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Paris, 28 Mars, 2019

**On the Meaning of Movement**

“Born to share meaning with affection,  
in the self-conscious rhythm of human life”

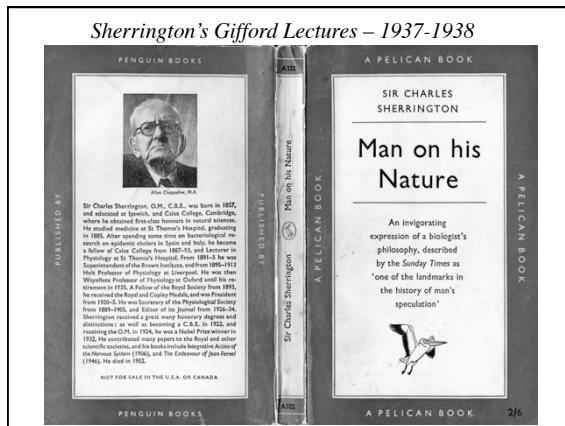
Colwyn TREVARTHEN  
Professeur émérite de psychologie de l'enfant  
et de psychobiologie, Université d'Edimbourg

PERCEPTION, MOVEMENT  
& ACTION RESEARCH  
CENTRE (PMARC)

INSTITUTE FOR MUSIC  
IN HUMAN & SOCIAL  
DEVELOPMENT (IMHSD)

**PART 1**

Animal activities, for all purposes and for all communication, feel **prospective or imaginative control in the space and time of movement** -- monitoring life's energy sensed in the body by *proprioception* and *visceroception*, by *touch* on the body surface, and by distance senses of *sight* and *hearing*. All arts of culture celebrate beauty felt in movement.



In the closing lecture of *Man on His Nature* Sherrington advocated respect for affections of the mind that help 'altruism' in relationships, for cooperative life activities with sympathy for other persons' feelings, including therapeutic care of patients and education of the young. This is a philosophical neuroscience that goes beyond examination of details, to take in the whole picture of organic, and human, mental life -- the science needed for understanding of the vitality and affections of young children, and why their love is so rewarding for parents, teachers and other companions who share their innocent life activities.

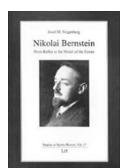
**Nicholai Aleksandrovich Bernstein** (1896-1966)

Building on Sherrington's discovery of the neural mechanisms of proprioception, and his theory of how actions of many body parts are integrated by the brain into a single moving subject, the Russian physiologist Nicholai Bernstein, in the 1930s, made a brilliant analysis of *how human movements are generated in the brain, imaginatively*. His laws of 'biodynamic structures' that make movements explain how excitations of muscular activity are **controlled by motor images**.

Bernstein studied how motor images generated in the brain produce efficient rhythmic actions with a heavy body of many parts and many biomechanical 'degrees of freedom'. He applied cyclographic techniques to show actions are composed of smaller movements. In 1926, he examined forces of human walking for the engineering of pedestrian bridges.



*From  
Reflex to  
the  
Model of  
Future.*



In the Moscow Central Institute of Labour in 1922, he measured manual work, e. g. cutting metal with a chisel, to optimize productivity. He studied how toddlers play with walking, and the effects of age and brain damage on its efficiency. In 1935, he gained a Doctor of Science without thesis, was one of the first members of the USSR Academy of Medical Sciences, and received the Stalin Prize for science.

Bernstein's theory of the brain's creation of movements was opposed by Pavlov, the author of conditioned reflex theory. It was known to Western scientists only in 1967, when *The Co-ordination and Regulation of Movements* was published in English.

## Maternal Voice and Communicative Musicality With a Baby from Birth

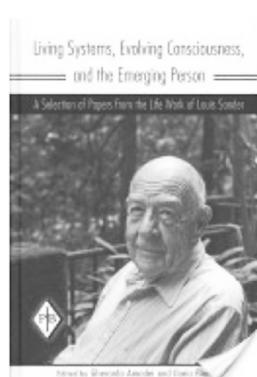
In the 1960s two discoveries made by micro-analyzing films of infants in intimate conversation or to inspect objects, discovered **impulses of human beings to move gracefully together to learn meaning in a cultural intelligence** -- impulses which medical science and psychology had not imagined were possible: (1) **In joyful play with parents, interests and games are shared by matching rhythms in infant and adult.** (2) **Age-related developments in the child's mind and body transform the imagination, or prospective self-awareness, that guides a 'common sense' in the dance of life shared with kind companions.**

A pediatrician in Boston, **Louis Sander**, made crucial contributions to both these new ideas.

