Andry, postdoc, epigenetic robotics (ADAPT?)
- Nadra Aouka, PhD Student
- Priscille Gérardin, MD, child psychiatry, PhD Student
- Marie Maurer, PhD Student (ADAPT)
- Caroline Potier, PhD Student
- Claire-Marie Verdon, PhD Student
- Coralie Sann, master in Cognitive biology (ADAPT)

- Areas: Early development - Developmental psychopathology - Imitation – Emotion - Causal reasoning - Social perception –

Focus

Perception of Soc stimuli

as

- Multisensory
- Synchronic
- Redundant
- Contingent
- Intentional

Stimuli in dynamic interactions

Searching for synchronic activities

I. Hampering contingency via experimental designs which disrupt the communicative flow

Technically

Do you detect non-contingent communication?

Maternal Live-Replay-Live TV communication

In vivo

Do you expect contingency from every human being?

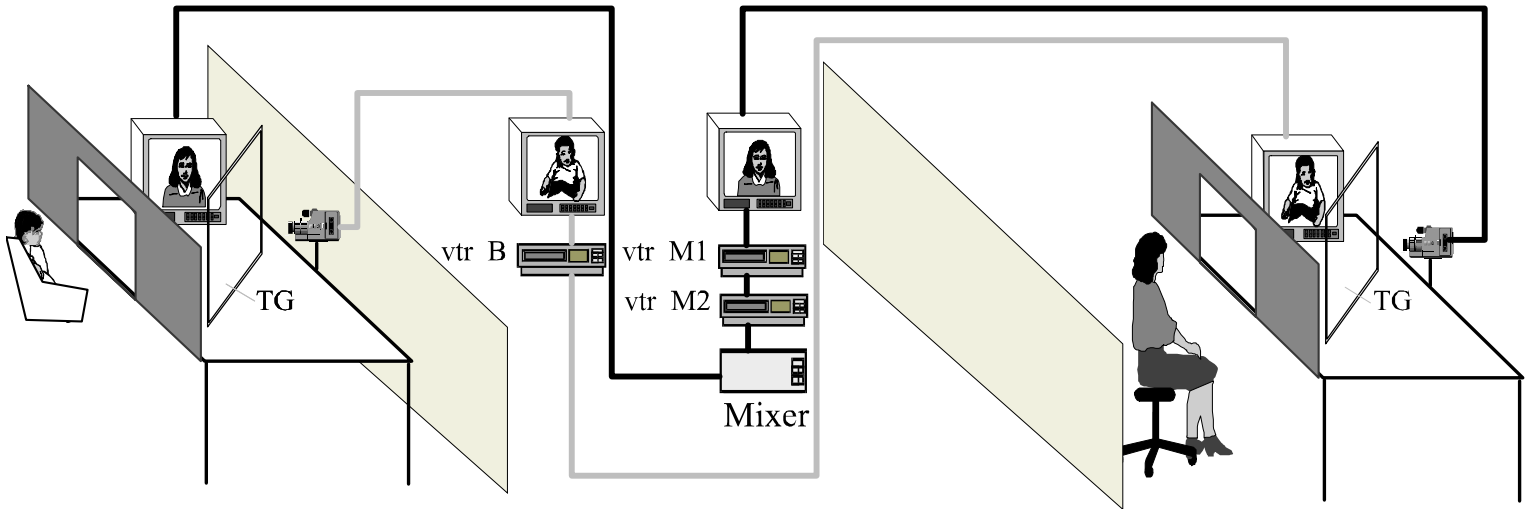
Revisited Still-Face: SF/Interaction/SF

Hampering social contingency via experimental manipulations

Replay

TV Live-Replay Experimental Design and Equipment

(a modified version of Murray & Trevarthen design, by Nadel *et al.1999)*



baby's room **engineery room** **mother's room**

- **Three independent rooms**
- **Mother and infant can hear and see each other through TV monitors**
- **The infant sees and hears continuously her mother. The mother is either contingent or non contingent**

  In project: voice synchronised or not with the lips

Coding system

During replay

- **A videocomputer interfacing system allows:**

  - to get simultaneously on the screen the infant and the mother's digitized single frames
  - to synchronise the frames according to a LED signal
  - to get automatically a stable frame to be coded (here, each 40/100th second

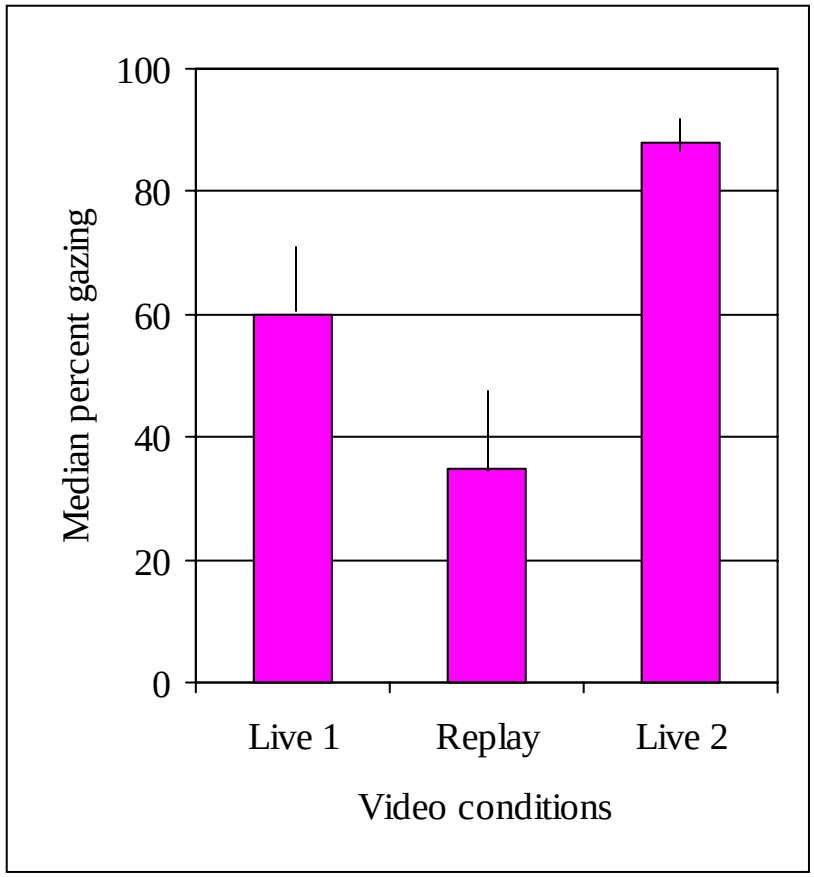
- **With our coding software**

  - we describe the frame with all the categories listed
  - we click on the mouse for the relevant item of each category listed
  - ° we choose one and only one item of each category since the items are exclusive and exhaustive

