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What Is It Like To Be a Person Who Knows Nothing?
Defining the Active Intersubjective Mind of a Newborn Human Being

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Abstract:

As thinking adults depend upon years of practical experience, reasoning about facts and causes, and language to sustain their knowledge, beliefs and memories, and to understand one another, it seems quite absurd to suggest that a newborn infant has intersubjective mental capacities. But detailed research on how neonatal selves coordinate the rhythms of their movements and senses, and how they engage in intimate and seductive precision with other persons' movements, sensing their purposes and feelings, gives evidence that it is so. The developmental and functional neuroscience of the human brain agrees. Indeed it seems that cultural intelligence itself is motivated at every stage by the kind of powers of innate intersubjective sympathy that an alert infant can show shortly after birth. We are born to generate shifting states of self-awareness, to show them to other persons, and to provoke interest and affectionate responses from them. Thus starts a new psychology of the creativity and cooperative knowing and meaning in human communities.

"An objective psychologist, hoping to get at the physiological side of behaviour, is apt to plunge immediately into neurology trying to correlate brain activity with modes of experience. The result, in many cases only accentuates the gap between the total experience as studied by the psychologist and neural activity as analysed by the neurologist. But *the experience of the organism is integrated, organised, and has its meaning in terms of coordinated movement.*"

(Sperry, 1939, p. 295; emphasis added).

" In the case of an animal, the mental states enter into the plan of the total organism and thus modify the plans of successive subordinate organisms until the ultimate smallest organism, such as electrons, are reached." (p. 98)

"There are ... two sides to the machinery involved in the development of nature. On the one side there is a given environment with organisms adapting themselves to it. The other side of the evolutionary machinery, the neglected side, is expressed by the word *creativity*. The organisms can create their own environment. For this purpose the single organism is almost helpless. The adequate forces require societies of cooperating organisms. But with such *cooperation* and in proportion to the effort put forward, the environment has a plasticity

which alters the whole ethical aspect of evolution." (p. 140)

(Whitehead, 1926/1953; emphasis added)

"Culture is activity of thought, and receptiveness to beauty and humane feeling. Scraps of information have nothing to do with it." (p. 1)

(Whitehead, 1929)

To Be a Person With Other Persons Is To Move In Sympathy With Them, Sharing Meaning

How can a newborn baby, a being with no meaningful knowledge, no education in the habits of culture and language at all and therefore, it is assumed, incapable of reflective intelligence, be a person? An infant must be unable to understand anything and unable to infer anything about an outside reality or to articulate meanings in communication. That is what our psychological science, attending to measurable *products* of intelligence, especially well-defined cultural and linguistically sophisticated intelligence, rather than to any essential motive/emotional *creative processes*, has assumed must be the state of a newborn mind. It follows that the human newborn has no 'self-awareness', no awareness of other human selves, and is not a person.

While more developed than a newborn rat or kitten, the human infant is more helpless than a newborn monkey or chimpanzee. It is a feeble and dependent animal creature with a very undeveloped cortical brain, but with human features of anatomy in body and nervous system. Its 'reflex-driven' activity is easily overwhelmed by unfamiliar stimuli and requires external 'regulation' of its states of activity and responsiveness to stimuli. Its autonomic nervous system regulates an organic vitality and lacks all reference to events perceived or remembered from experience of an outside world, and therefore has, it is claimed, no 'emotions' (LeDoux, 1996). All its experience appears to need forming by learning, and to depend on the support of an affectionate parent. Its very immature cerebral neo-cortex has exceptional 'plasticity' or capacity to store information, fed by the perceptual impressions of stimuli from the physical and social worlds. It awaits a consciousness that depends on development of a special facility to acquire articulate language (Rolls, 2005). Thus developmental science has conceived the initial state of the human mind as lacking intentions, feelings and consciousness. It is hardly a mind at all.

