

Intuitive meaning

Bodo Frank | University of Zurich

Colwyn Trevarthen | University of Edinburgh

 <https://doi.org/10.1075/ceb.6.11fra>

 Available under a CC BY-NC-ND 4.0 license.

Pages 261–304 of

Moving Ourselves, Moving Others: Motion and emotion in intersubjectivity, consciousness and language

Edited by Ad Foolen, Ulrike M. Lüdtke, Timothy P. Racine and Jordan Zlatev

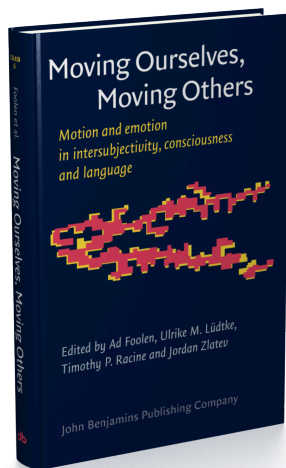
[Consciousness & Emotion Book Series, 6]

2012. viii, 492 pp.

© John Benjamins Publishing Company

This electronic file may not be altered in any way. For any reuse of this material, beyond the permissions granted by the Open Access license, written permission should be obtained from the publishers or through the Copyright Clearance Center (for USA: www.copyright.com).

For further information, please contact rights@benjamins.nl or consult our website at benjamins.com/rights



Intuitive meaning

Supporting impulses for interpersonal life in the sociosphere of human knowledge, practice and language

Bodo Frank & Colwyn Trevarthen

University of Zurich / University of Edinburgh

What is the foundation of social meanings, the cultivation of motives and beliefs in a community of human minds? How does meaning and collaborative intentionality emerge in intimate human relationships of early childhood and how does it grow in society? This article begins with an account of the origins of shared intentionality and intersubjective cooperation of feelings and ideas in infancy and early childhood. Then, the enquiry extends to the concepts of the social sciences, drawing ideas from the relational sociology of Pierre Bourdieu and the social philosophy of Jürgen Habermas. It attempts to elaborate the transition between the primary psychobiology of human sympathy, of proto-conversation and early intersubjective play and cooperation, and more abstract socio-philosophical concepts of the articulate and technically complex adult world. An important conclusion is that the same motives that make the creation and propagation of meaning possible in early childhood and the successful mastery of adult competence can be responsible for social marginalization or exclusion when the experiences of individuals or communities diverge from those of the larger society. We attempt to indicate how a recovery of the original intimate motives by sympathetic intervention can assist a deviant individual to gain a more meaningful place in the social group.

Keywords: intersubjectivity; motives; emotions; sympathy; meaning; habitus; culture; marginalization; special education; therapy

We live, work, learn and talk in a sphere of meaning made by persons sharing actions and experiences, passing on knowledge, techniques and beliefs about the world in ritual and symbolic ways. Our fates as individuals, our unique 'personal narrative histories', depend upon the health and pride of this sharing, on the affections and poetry or 'making' of life – how our families and communities appreciate and support us

through all stages of development, and what we give to them in return (Trevarthen 2006). Human beings are intuitive collaborators.

The life of culture requires sympathetic response to hopes and fears and eager transfer of ideas, methods and explanations. It is not just a commerce of *products* in the form of objective information in texts and material objects of technology. Nothing meaningful can be achieved or sustained without human sympathy for the *process* of psychological states and narrations – without us taking part in the relating of stories that give shared purpose to what we do, and common value to what we perceive. In this chapter we develop this idea that all of practical and realistic meaning in human communities, and all cultural rituals, rules of conduct and languages, depend upon intimacy in action and experience – on the kind of trust, mutual affection, pride and an appreciation shown in Figure 1. And we consider the consequences of marginalization or exclusion from intimacy of understanding.