2-month-olds can interact with a contingent mother through TV monitors

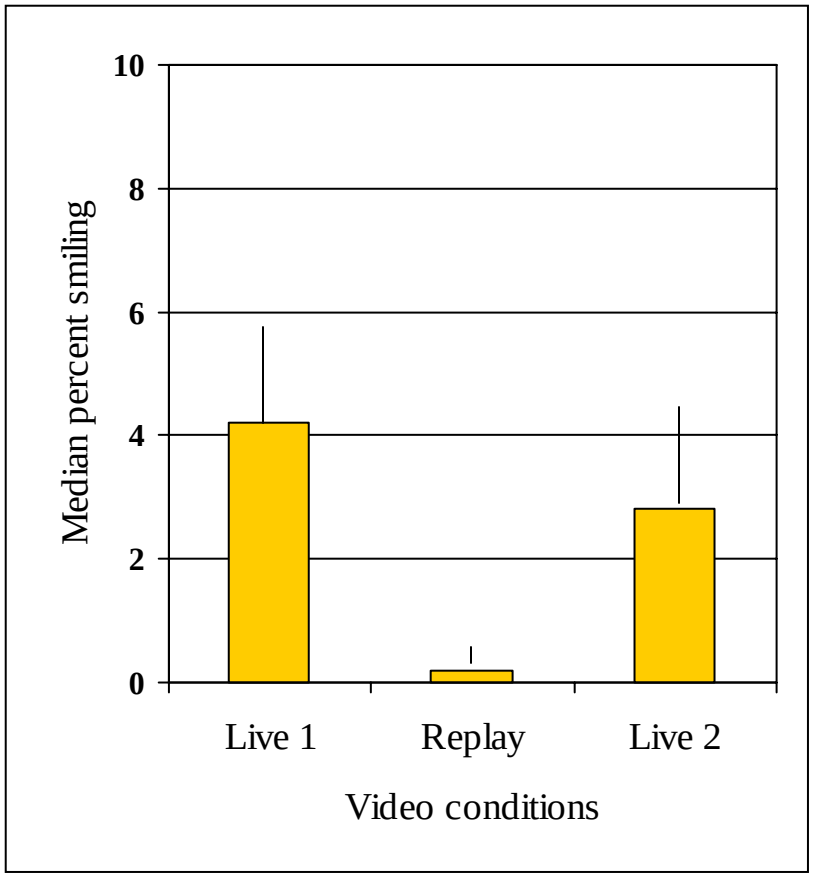
2-month-olds are upset in front of a smiling but non-contingent mother

Gaze to mother according to communicative conditions



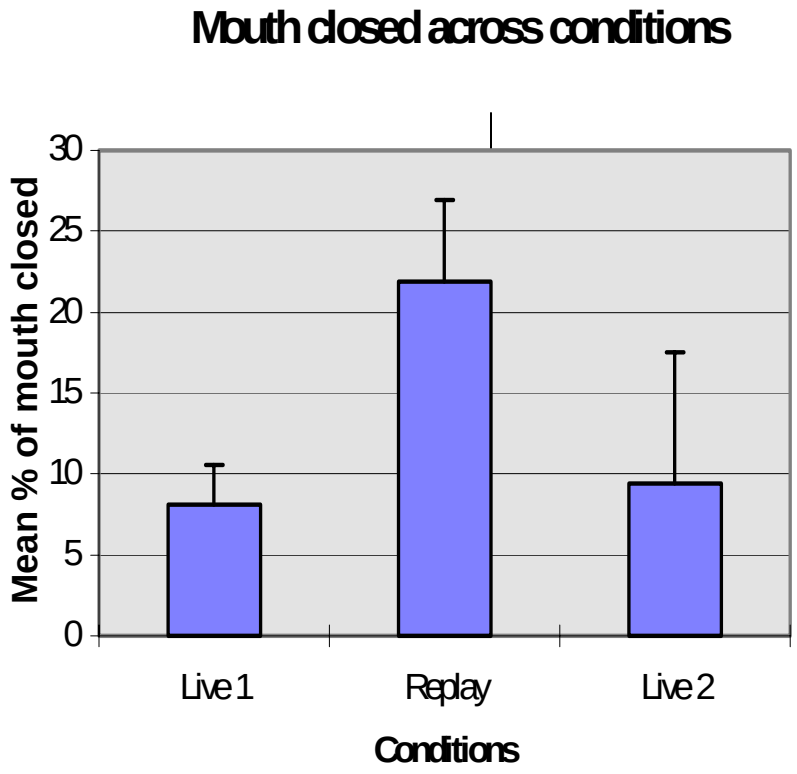
- Infants gaze away during replay
- Infants gaze more to mother during Live 2 than during Live 1

Smile to mother according to contingency conditions



- Smile to mother decreased during replay
- Smile to mother reappeared during Live 2