But, when calm, healthy, comfortable and well supported, an awake newborn infant, observed closely, shows a remarkably coherent *rhythmic purposeful consciousness* – a spontaneous directing of well-formed movements, selective awareness and affective appraisals in a precisely regulated, brain-generated time (Trevarthen and Reddy, 2007). He or she moves head, eyes, arms hands and feet as one coherent, integrated vital Self. The brain parts capable of effecting this integrated

mobility are present and active before birth, and largely sub-cortical (Merker, 2007). And, furthermore, newborns act in expressive ways that appear to be peculiarly human and highly sensitive to human presence. Most impressively, an alert newborn can draw a sympathetic adult into synchronized negotiations of arbitrary action, which can develop in coming weeks and months into a mastery of the rituals and symbols of a germinal culture, long before any words are learned. In short, a human being is born capable of seeking and playing with others' attentions and feelings in a rich variety of provocative, humorous and teasing ways (Reddy, 2008). Infants, it appears, are born with motives and emotions for actions that sustain *human intersubjectivity*. They perform actions that are adapted to motivate, and invest emotions in, an *imaginative cultural learning* (Trevarthen, 2001a; Bråten and Trevarthen, 2007). Their Intelligence is prepared to grow and be educated by sharing the *meaning* of intentions and feelings with other humans by means of many expressive forms of body movement that may be perceived in several modalities.

Growth of a scientific understanding of these innate human attributes has required a new approach, in two ways. First, it demands a radical shift in theory of how, and for what purpose, minds evolve -- how conscious intentionality or 'will' may be generated by irrational cerebral processes that regulate and guide body movement of individual animal beings. It has required an appreciation that both conscious awareness and learning of animals are adaptations of intelligence to serve *self-generated actions*. Second, it must appreciate that intelligence has evolved to make it possible for the intentions of actions to be shared socially, as is most evident in advanced species that cooperate by skilful signaling in life activities and exploitation of environmental resources. The research methods of this science have had to be speculative and descriptive, before hypothesis driven and experimental, to satisfy these two demands of a natural science of intelligent action.

In application to human beings, a special theory of infant's *motives* is needed, which can only be confirmed by intensive study of the coordination and regulation of movements, including kinds of movements for communication that are uniquely human. Especially significant are the emotion-expressing movements -- smiles, frowns, pouts, intent or 'interested' focusing of seeing (Oster, 2005), with shifting of seeing and hearing by turns of the head, and hand and feet movements carefully modulated by attention to experiences of holding and touching (Trevarthen, 1986; Adamson-Macedo, 2004). Such movements are not only adapted to sustain the flow of an emerging self-awareness, but may demonstrate self-regulations of movement 'publicly', for other persons, anticipating or 'provoking' their response, and enjoying play with it. They function as emotional expressions to engage in communication by 'intersubjective motor control' with signs of the mind states in other human beings (Trevarthen, 1986). Newborns, in addition to very remarkable expressive capacities, show preferences for responding to many forms of human signal: certain tastes and odours; felt, heard or seen cadences of movement; forms, colours or sounds that identify

persons, especially a responsive and sympathetic mother (Fantz, 1963; Goren, Sarty and Wu, 1975; McFarlane, 1975; Hofer, 1990; Zeifman, Delaney and Blass, 1996; Blass, 1999).

Developmental psychology has had to develop the less prejudiced 'descriptive' methods of ethology to study by detailed observation how this inexperienced human acting and interacting can be informed by a selective, moving conscious awareness modulated by intrinsic aesthetic and moral sensibilities and emotions. It leads to a new human psychobiology, one that confirms the conclusions that Charles Darwin came to after making careful observations, with his wife Emma's able assistance, of how his own infants behaved expressively with human sensibility in natural circumstances (Darwin, 1872, 1877, 1887/1958).

Many years ago Roger Sperry (1939, 1952) argued that psychology will drift away from any comprehension of how the brain works, and how the mind acts, if it only measures *reactions* to stimuli, if it tries to map the *input* to the nervous system and its rational categorisation. He and Karl Lashley (1951) insisted that the direction behaviourism was going overlooked the great creative capacity of the central nervous system to conceive movements of a whole body in negotiable relation to stimuli.

Since these warnings, psychology, enthralled by the technical and pseudo-rational powers of 'representation' in the 'artificial intelligence' of computers, has recently directed its energy to the measurement of cognitive processes of object awareness, reason and language, trying to simulate imaginative explanations of the 'processing, storage and retrieval of information' by disembodied modular networks of logically connected elements (Miller, 2003). The *creative output* of natural intelligence in moving animal bodies, its *conation* and *emotion*, have been made mysterious and are still largely neglected. Thus mainstream psychology leaves the personal attributes of infants, the motives and emotions of their movements and the innate cooperative 'witty' sympathies of human minds, obscure (Reddy, 2008). Neither the purposes of the individual human being, nor the meaning built by sharing of purposes, experiences and feelings between consciously active and mutually aware subjects, are explained. We have to go back to certain basics of animate life to correct this.