- (1) With William Condon, Sander confirmed that **neonate hand movements can synchronize with the rhythms of adult speech.**
- (2) Tracing the development of communication between mothers with different personalities and self-confidence with their children from birth to age 6 years, he demonstrated that **a strong and creative childhood is developed in collaboration with innate sympathies of a happy mother, who is ready to change in sympathy with developments in the interests and skills of the child.**

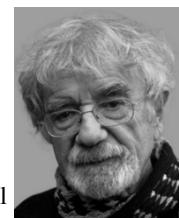
### Living Systems, Evolving Consciousness, and the Emerging Person: the life work of Louis W. Sander

How emerging knowledge of developmental processes, biological systems, and therapeutic process can be integrated as **basic principles that govern the living system.**



### Autopoiesis in Consensuality

“..a description always implies an interaction. What we do as observers when we make descriptions is exactly that: We behave in an interlocked manner with other observers in a consensual domain ontogenically generated through our direct (mother-child relation) or indirect (membership in the same society) structural coupling.”



**Humberto Maturana**

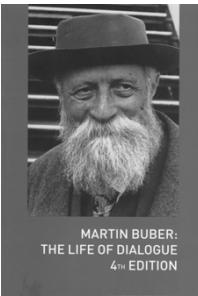
Maturana, H. R. (1978). *Biology of language: The epistemology of reality.*

“Buber singles out the fundamental relational character of human beings. Such relational character is at least two-fold. It can be a third-person relation, an *I-It* (and I-She, I-He) or a second-person relation, an *I-You*. Buber calls them the *two basic words*.”



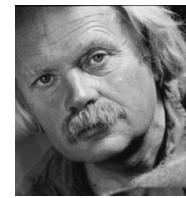
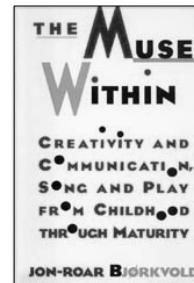
**Vittorio Gallese**

Gallese, V. (2014) Bodily Selves in Relation: Embodied simulation as second-person perspective on intersubjectivity. *Phil. Trans. R. Soc. B* 369,



**Martin Buber  
(1878-1965).**

**Jon-Roar Bjørkvold,**  
Prof. of Musicology,  
University of Oslo



“We all need this Muse Within, for we are what I shall call *muse-ical beings*. To lose our *museicality* would be to lose a profoundly essential part of our humanity.” (p. xviii)

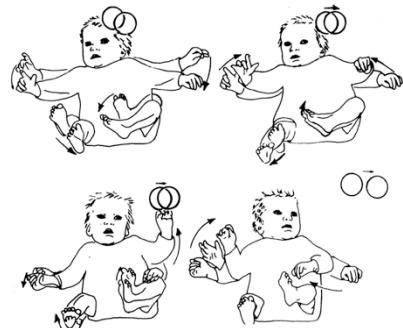
### Human Vitality Shared In Dance and Song, Before Language, Making Life Meaningful



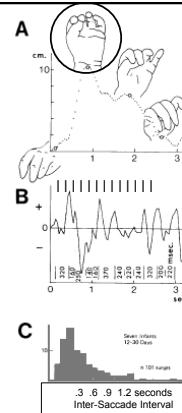
a will to survive  
a power to grow  
a musicality to move  
an urge to play  
a courage to create