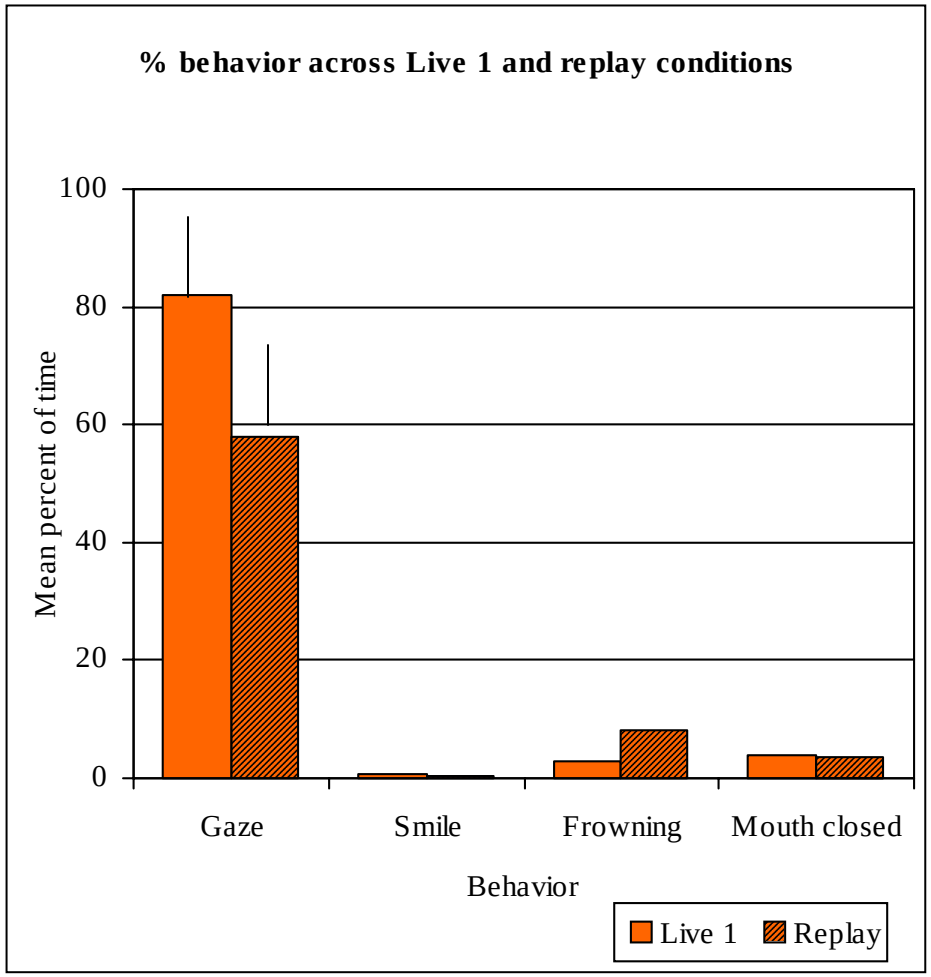
Mouth tightly closed according to communicative conditions



- **Mouth tightly closed (MTC)** indicates an absence of communicative prespeech
- Duration of **MTC increased** significantly during replay
- Duration of **MTC decreased** significantly during Live 2

Detection of non-contingent communication and expectancies for contingency in infants of depressed mothers

- Infants of depressed mothers detect non-contingent behavior (they gaze away) but
- They do not seem to be upset or angry during the non-contingent episode:
- Why ?
  - Usual non-contingent interactions of their mother ?
  - Maternal contingent behaviors displayed are not the more efficient ones ?



Contingent communication of ND and D mothers (L1)

	ND Mothers	Depressed Mothers	Student t
% Gaze to baby	M=96.4 (SD= 3.6)	M=93.2 (SD= 3.3)	NS
% Smile to baby	M= 90.7 (SD= 27.7)	M= 68.3 (SD= 24.4)	NS
% Speak to baby	M= 92.5 (SD= 6.04)	M= 75.7 (SD= 20.2)	NS

The frequency of contingent behaviors did not differ significantly in D mothers compared to ND mothers

Contingent communication of ND and D mothers (L1): mirroring

- ✓ ***All ND mothers mothereesed almost all the time***
- ✓ ***9/10 ND mothers imitated their infant's gestures or facial expressions***
- ✓ ***Only 1 depressed mother mothereesed frequently***
- ✓ ***Only 1 depressed mother imitated once***

%	ND Mothers	D Mothers
mothereese	**M=92.5 (SD=.2.4)**	**M=27.2 (SD=43.6)**
imitate	**M=11.6 (SD=6.7)**	**M= .007**

Hampering contingency via in vivo disruptions of social interaction : The Still Face Paradigm

TWO USES OF THE STILL FACE PARADIGM

Still Face Paradigm revisited

(Nadel *et al.*, 2000)

Classical use

infant with a familiar partner

- **Procedure**:

Interaction - Still Face - Interaction

- **Test:**

Do you detect non-contingent behavior?

Revisited use

non verbal child with a stranger

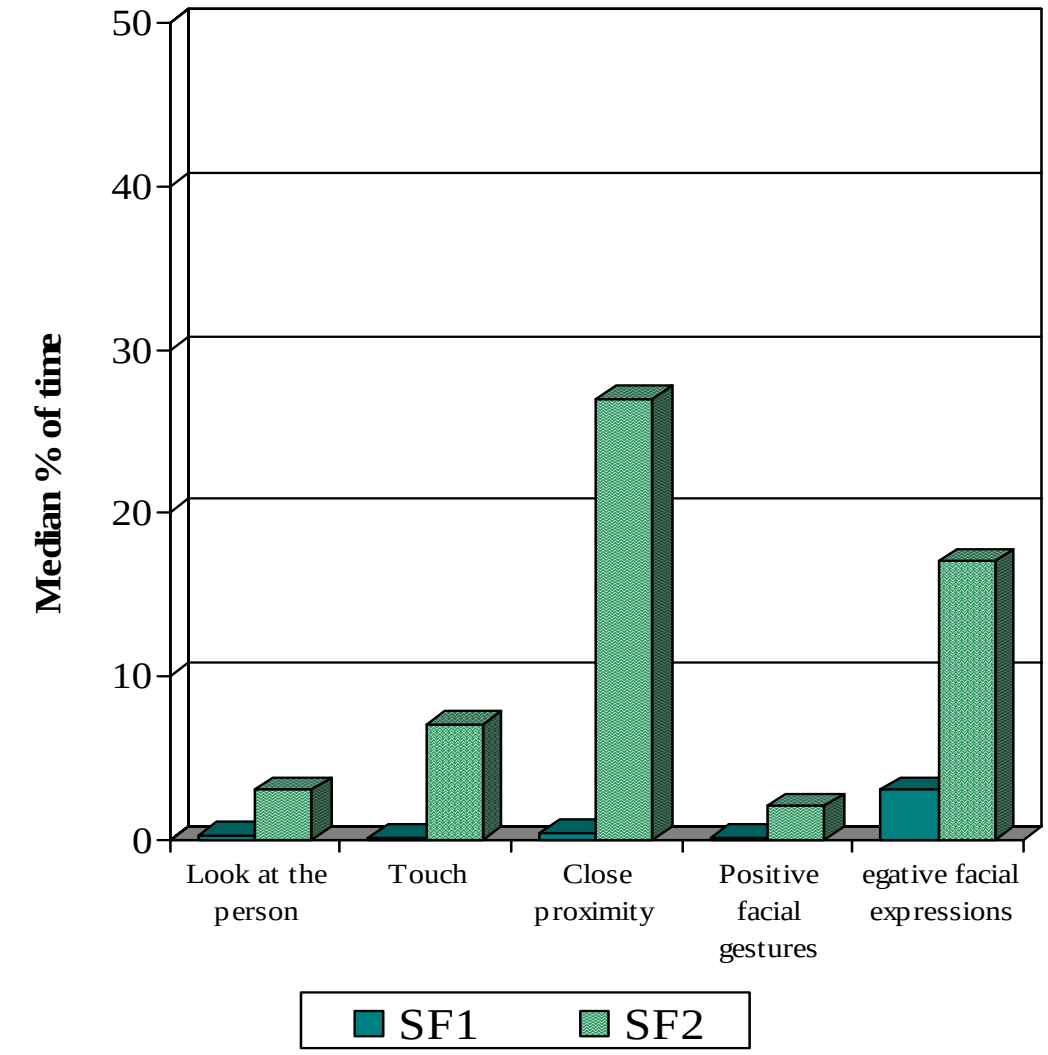
- **Procedure**:

Still Face –Interaction –Still Face

- **Test:**

Do you have formed the concept of persons as intentionnally contingent agents?

Significant changes in social behaviors of children with autism across still face conditions



- ***Low functioning children with autism showed no concern with the stranger's first still face***
- ***After having experienced an interaction with the stranger, they focused on her behavior during the second still face***
- ***This demonstrates that they have not formed a concept of persons as social and contingent agents***

First still face of the stranger

- **The child focuses on toys**
- **Does not worry about the still adult**
- **Does not look upset**

Imitative interaction

- **The stranger imitates The child recognizes being imitated (tests, controls)**
- **Social contact is established**

Second still face of the stranger

- The child focuses on the adult all along the 3 minutes

Toward the end of the 3 minutes of second SF….

- **The child tries to initiate contact**
- **The child looks surprised and then upset**
- **The child is thus able to detect non-contingency , and to form social expec-tancies after having experienced the person as a person (no ontological expectancies)**

PART II.

Facilitating sharing via experimental designs which afford almost perfect contingency via synchronic activities

Synchronic imitation as almost perfect contingency

- Identical objects afford synchronic imitation

Neonatal Imitation TP

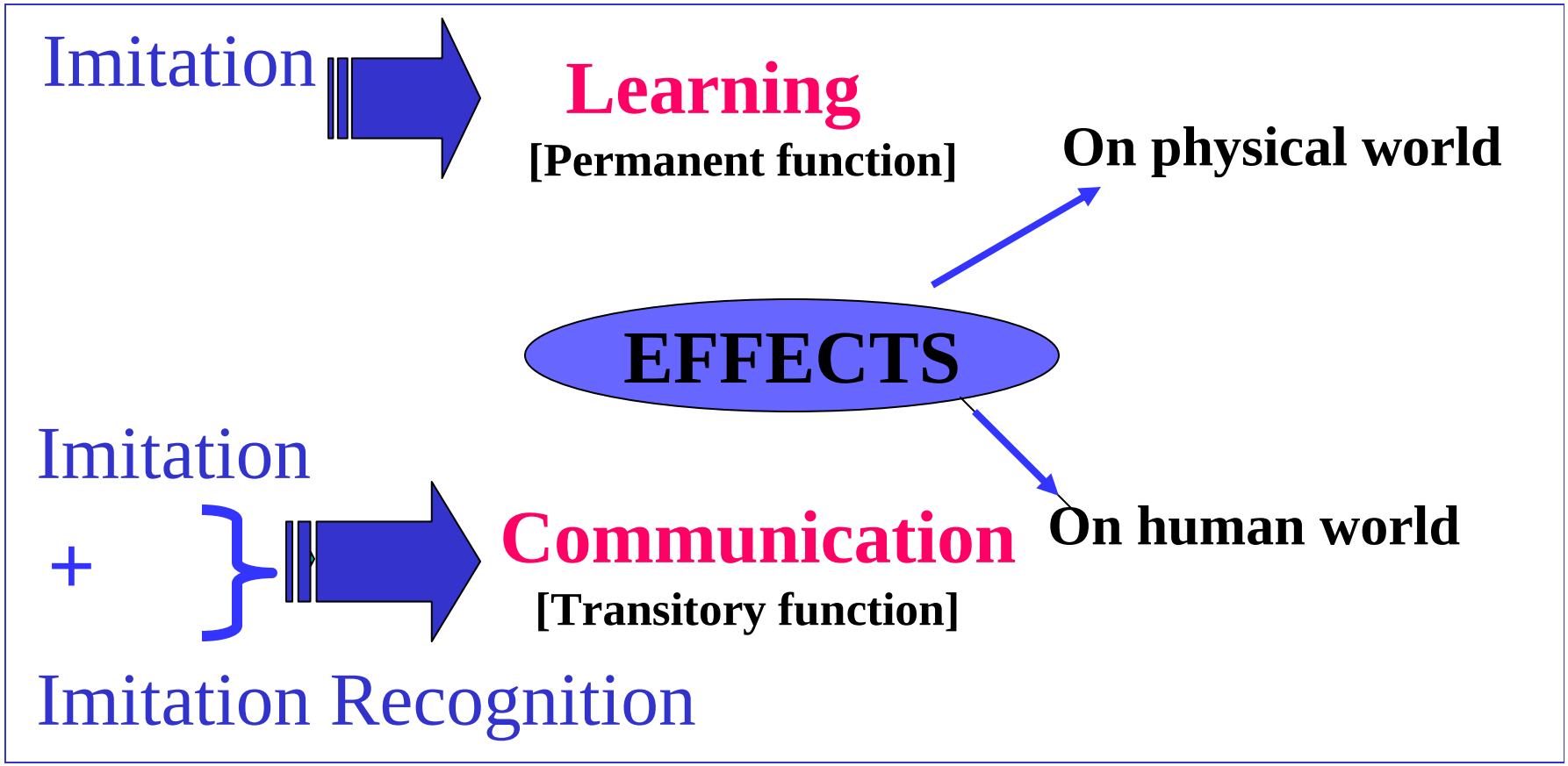
Neonatal Imitation Eye Blinking

Robotic mouth versus human mouth: a test of biologial movement as a parameter of perception-action coupling