How Animals Behave, and How Humans Are Both the Same and Different

Fundamental adaptive activities of animals as individuals and socially have been described in precise terms by natural historians over the past two centuries (Lamarck, 1809; Darwin 1872; von Holst, 1936; Tinbergen, 1951). The movement of an animal is intrinsically creative and cooperative (Whitehead, 1926/1953). It is the product of morphogenesis of an integrated life system, or organism, composed of intricately ordered assemblies of cells, with organs adapted to perform their roles in a 'division of labour' that sustains the vital state of a whole body. To live as an animal is to

move with *good purpose*; that is, to want to act in ways that will be felt to be beneficial to the whole individual – it is not just submitting to perception of certain present stimuli and instinctively reacting to them, or learning how to 'condition' behaviours to react to events better. Animals move with coherent intentions directed by a quest for an integrated and imaginative conscious experience of the world they move in, their functions held together by patterns of 'horizontal control' (Packard, 2006). Sensing the world in relation to the form and displacements endowed with their bodies, they are curious about their surroundings and how to use objects, feeling with intrinsic emotional values how to avoid hurt or fear and to gain pleasure from what life needs, seeking a state of active security or well-being. This is the nature of animal self-awareness, which, in proportion to the development of individuals with more elaborate mobile bodies, depends upon formulating movements in prescribed ways (Bernstein, 1967) while anticipating what it will feel like to move (von Holst and Mittelstaedt, 1950; Merker, 2005), on *perceiving affordances* or how the sensed environment can help moving achieve its goals (Lee, 1978; Gibson, 1979), and on intrinsic emotions that, as Jaak Panksepp has demonstrated, are generated according to ancient innate principles in the core neurochemistries of the brain (Panksepp, 1998; Gallagher, 2008).

The father of modern neurophysiology, Charles Sherrington (1906), put it succinctly. The acting animal seeks with *extero-ceptive* 'projicience' or imaginative expectation what will be the 'affective appraisal' of an object at a distance when it is brought, through moving of the body in its *proprio-ceptively* controlled 'action space', into contact with the parts of the body that may feel, taste and consume it. The whole of any such intelligent episode depends on the coherent Self, moving, with curiosity and a cautionary emotional appraisal, in its felt body (Damasio, 1999).

Social animals have evolved ways of inter-acting, of moving in complementary or coordinated ways and sensing the power and purposes of one another's movements *intersubjectively*, so that, by cooperating in their motives, they can increase their individual and collective benefits and their adaptation in a sustaining ecology. They make their autonomic self-regulations of vital state apparent to one another so they can act emotionally in 'sympathetic' ways (Porges, 1997). Their social life requires that they evaluate the purposes of one another by detecting intentions, interests and feelings from the energetic and self-regulating qualities of each other's movements, *altero-ceptively*. They are born with adaptations of body and brain to initiate these individual and social purposes by producing controlled effects in moving (MacLean, 1990).

Human beings do all of these things, and more. The cooperative cultural experience of a meaningful world depends, in every human community, upon skills of interest, of initiative in action and of emotional evaluation that have been created by past generations in the 'history-making' of their world (Turner and Bruner, 1986). Children, even very young infants, appear to communicate with

an artful imagination ready to pick up new expressive tricks (Dissanayake, 2000). They try to move with others to learn how to live in *fictional, meaningful, historical* ways, using cooperatively invented conventions of moving with their complex 'extravagantly mobile' bodies. Their behaviours are negotiated in exchange of purposes and states of creative activity, sharing 'vitality dynamics' (Stern, 1985, 1999) with other persons with what Stein Bråten felicitously calls 'felt immediacy' (Bråten, 1988), acting in collaborative negotiations that eventually contribute to the rituals, stories and fabrications or 'habitus' of a *culture* (Gratier and Trevarthen, 2008). A human person is an animal who is motivated to know what the actions of other humans *mean* when they are completely arbitrary and, from an immediately practical point of view, useless (Halliday, 1978; Zlatev et al, 2009). Learning such actions serves only the development of mutual understanding of purposes between subjects. The importance of these acts lies in their 'meanings' and 'values' -- the *agreements of intending they affirm*, and in the precise associations they make, by *emotional referencing* (Klinnert et al., 1983; Reddy, 2008), to beneficial or dangerous experiences of acting in another time and place – that is, by human feelings that give *aesthetic appraisal* of things or events, and *moral appraisal* of other's actions (Trevarthen, 1984, 1993). By means of conversational stories or dialogues in which symbols come to life as a convivial traffic of fantasies to which real practical significance can later be attached, we come to live in a world in which we have access to meanings thousands of years old that are capable of linking ideas between people far apart in quite different circumstances (Bruner, 1986, 1990). Human meaning tries to get the fundamental truth of things without having any hope of success – its primary purpose is to share the experience of doing and knowing with feeling in specifically human ways. This is how we persons are.