### Sharing Stories of Life Before Words

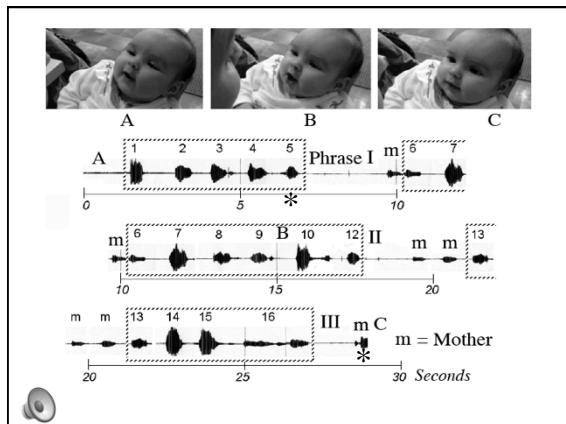
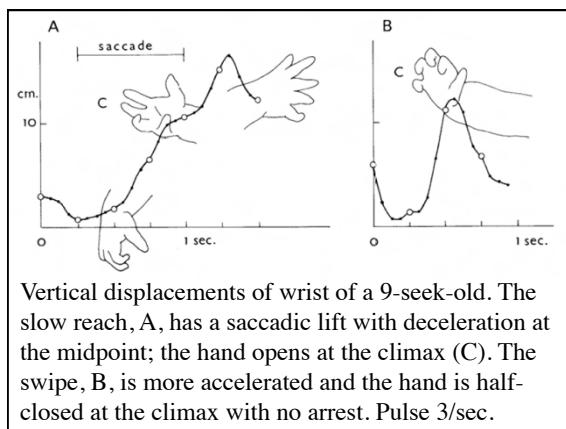
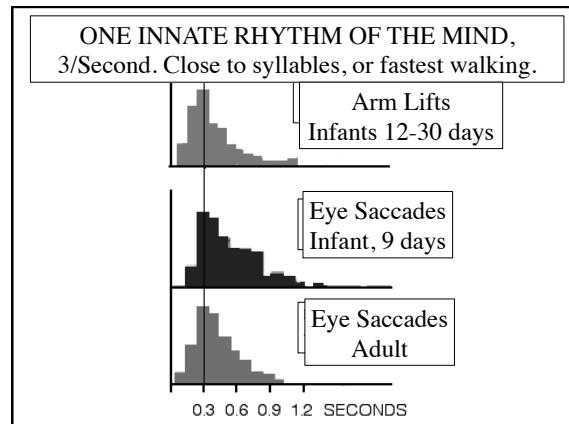
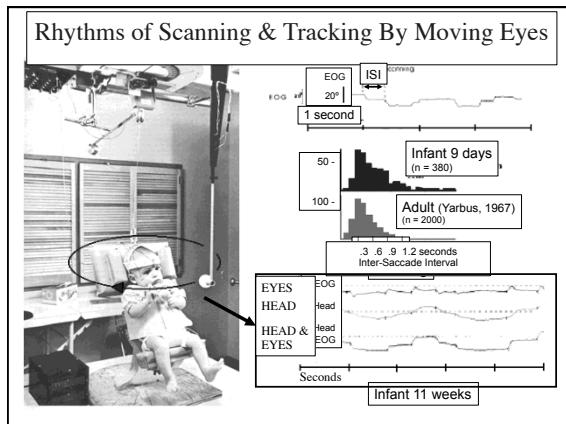
INTIMATE LOVE    INVENTIVE PLAY    INFORMATIVE WORK



Arm and hand movements of innate ‘prereaching’ of a three-week-old baby. Whole-body and rhythmic.



D    Pre-reaching 23 days after birth.  
 (A) Vertical moves of the wrist. Hand part-open at climax.  
 (B) Pulsing or stepping.  
 (C) Lifts of the wrist for 7 newborns.  
**A main period of 200-300 msec.**  
 (D) Infant tracks an object moving slowly to her left.



**WHAT NEWBORNS CAN DO  
TO SHARE LIFE STORIES WITH  
FEELING.**

**MOVING SIGNS OF A SOCIALE SELF  
WITH IMITATION AND INVENTION  
IN RHYTHMS OF SYMPHONIC  
SONG AND DANCE.**

## AVA ON THE FIRST DAY – EXPECTING CONNECTION

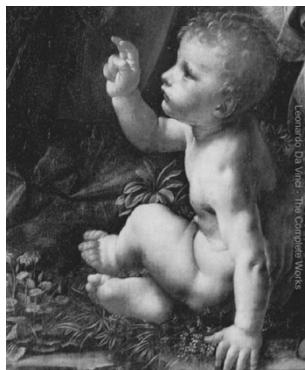


Moments after birth, an infant may look and listen rhythmically for confirmation of human feelings.