Potier, Viezzi, Gaussier & Nadel, 2002

First reciprocal imitations at 2 months

Imitation: Two functions for a single ability



From birth to 6 months, some imitations disappear, while others start

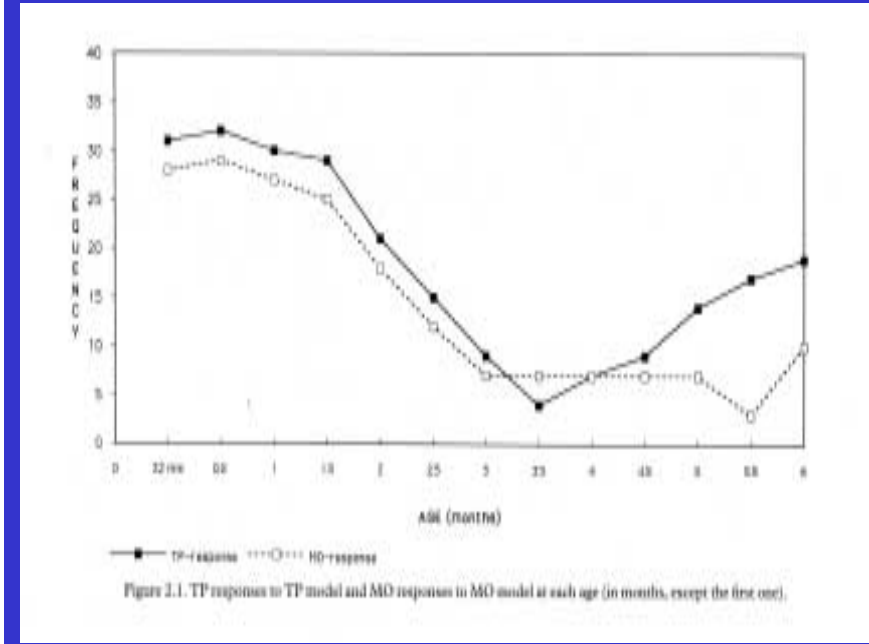


Figure 2.1. TP responses to TP model and MO responses to MO model at each age (in months, except the first one).

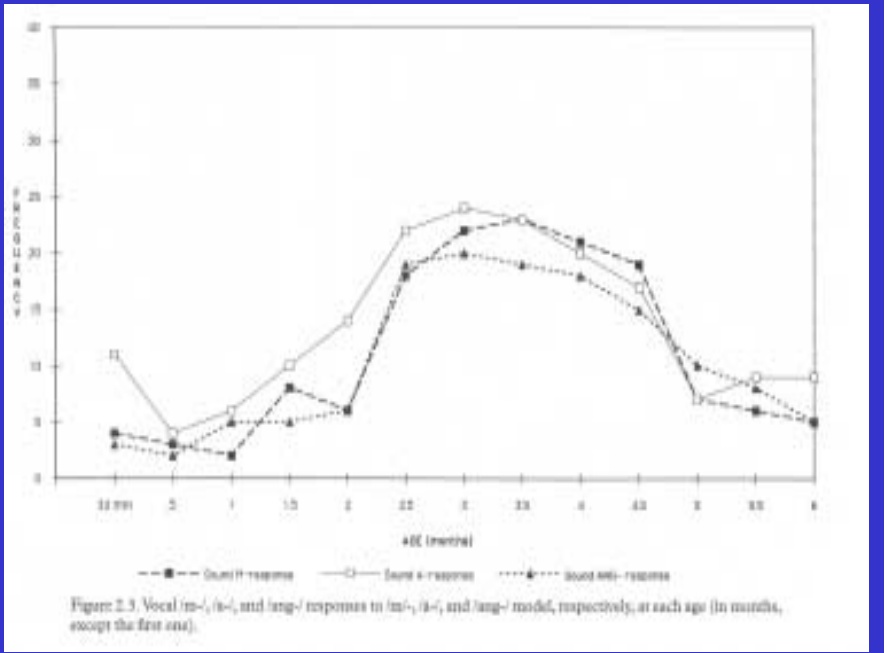
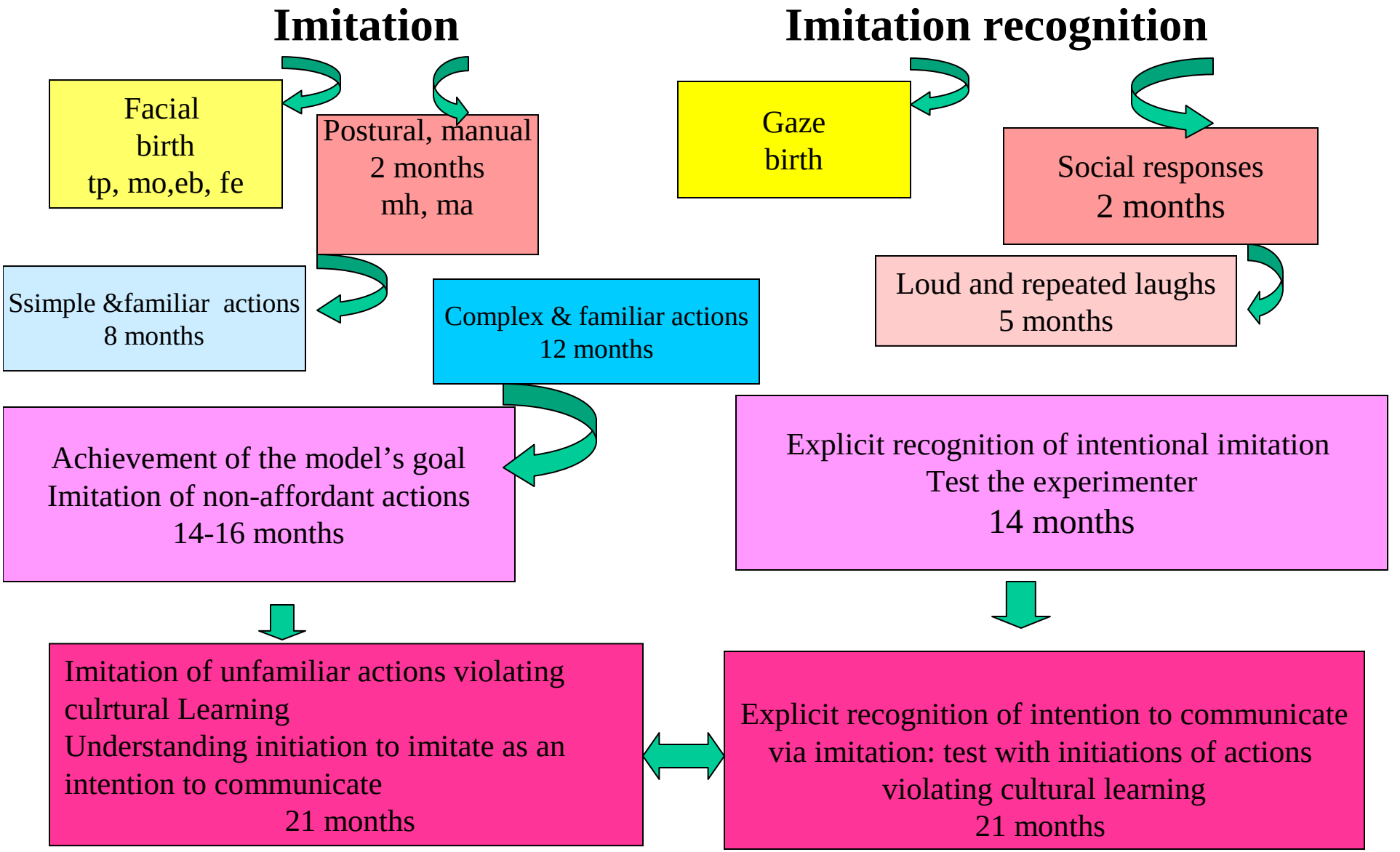