How a Newborn Moves and Responds As a Person

"My first child was born on December 27th, 1839, and I at once commenced to make notes on the first dawn of the various expressions which he exhibited, for I felt convinced, even at this early period, that the most complex and fine shades of expression must all have had a gradual and natural origin." (Darwin, 1887/1958, p. 131).

"During the first seven days various reflex actions, namely sneezing, hickuping, yawning, stretching, and of course sucking and screaming, were well performed by my infant. On the seventh day, I touched the naked sole of his foot with a bit of paper, and he jerked it away, curling at the same time his toes, like a much older child when tickled. The perfection of these reflex movements shows that the extreme imperfection of the voluntary ones is not due to the state of the muscles or of the coordinating centres, but to that of the seat of the will." (Darwin, 1877, p. 285)

There are well observed facts of how infants may move with an integrated rhythmic control and

prospective awareness within minutes of birth, which show:

- (1) they have coherent, self promoting purposes regulated in brain generated time, and ways of regulating their vital state and the sense of well-being in their bodies;
- (2) they are super-sensitive to the attentive, purposeful and emotionally regulated actions of any other person who seeks to engage in contingent responsiveness with them.

Most remarkable of all:

- (3) they show themselves capable of making an effort of will and attentiveness to take part in an emotionally charged reciprocation of arbitrary ways of moving, and so to become part of a dramatic narration of being in companionship with another person (Brazelton, 1979; Trevarthen, 1979).

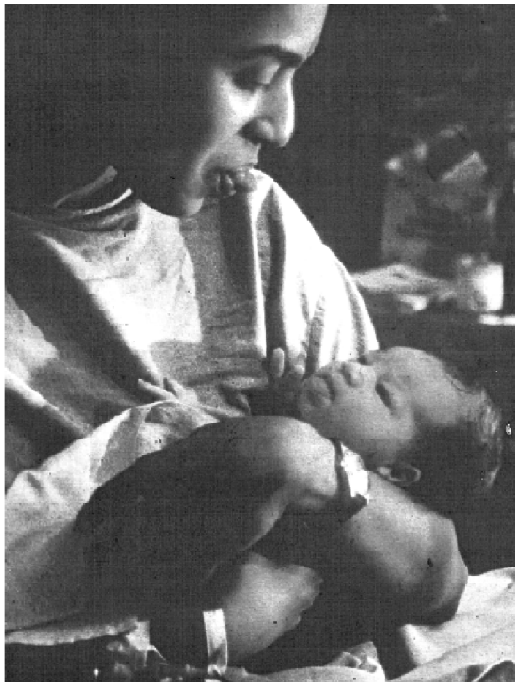
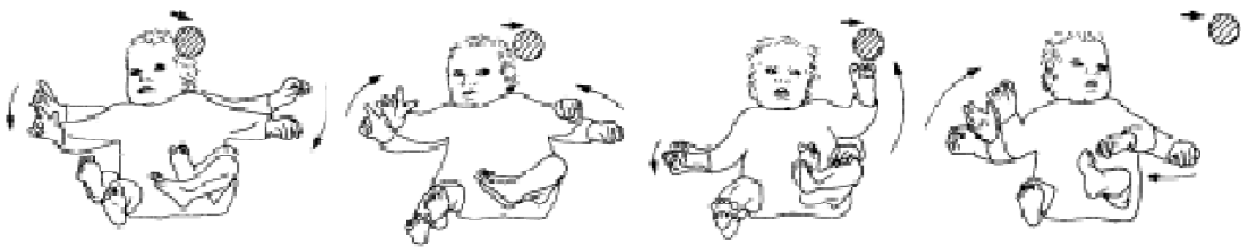




Figure 1: Coherent, conscious and expressive activity of newborns.