Figure 1. A family in an affectionate and meaningful world about to undergo transformation; one culture confronting another much larger one with pride in itself. Sampson and Leah Beaver with their daughter Frances Louise in the year 1907 in Canada. As Blackfoot Indians they lived with little technology, not even using canoes. They are close to nature, rich in art, and well in trustful relationship, as they are recorded by an alien photographic machine (Kipp 1996)

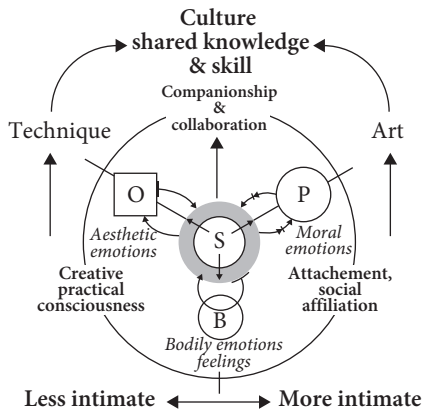
1. The psychobiology of culture in infancy and early childhood

1.1 The contribution of a natural science of infancy

Research on the behaviours of infants recorded in near natural circumstances, where their actions are spontaneous and adaptive to surrounding events, has demonstrated that humans are motivated from birth to act and learn as persons who intend to relate to other human beings (Trevvarthen 1977, 1979, 1998, 2010). Innate impulses to move as coherent intentional and conscious selves in emotional engagement with the sensitive responses to the intentions of other persons in inter-subjectivity, eventually lead the child to learn the socially accepted meanings that constitute a 'culture' with its traditional practices and language (Trevvarthen 1988, 1992).

The intentions and emotions of infants are entirely expressed in how their bodies move in self-centred time and space, and how they willfully assimilate external 'affordances' for future action by orienting their attention (Gibson 1977). The rhythmic prospective control that equips infants with this self-awareness of moving makes their intentions, interests and feelings 'public', such that sufficiently attentive other persons may experience what the infant intends, experiences and feels by a process of 'sympathetic resonance' or 'attunement' in mutual awareness (Stern 1984; Thompson 2001; Bråten 2009; Bradley 2009). They have a productive *self-other-awareness*, knowing other minds 'intuitively', and with feelings that rest the quality of intimacy, needing no 'theory of mind' (Reddy 2008). This interpersonal awareness of 'significant others' who give emotional support (Lüdtke, this volume) has priority in development, actively guiding growth of experience, even from before birth as the foetus can hear and learn to identify the prosody of the mother's voice, and taking the lead over any 'objective' engagement with physical objects or events.

To prove this theory of the innate personality and cooperative awareness of infants, and to understand its implications, developmental psychologists have, in the past 40 years, found that it is not sufficient to observe only what the infant and child *learns*. Nor is enough to demonstrate the construction by the child of cognitive procedures and schematic models of objects and of their potentials for use (Piaget 1954). A new genetic epistemology seeks evidence that the *process* of human knowing, as distinct from the *content* of knowledge, presupposes actively motivated human sympathy and intersubjective collaboration. An innate *prefunctional morphogenesis* builds the adaptive anatomy of the body and brain of the embryo and foetus in human form, with the special sensory and motor organs adapted for communication. Within the embryo brain stem the emotion defining Affective Nervous System (Panksepp 1998), which will regulate actions throughout life, develops before the cognitive mechanism of the cerebral cortex, and its neurons guide the growth and differentiation of cortical circuits (Trevvarthen & Aitken 1994; Trevvarthen 2001) (Figure 2).



Map of motives & emotions

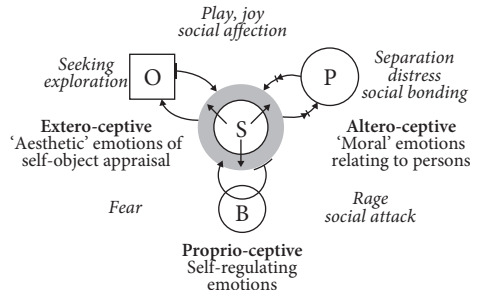


Figure 2. The innate anatomy of human motives, anticipating a life in communication.

Left: The Intrinsic Motive Formation in the core of the brain (Trevarthen & Aitken 1994) coordinates the vital states of a human being, directs engagements of the embodied Self (S) with the environment, and regulates collaborative cultural learning of technical and artistic skills. (Trevarthen 1998).