Figure 2.3. Vocal /m-/, /s-/, and /ang-/ responses to /m/-, /s-/, and /ang-/ model, respectively, at each age (in months, except the first one).

- **Developmental Role of inhibition?**

Imitation is not a unitary phenomenon



Imitation : a language without words for prelinguistic children

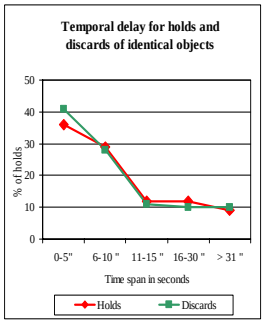
Imitate and be imitated :
A primary way to share intentions

More than a social behaviour, a communicative system

IMITATOR IMITATED

- **Two roles to switch according to rules of turn-taking**

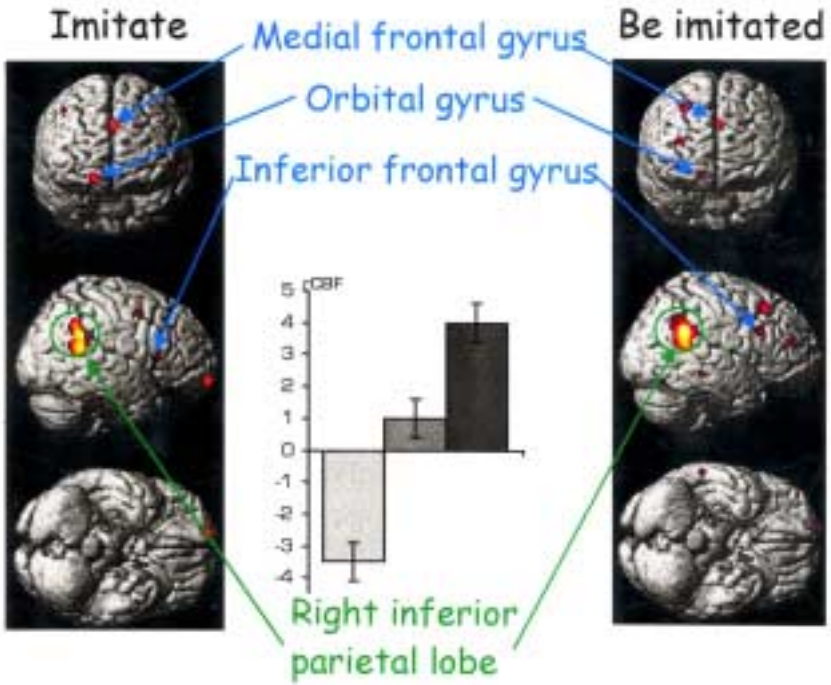
- **Motor activity developped in social synchrony**