Above: A 4-week-old infant captures and tracks with her eyes an object that is moving from right to left of her body. She coordinates her whole body and makes two reach and grasp movements with her right arm and hand, and a fast, fisted movement of her left hand (Trevarthen, 1974, 1975, Trevarthen et al., 1975). Integrated activities of this kind can be seen with healthy and alert newborns immediately after birth (Brazelton, 1984).

Centre: Newborns less than an hour old imitating the mother's tongue protrusion, tracking a red ball in a 'game' with an adult, and participating with her in reciprocal imitations of hand gestures. (Photos by Kevan Bundell)

Below: A 6-day-old baby girl, partly sleeping, makes expressions of hands and face that provoke ideas of thoughts and feelings she wishes to express. She may have been hearing her mother who was talking to someone in the next room.

Infant human beings imitate other humans, not just to act like them, but to enter into a communicative and cooperative relationship with them by some transfer of the feeling of body action (Figure 1). They act as though they 'want' to learn new 'tricks' of vocalization and gesture, making an effort, with accelerating heart, to respond with a matching expressive act, and they show emotional appraisal of the exchange of intentions (Maratos, 1973, 1982; Melzoff and Moore, 1977, 1983; Heimann, 1998; Kugiumutzakis, 1993, 1998; Nagy and Molnár, 2004). They can, in this way, start building understandings that may serve later to identify a particular companion in the meaning

of a shared world (Melzoff and Moore, 1992). They can, in an elementary way, 'play a part' and 'learn a job', in a cooperative life. These precocious abilities for mimicry of arbitrary actions are not demonstrated, except in very rudimentary form, by other species, even those closest in genetic relationship to humans (Trevvarthen and Aitken, 2003).

Monkeys and apes can show intense awareness of the purposes and changing interests of their companions, and they live in communities tightly regulated by emotion, but their imaginative/imitative play, especially with vocalizations and gestures of the hands, is limited. Neonatal chimpanzees will imitate the facial movements of a human being (Bard, 1993, 1998). Stein Bråten has recorded how a chimpanzee in Oslo zoo, when too young to move about safely on their own, are in intense relationship with both the body and awareness of their mother as they cling to her, investigating the world in coordination with her shifting focus of interest (Bråten, personal communication and forthcoming). This may be seen as an evolutionary precursor of the 'intent participation learning' by which human young everywhere become apprentices in cultural practices. But there is a difference in the way imagination or self-experience is shared by newborn apes and by human infants, and it relates to motives that make both art and language possible (Dissanayake, 2000, 2009; Merker 2009, in press).

Especially important as one necessary foundation ability for the evolution of spoken language is a human capacity, unique among primates, for learning how to make, and imitate significant sounds beyond just singing social feelings.

"For every word we know how to pronounce and for every song we know how to sing we rely upon a competence that is lacking in other apes, and whose corresponding neural mechanism is, accordingly, a uniquely derived trait of the genus *Homo*. The competence in question is the capacity to *reproduce by means of the voice that which has been heard by ear*. Though a basic prerequisite for both our singing and our speaking, it is essential for little else in our behaviour. The capacity is technically known as *vocal learning*." (Merker, in press).

This capacity for vocal imitation is present in a human newborn, but undergoes development on early infancy, and then slowly matures into a talent for imitating and creatively using speech (Trevvarthen, 1986; Oller and Eilers, 1992). The longitudinal studies of Kugiumutzakis (1998, 1999) and Heimann (1998) agree that the earliest vocal imitations, before 3 or 4 months, are restricted to open mouth vowels, with little modulation, though Kugiumutzakis has demonstrated they may be imitated as strings of sounds with control of rhythm and intensity. Even a two-month premature infant can participate in a precisely timed alternation of simple 'coo' sounds with an adult, sharing the rhythms of syllables and phrasing as these are retained in mature speech (Van Rees and de Lieu, 1993; Trevvarthen et al, 1999; Schögler and Trevvarthen, 2007; Trevvarthen, 2008).