Right: The basic emotions systems (Panksepp 1998; Panksepp & Trevarthen 2009) are indicated as they relate to the body, to the experience of physical objects or to communication with other subjects. Three systems of emotion regulate movements and perceptions: *proprio-ceptive* for feelings of the well-being of the body (B); *extero-ceptive* for feelings of engagement with the objects (O) of the physical world; and *altero-ceptive* for sympathetic feelings for the intentions and emotions of other persons (P)

1.2 Agency and cooperation: How animal individuals move and communicate

A psychobiology of human consciousness in infancy and its cultural elaboration requires a grounding in the physiology or neuroscience of intentional animal movement, the science that attempts to explain how the integrated central nervous system of an animal may, with 'extero-ceptive' awareness, command coordinated and regulated animation of the complex somatic sensory-motor system of a mobile body with its vitality-sustaining internal visceral processes. In addition, a scientific account of the cooperative intersubjective powers of communicating animals has to accept that there is a process of transmission, or 'resonating with', the rhythmic energetics of self-regulation between individuals. These powers, evident even in social coordinations of primitive forms of animal life, require an 'altero-ceptive' sensitivity for the 'proprio-ceptive' and 'viscero-ceptive' regulations made apparent in other individuals – by how they move to seek and choose objects, how they make themselves comfortable, how they act to maintain internal well-being through selective appropriation of what the environment affords as essential sustenance, and how their bodies may be sensed to change when they self-regulate physiologically (Figure 2).

A core principle for both effective action and sustained vitality of any animal is *prospective control* of movement with *self-assessment* by an integrated brain. One hundred years ago Charles Sherrington, the founder of modern neurophysiology, proved, by systematic experimentation with the functions of peripheral nerves that link body and brain, a comprehensive theory of 'the integrative action of the nervous system' (Sherrington 1906). He explained conscious voluntary action as the product of extero-ceptive 'projicience' that perceives the location and form of objects and 'knows' what they are good for – the anticipation by 'distance receptors' of the satisfaction of vital needs. What eyes or ears detect may guide motor activity of a body made united in its biomechanical powers by an intense and constantly tuned proprio-ception of muscular forces in dynamic postural or kinematic equilibrium. Furthermore, both exteroceptive and proprioceptive sensory realms of the integrated self are guided by the 'affective appraisals' of viscer-ceptive senses, which measure the *values* of objects taken up by the body.

Subsequently others, notably Nikolai Bernstein (1896–1966; Bernstein 1967), Karl Lashley (1890–1958; Lashley 1951), Eric von Holst (1908–1962; von Holst 1936; von Holst & Mittelstaedt 1950) and Roger Sperry (1913–1994; Sperry 1952), adduced evidence for the capacity of the brain to predict the consequences of movement with 'images' of the internal effects and the eventual engagements with environmental media and objects. David Lee has extended James Gibson's theory of prospective perceptual control with a precise mathematical formulation of how the brain 'models' the course of every unit movement by controlling the speeds and accelerations of action to close the body on goals with elegant precision, and Lee's 'tauG' guide process has been detected in the brain activity that formulates a movement (Lee 1998; Lee & Schögl 2009).

Animal intentions evolve and grow, from the start, with potentialities for inter-subjective social collaboration, making their intelligence communal. The brain-generated dynamic 'motor images' (Bernstein 1967), which define cadences and transformations of movements in specific rhythmic ways, can be read by another subject as expressing the conscious expectations of the mind that forms them. They can serve to communicate mental actions and emotional states. This is how one animal can 'get inside the skin' of another and engage in willful cooperation or competition with their intentions. The evolution of social signaling has been the subject matter of ethology from its beginnings early last century (von Frisch 1923; Lorenz 1966; Tinbergen 1951). Physiologists' demonstrations in recent decades that brain actions predictive of the consequences of moving can be used not only to guide movements of the self, but also to detect and evaluate the motivation of another individual's movement, has revolutionized psychological theory of both subjective and inter-subjective regulations (Gallese 2003; Jeannerod 2006).

In the course of animal evolution, actions of the brain within the body to regulate its purposeful movements, the 'ergo-tropic' actions that are projected to displace and navigate the body in engagement with the environment, or the 'tropho-tropic' ones that regulate the well-being, comfort or appetites of the body, are made more 'explicit' or 'ritualised' for purposes of social communication (Tinbergen 1951; Hess 1954; MacLean 1958). Efferent commands that evolved to move the organs of the body in self-regulating functions of breathing, circulation of the blood, feeding and selective attending have become elaborated to make social signals that 'tell' to other individuals what an animal feels, needs, wants, or will do, and with what urgency or care (Porges 1997; Panksepp 1998; Trevarthen 2001). Inner emotional states of any kind become transmissible to sympathetic partners; that is, other subjects may experience and engage with one's emotions, positive or negative, by what, in humans, we recognize as 'moral sentiments' (Smith 1759).