## DAY 4 - AVA IS ALSO READY TO SHARE A STORY OF LIFE, WITH HER GRANDMOTHER



**Story-making**, from first conversations, to the fun of games, and then to cooperation in tasks and ‘acts of meaning, becomes language, to name important objects and actions



With a similar gesture, infant Jesus, full of his importance, blesses the infant Saint John, his playmate in the *Virgin of the Rocks* by Leonardo da Vinci, painted 1483-1486.



SHARING  
MOVING  
STORIES  
Leonardo da  
Vinci  
*Virgin of the  
Rocks*  
Louvre, Paris  
Madonna,  
Infant Jesus,  
Infant John  
the Baptist,  
and an  
Angel.

“The old model of thinking of the newborn infant as helpless and ready to be shaped by his environment prevented us from seeing his power as a **communicant in the early mother-father-infant interaction**. To see the neonate as chaotic or insensitive provided us with the capacity to see ourselves as acting 'on' rather than 'with' him.”



**Dr. T Berry Brazelton**  
1979 Evidence of communication during neonatal behavioural assessment, p. 79.



**Barbara Gwenn Goodrich**  
Uni. of Colorado, Denver Veterinary Medicine, Aesthetics, Philosophy of Science

**“We Do, Therefore We Think: Time, Motility, and Consciousness”**  
Reviews in the *Neurosci.*, 21(5), 331-361 (2010)

“This article is a philosopher’s expanded review of two recent books on neurophysiology: **Rodolfo Llinás’s *I of the Vortex*** and **György Buszákí’s *Rhythms of the Brain***. Researchers such as these are converging on a view of **consciousness as originating in motility and as inherently temporal** due to the brainwave oscillations that underlay it.”

Remarkable evidence from motion-capture technology, showing us **innate motives**, difficult to explain 'logically'.

The impulses are not 'cognitive' – they are **emotive**, provoking dynamic thoughts and dreams, telling stories.

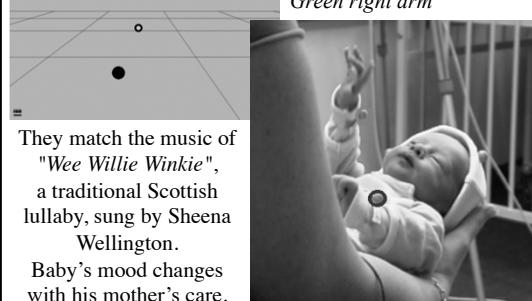
To understand them requires a new science of mind –of **hope and value in moving, of intelligent motives, interests and feelings, displayed to be shared**.

Baby Bailey is male, 1 week premature, and hungry. His hands move imaginatively, in dialogue, and with 'narrative musicality' of feelings, shared with mother.



Two Things.  
What Are They?  
What Is Happening

Dots moving to music. Arm moves of a hungry newborn were recorded *Red left arm; Green right arm*



### The rhythms of speech are innate

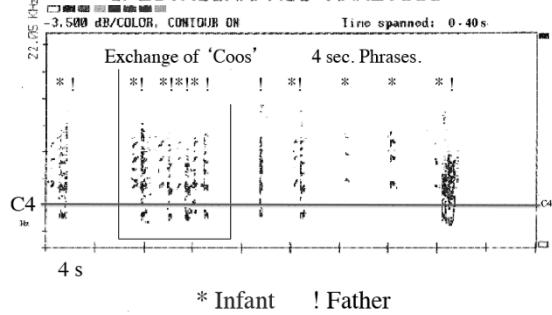
A video of **Naseera when she was 2 months premature** proves she is born to share vocal ideas in one sense of story time. She improvises a conversation with her proud and sympathetic father.