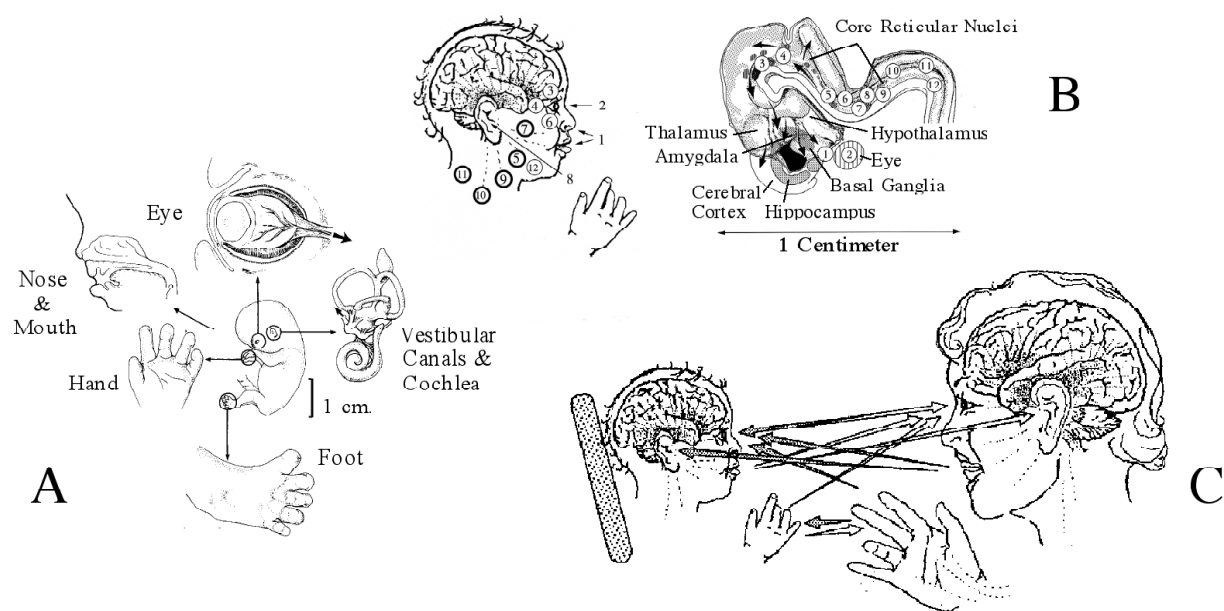


Figure 2: Psychobiological foundations of protoconversation.

A: The organs of human communicative expression and sensitivity are elaborated by the early foetal stage, at 60 days, before the central nervous system is active.

B: The special visceral efferent nuclei of the brain stem, which regulate eye movements, facial expressions and vocalizations of an infant, and of an adult, are well-formed in the brain of a 50 day human embryo.

C: In protoconversation with an attentive and sympathetic adult, the brain of an infant a few weeks old, with very immature cerebral cortex, can engage in a precisely regulated rhythmic exchange of interests and feelings with the adult brain by means of *sight* of head and face movements, with eye-to-eye contact, and hand gestures, *hearing* of vocalizations, and *touches* between the hands. (Trevarthen, 2001b, 2004).

Neurobiology of Neonatal Intersubjectivity

Brain science shows both developmental and comparative evidence that the human brain is formed prenatally with adaptations at all levels to motivate activity and emotions – it has subcortical or brain stem systems that are homologous with those that mediate communication in reptiles and birds, and these have additional features that are specifically human and that anticipate development of a new complex of communication of mental activity by eye movements, facial expressions and vocalizations. The subcortical components for power of movement, emotional expression, distribution of attention and 'executive functioning' are integrated with large neocortical elaborations (Trevarthen, 1985, 2001b, 2004).

An electroencephalographic study has demonstrated that a two-month old infant looking at a photograph of a woman's face shows activation of asymmetric areas of the prefrontal and parietal cortex. These are the areas that in adults are essential for perceiving the conversational expressions in another person and for responding with complementary facial, vocal and gestural expressions (Tzourio-Mazoyer et al., 2002). This indicates that the cortico-subcortical integrations necessary for learning the codes for intersubjective communication, including those for language, are already functioning at this early stage in proto-conversation..