1.3 Intersubjectivity with newborns

Newborn infants, contrary to the classical reductive assumption that they lack subjective coherence of movement and an integrated awareness, have been proved, by detailed analysis of their actions, to have *extero-ceptive*, *proprio-ceptive* and *viscero-ceptive* prospective control of their movements, which are highly efficient and variable in force and form (Trevarthen 1984). The orientations of their receptors are guided by interest that can direct them to select nearby objects located outside their bodies. They show, by this psychological control of activity, *primary subjectivity* (Trevarthen 1979, 1998).

Infants also have well-differentiated manifestations of emotions that relate either to the regulation of their attempts to focus on environmental events of a physical kind, or, and most conspicuously, to their interactions with other persons, and these emotions powerfully influence the affective responses of their parents (Trevarthen 1979 1993, 1998, 2001). Most obviously infants express the four different poles of emotion that define 'pleasure in sharing' or 'fear and anger of opposition', and 'interested focus on a task in hand' that may become 'anxiety' if the task is too difficult, or irritable 'boredom' if it is too easy – that is, if the 'flow' of effort is not optimal (Csikszentmihalyi 1990). Piaget, with exclusive interest in the formation of cognitive schemas for coping with the objective world, distinguished in infants expressions of *pleasure in mastery*, when experience is 'assimilated' in 'play' onto a strong and clearly conceived schema, and *serious intent* when the schema is in need of 'accommodation' by 'imitation' (Piaget 1962). Papoušek (1967) made the important observation that infants, when trying to anticipate and engage with a series of events triggered by their movements in an experimental set-up, show pleasure when they predict correctly and concern or sadness when they fail. Such expressions have obvious potential to coordinate the actions and experiences of different subjects.

Laughter in humans is an expression of excitement stimulated by sharing physical or expressive play, and it has powerfully beneficial effects on individuals' states of mind, and on affiliation or liking between them, especially in childhood. Panksepp, who observes that, "laughter is the clearest signal that natural play urges are being engaged" (Panksepp 2007: 58), has demonstrated that similar vocal displays of enjoyment by juvenile rats have an affiliative function (Panksepp & Burgdorf 2003). Moreover, he claims that hyperactivity in young children may be regulated by playful activity that stimulates energetic social enjoyment, and relieves frustration from lack of adventurous companionship (Panksepp 2007).

Sympathetic engagement, 'in time' with the dynamics of another person's movements and feelings, sensing their 'vitality dynamics', has a strong innate foundation enabling transfer of intentions and feelings (Stern 2004, 2010). Newborns' movements exhibit both the same basic rhythmic 'musical' parameters of adult movement, and a capacity to engage, by eye contact, facial expressions, vocalizations and body attitudes and gestures, in reciprocal 'dialogue' with the expressive actions of another person in an intimate playful exchange in which new expressive acts are learned and used as mutually known conventions (Osborne 2009a; Trevarthen 2008, 2010). They also show the beginnings of immediate responsiveness to other person's expressions of affectionate interest, and interest in sharing experiences. Newborn hands, especially, express states of arousal and moods, thoughts, sympathy for others' thoughts, and are ready to share adventures in imagination and memory with attention to another person's hands moving in sympathy (Trevarthen et al. 2010) (Figure 3).

The readiness with which some newborns imitate expressions of another person's face (Maratos 1973, 1982; Meltzoff & Moore 1977, 1983; Field et al. 1983; Field 1985; Kugiumutzakis 1998, 1999) is evidence that they have what Stein Bråten (1998; 2009) has defined as a "virtual other" in their cerebral system for communication. Following a period in which neonatal imitation was pronounced impossible, experiments have led to the idea that newborns imitate to test their similarity to other persons, by matching the form of demonstrated body movements, perhaps to identify with them (Meltzoff & Moore 1999). However, this imitative 'matching' is not, as widely assumed, merely a detection or feeling of similarity between the body of a Self and that of an Other. In natural spontaneous interactions between infants and attentive adults, the imitative behaviour of each of them is fundamentally a test of *the purpose and affective quality of dynamic states of mind in the other*, which may or may not be reflected upon consciously (Damasio 1999; Gallagher 2008). It enables the generating and exchange or 'dialogue' of expressions and mutual intention and affection in 'felt immediacy' (Bråten 2009). It is from the outset inter-subjective in this sense (Trevarthen 2010). Experimental tests of the capacity of newborns to imitate formally presented gestures, vocalizations and oral and facial actions generally do not allow estimation of the infant's motivation and emotions, and they can easily fail