In search of almost perfect contingency via redundancy

In search of synchrony

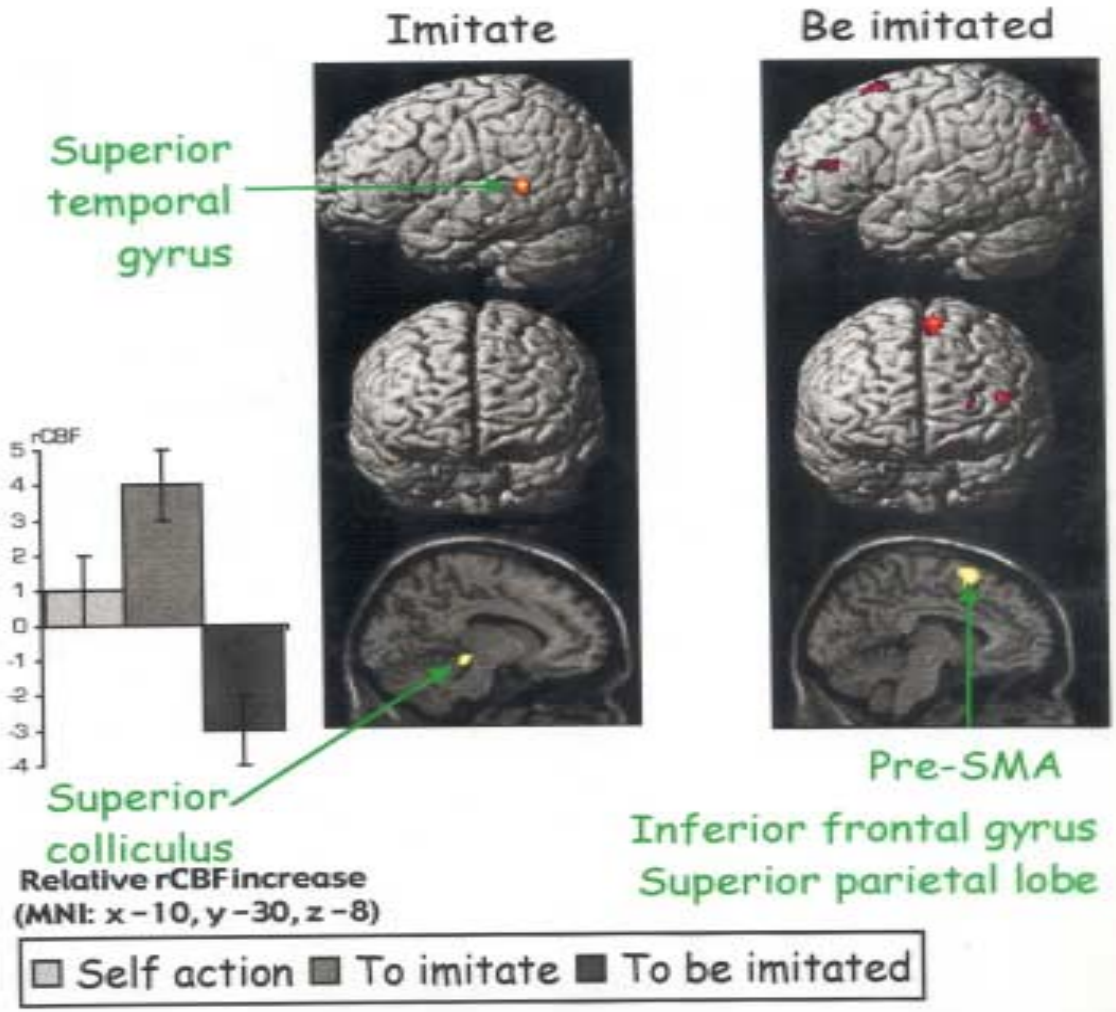
Result 3: contrasted to self-action



□ Self action ■ To imitate ■ To be imitated

(*SPM99*, $p < 0.0005$; voxel extent threshold 10)

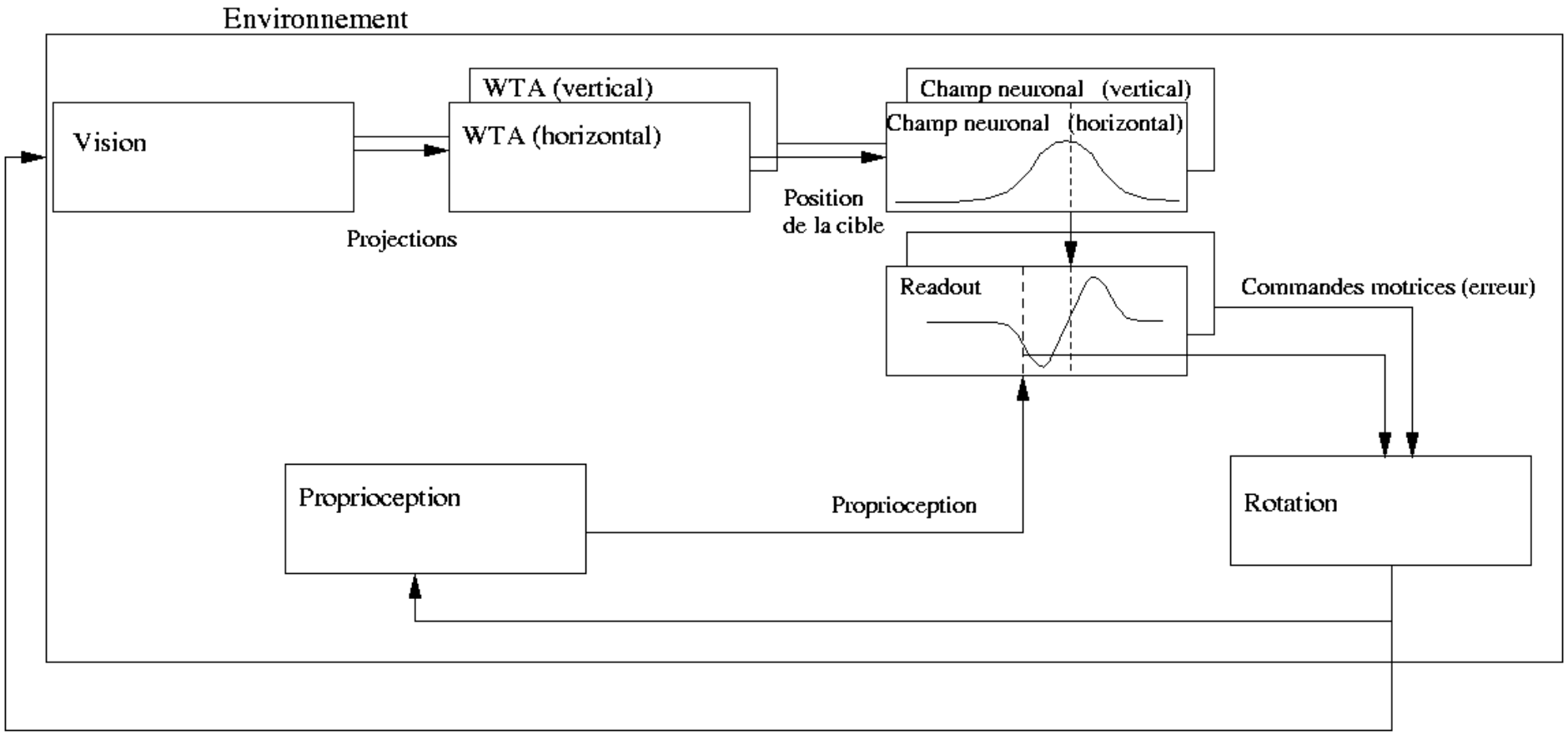
Results 4: contrast between imitation conditions