Most remarkable, and little studied, is the coupling of human hands with the brain stem motor centres in the functions of hands as self-regulatory and as expressive organs. Human hands act in collaboration with the special visceral efferent motor nuclei that have evolved beyond their primitive functions as regulators of vital functions of the Self, such as breathing, eating and seeing, to control expressive movements of eyes, face and voice in communication (Porges, 1997).

Neonatal hands make many delicate movements in 'self-synchrony' with other body movements, face expressions and vocalizations, and these movements are capable of sympathetic 'inter-synchrony', with the movements of looking and speaking of an adult (Condon and Sander, 1974; Trevarthen et al, 2009).

All these innate gestural and vocal expressions exhibit coordination by an 'intrinsic motive pulse', a time sense generated and regulated in the brain (Trevarthen, 1999), with variations of 'vitality dynamics' (Stern, 1985, 1999). The communicative power of drama, poetry, dance and music depend on this temporal patterning of movement shared by all of us (Stern, 2010). The vocal exchanges between a mother and a young infant are found to have measurable parameters of 'communicative musicality': a rhythmic 'pulse', changing 'quality' or expressive intensity of pitch and tone, and capacity to entrain attention and purposeful imagination in 'narrative' sequences of many seconds (Malloch, 1999), out of which all elaborated forms of human companionship in action and experience are constituted. Intersubjective motor control of imitation and dialogic exchange (Trevarthen, 1986) requires that the parameters of expressive movement are well-regulated and simulated in the awareness of others, and among the most pervasive and important of these is the rhythmic pulse characteristic of the vital control of all animate functions and of body movements in particular. This is clear in the 'chronobiology' of music (Osborne, 2009), and from the 'musicality' of behaviours in all active human communication and from the sensitivity of infants to the dynamics and expressive modulations of music (Malloch and Trevarthen, 2009).

Physiognomic form or 'shape' of expressions must be perceived extero-ceptively, by sight, hearing or touch. The sense of 'projicience' or anticipation of effects in every act directed to the outside world (Sherrington, 1906) is shown by the searching and self-testing movements of other

individuals – *seeing* the expectant orientation of the head and movements of the eyes and the expressions of the mouth and gestures of the hands, *hearing* the form of the mouth in a vowel sound. These forms of expression can be portrayed technically by static images (photos, graphs, phonetic symbols, text, or pictures of hand signs), but all naturally occur as momentary states in dynamic sequences of moving. The changes in direction, rate, intensity and combination are highly significant in communication as expressions of different motives and emotions (Stern, 1985, 1999; Stern et al., 1985; Trevarthen, 1986), and all these parameters are controlled with precision in the movements of infants.

Accurate recording of how movements unfold in time and space reveals that there is a consistent regulation by 'motor images' (Bernstein, 1967) and that these can be described with remarkable economy and precision by a mathematical formula discovered by David Lee and called by him the 'tauG' function (Lee, 2005; Lee and Schögler, 2009). Variation of form in the family of curves described by the function can be closely compared to expressions of emotion and the feelings they stimulate when expressed in purposeful activities of any kind, and in dance, music, song or poetic speech.

Dialogues, Games and Cooperations: The Genesis of Cultural Meaning

The sensitivities and actions of newborn infants are more easily comprehended in the light of developments that follow on through the first year, at the end of which an infant, who has been a willing partner in action games and simple song narratives, is clearly now intrigued by cultural practices and tools, and about ready to learn words (Trevarthen, 1998, 2004, 2008). The newborn appears to have motives and responses, as well as expressive organs, that are adapted to foster these developments.

Dialogues with two-month-olds exhibit the rhythmic steps, affective melodies and narrative envelopes of energy cycles that are the dynamic characteristic of human body movement, thought and language. As the body becomes stronger and more self-supported, infants are more alert, curious and playful. But even newborns exhibit the exuberance and extravagance of proprioceptively regulated agency, or poly-rhythmic subjectivity, that is uniquely characteristic of all humans, and that animates the gesture narratives of musical sound (Trevarthen et al, 2009). From birth, this spontaneous expressiveness involving the head and body with all the limbs, seeks engagement, altero-ceptively, with the agency of other persons. In games with others, infants negotiate at the growing borders of shared purposefulness with powerfully expressed emotions of self- and self-other-experience, and they learn rituals of body movement and of joint intention with others.