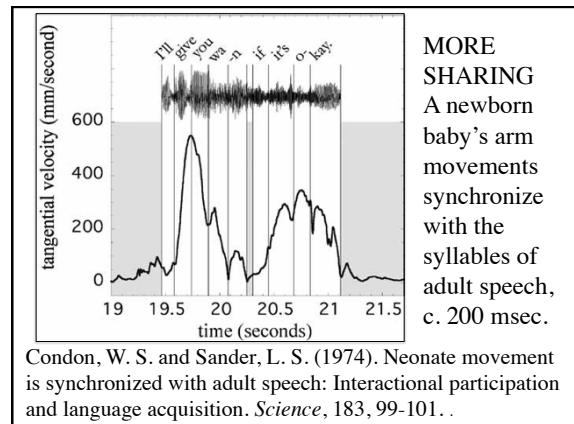
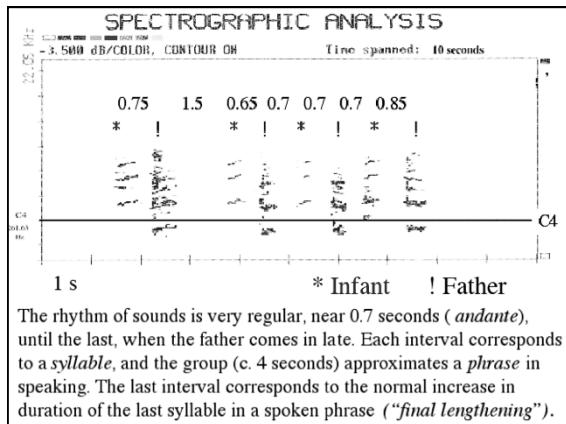
From van Rees, S., and de Leeuw, R. (1993). **Born Too Early: The Kangaroo Method With Premature Babies**. Video by Stichting Lichaamstaal, Scheyvenhofweg 12, 6093 PR, Heythuysen, The Netherlands.

Naseera kangarooing with father 8 weeks before term. They share many feelings and express their pleasure.



### SPECTROGRAPHIC ANALYSIS





**Young awake infants are visibly active mentally -- thinking and ‘talking’ with ‘mimesis’.**

They show **gestures of the hands** -- indicating **feelings** in their bodies, orientation of their **interest** to events in the world, and the **sympathy** they have for of other persons who may respond to their signs, acting and thinking with them, to accompany **symphony** made with the singing voice.

*Infant hand gestures are part of a rich display of expressions by posture and attitude of the head and eyes, and intricate face movements, to be shared.*



Dr. Leboyer’ s newborns are expressive with body, face and hands, enjoying life in movement.

**SHE IS VERY EXPRESSIVE**



A Musician’s Daughter, 6 Hours Old



Peut-être que nous voyons un chef français qui dit:  
« que cette sauce est bonne, je me délecte! »  
Ou une ‘moudra’ bouddhiste

20 minutes old, tracking a lively ball *moved in a game*. The world is to grasp, and *it communicates*.



At 30 mins. old, Shamini imitates her mother, Vasu Reddy, opening her mouth and poking out her tongue.



Other persons' actions are copied, to share meaning.

**Emese Nagy**

Reader in Psychology,  
University of Dundee,  
Dundee, Scotland,  
Psychologist and physician,  
researching the psychology  
of the neonates, foetuses and  
children with autism.



She demonstrated that newborns imitate with the intention to take part in a dialogue with emotional appraisal of the quality of the engagement with a responsive partner.

**The Newborn Infant:  
A Missing Stage in Developmental Psychology**  
Emese Nagy (2011)  
*Infant and Child Development*, 20: 3–19.

“Although neonatology, the study of the newborn, is well established in medical science, psychological research on the newborn is relatively scarce.

**... the neonate's early social preferences and responses indicate a unique, sensitive, experience-expectant stage of development.”**

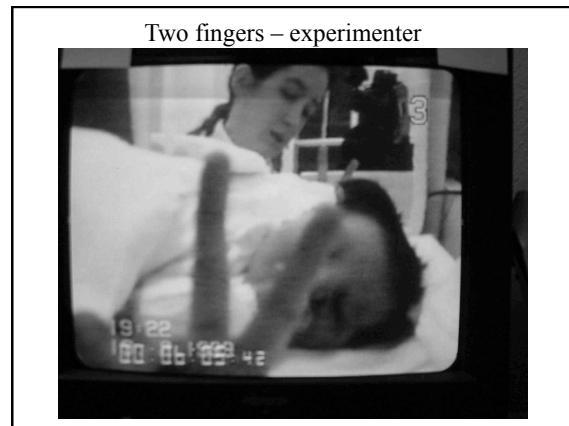
Dr. Emese Nagy in Szeged, Hungary, with Newborn



She found out why newborns imitate – to share.