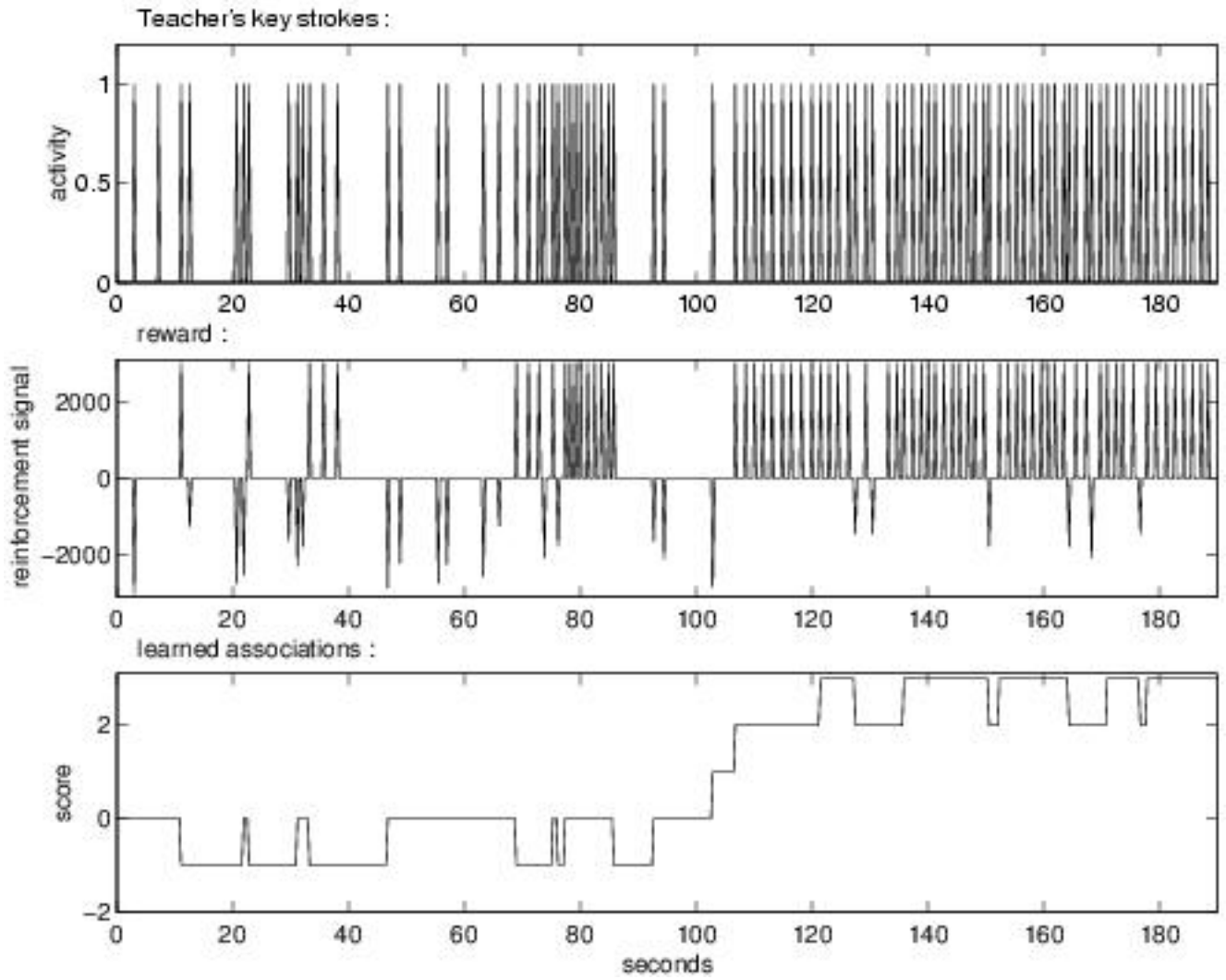
ETIS group implementing the two functions of imitation (Gaussier, Revel & Andry)

Based on an on-line learning of visuo-motor coordination

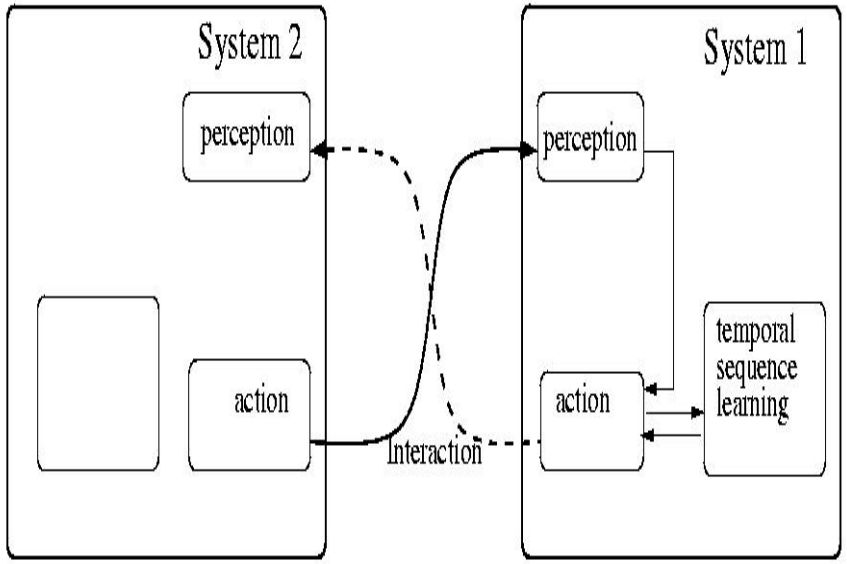
Architecture :



Synchronisation of two systems



Synchronic imitation between infants or robots



Interconnection of two systems. System 1 and 2 have the same architecture.

Each system has learned associations between its inputs and outputs. The two systems produce outputs (the same sequence of motor outputs for example) simultaneously.

Imitation in Infancy

Edited by

Jacqueline Nadel and

George Butterworth

Cambridge Studies In
Cognitive and Perceptual Development