By six months an infant should show a proud performer's personality, showing off and acting self-conscious (Reddy, 2008; Trevarthen, 1986, 1998; ***). He or she will be sensitive to the identity, as well as the manners, of any person who attempts to share play, showing a teasing happiness in the company of familiar playmates, shyness with intrusive approach of a stranger, and shame when unable to sustain self-confidence when attempting a familiar performance with someone who does not play their part. (Trevarthen, 1998; ***)

At 9 months the experience of objects motivated by from individual interest and manipulation, which develops through the middle of the first year with postural control of the trunk and head, full and flexible support of outreaching arms and hands, and guidance by touch, sight and hearing of manipulations by the fingers, ceases to be so self-absorbed. It becomes open to direction by another person's intentions and enthusiasm, or their indications of caution or annoyance related to external happenings or objects and the shared space of action. This new cooperative awareness of a world in common leads to performance of joint tasks, which are regulated by *compliance* with requests, indications and instructions, or *refusal* that is clearly opposed to the other's intentions. The affective control of these acts can lead to teasing play. But games involving objects becomes more serious or 'business-like' as cooperation to achieve a goal with help for, or from, another becomes the main interest (Trevarthen and Hubley, 1978; Hubley and Trevarthen, 1979). Furthermore, the nature of a task can be inferred by observing another attempting to carry it out, and an observed practice can be remembered (Meltzoff, 1985, 1995). Cultural habits for use of objects and for performance of technical production or works of imaginative art may require that the performer takes an objective view of the task, or a more deliberate and focused interest in the methods involved. This requires a disengagement from sharing of impulses and feelings – a 'detachment'. Can a newborn show this detached individual intentionality distinct from the sociable motivation required for a proto-conversation?

Observations of infants inwardly 'contemplative' states of mind suggest that right from birth an infant can have some kind of creative experience of being alone with the feelings of the body, reflectively exploring the experience of being a human life, feeling tensions and contacts of moving, touching their own hands and face, looking at their hands move, listening to the effects of movements within their body and when they move outside things. Some very delicate self-regulations serve essential functions of feeding, of being well supported, to push away hurtful objects. Neonatal sucking seems an instinctive reflex, but has been shown to have delicate prospective control (Craig and Lee, 1999), and can become an instrumental act to regulate exteroceptive experience (Bruner, 1968). Other movements seem to serve self-awareness only. Neonatal hand movements are investigative, self-stimulatory and regulative for the infant. What has been called 'neo-play' with touch sensations of moving hands appears to help build a self-

awareness, from which an awareness of objects remote from the body may be conceived and their properties explored and used (Adamson-Macedo, 2004). And such spontaneous movements can compose episodes within a sequence of changing states of vitality, comparable with the 'narratives' of approximately 30 seconds duration identified in protoconversation with a 6-week-old, or in games and songs with older babies (Malloch, 1999; Trevarthen, 1999; Malloch and Trevarthen, 2009).

A psychobiological perspective on thought suggests that the imaginative mental creation of a plot, a story garnered from experiences of the past that are reassembled in new ways in the phenomenal present, depends on an internally regulated physiological cycle of energy in living and acting. It is significant that the time of a proto-narrative, ranging from 20 to 40 seconds, corresponds with a poly-vagal cycle of control by the brain of activities of the heart and lungs (Delamont, Julu and Jamal, 1999; Trevarthen, 1999).

My conclusion is that the proto-cultural intelligence that can be attributed to a one year-old infant, which comes to a rich imaginative ripeness in the next two years, with the intersubjective intentions and perceptions that it depends on, can be already found in the active agency and sociable awareness of an alert and contented newborn. We must respect these intuitive beginnings if we are to comprehend the elaborately representational and rationally regulated minds of speaking humans. These are the motives at the beginning of education that Whitehead calls 'romantic' and that, he claims, must remain active and well-regulated within the child and young adult who is being instructed at later stages in 'disciplined' and 'generalised' knowledge. Margaret Donaldson in *Human Minds* (Donaldson, 1992) has a similar idea of the stages of cultural education, and Merlin Donald's theory of how the human mind evolved (Donald, 2001) similarly assumes that a culture of expressive and creative mimesis were necessary for the emergence of language. Infectious mimetic fantasy play, Victor Turner (1982) called it "the human seriousness of play", is the driving force of cultural learning in early childhood, and its primary needs are evident in neonatal intersubjectivity.

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