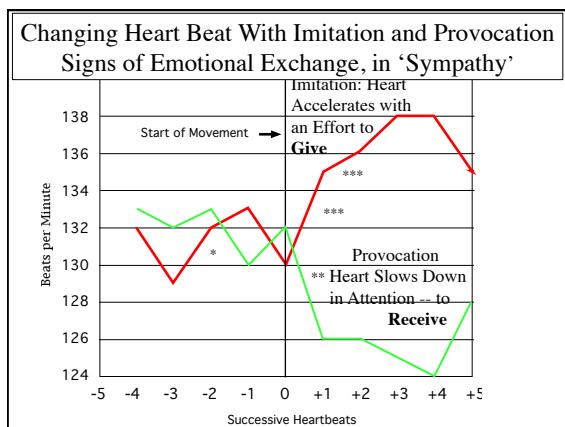
Emese, as experimenter, shows index finger extension



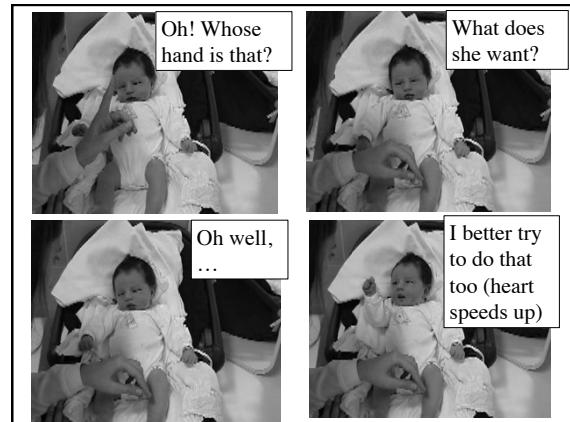
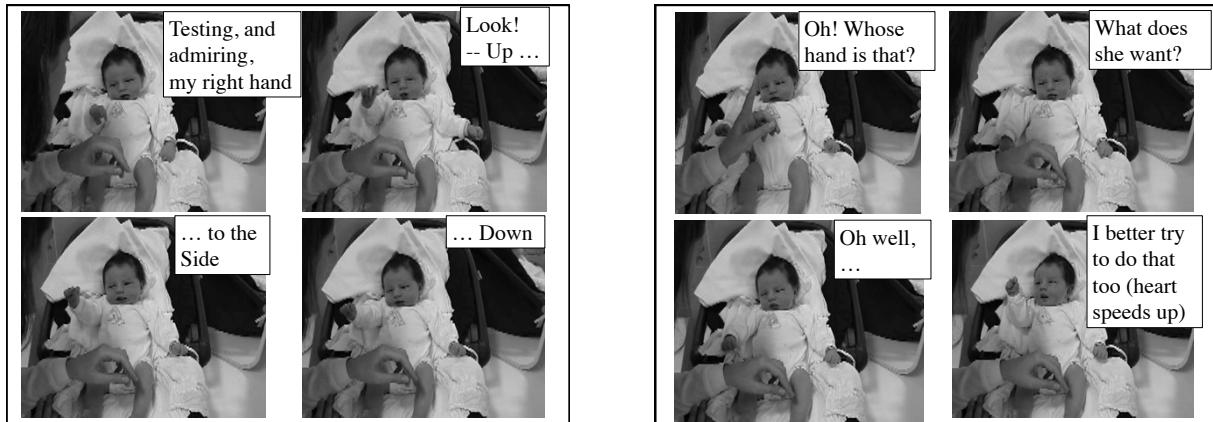


**WHY DO BABIES IMITATE?**  
 What Emese found when she waited for the baby's turn.  
 "Searching for the mechanism of neonatal imitation resulted in the discovery of a *neonatal initiative capacity*, I called "*provocation*".  
 Newborns spontaneously produced previously imitated gestures while waiting for the experimenter's response."

Nagy E, Molnár P (2004) *Homo imitans or Homo provocans?*: Human imprinting model of neonatal imitation. *Infant Behavior and Development* 27, 54–63



15 seconds of dialogue of Emese Nagy with a baby less than 2 days old



#### STORY-TELLING AT 2 MONTHS.

**Primary Inter-subjectivity**  
Mutual regulation of 'chats,'  
sharing emotions about planned events.