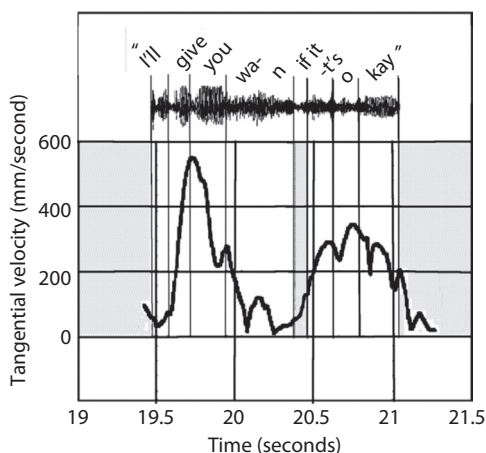


Figure 3. Above: Newborns less than an hour after birth in a clinic in India, participating in imitation of tongue protrusion, and reciprocal 'demonstrations' of hand gestures. (Photos by Kevan Bundell)

Below: An infant, recorded by a motion capture camera in the hospital about 36 hours after birth, regulates her arm movement (measured as the tangential velocity of the wrist) to synchronise with the pattern of syllables in an adult voice. The infant's arm lies at rest before and after the adult moved toward the table to say, "I'll give you one... if it's okay". The two phrases make up a complete sentence with a 'relaxed' conclusion. The infant extended her left hand from an at-rest flexed position with the hand close to the head, down toward her waist, and then back again to a flexed resting position. The outward stretch matched the first phrase, "I'll give you one." There was a slight pause in the arm movement anticipating one in the speech (shaded) near 20.5 seconds before the conclusion, 'if it's okay', when the arm was brought back to flexion. Syllabic boundaries are marked by vertical lines to show their correspondence with velocity shifts (the dark curve). The stresses in speech on 'give', 'one' and 'kay' are separated by approximately 500 milliseconds, which corresponds to *allegro moderato*. (Trevarthen et al. 2010)

to support an engagement – hence the reports of ‘failure to replicate’ (e. g. Anisfeld 1979). More descriptive and ‘permissive’ approaches with less regulated observation lead to a much richer conception of the process and purpose of the ‘copying’. The infant acts *with* the adult to provoke and co-regulate an interpersonal interaction, and the act of making the imitated action is accompanied by emotions of interest and pleasure (Nagy & Molnár 2004). The infant and adult play an imitative ‘game’.

1.4 Protoconversations with two-month olds

Micro-analysis of face-to-face communication between mothers and two-month-old infants has revealed the following important features of behaviours motivated for interpersonal communication: they are composed of rhythmic elements or steps that are combined in phrases; they express affective melodies of a ‘courteous’ emotional ‘attunement’; and they are regulated over longer intervals by ‘narrative envelopes’ or energy cycles (Bateson 1975, 1979; Stern 1985, 2010, Trevarthen 1977, 1979, 1988, 1999; Jaffe et al. 2001). These forms of infant expressive activity and engagement (Trevarthen 1986, 1999) are the same as characterize all human body movement, thought and speech with gesture (Langer 1953; Key 1980; Fonagy 2001; Köhl 2007). They prepare the way for learning language in live communication (Ryan 1974).

In a protoconversation, the 2 month old and mother both act to make a “dialogue” of visible and audible expressions (Figure 4, and Malloch & Trevarthen 2009). The mother’s vocalizations and other expressions show the coherence and emotive dynamics of “intuitive motherese”, a register of speaking that is immediately responsive to the infant’s equally coherent and emotive dynamic expressions – of face movements, coos or frets, hand gestures and body movements. The physiognomic and kinematic patterns of this motherese, like its reception, are universal and unlearned (Fernald & Simon 1984; Fernald 1989; Papoušek 1994; Grieser & Köhl 1988).

Comparison of the behaviours of infants and mothers with the elements of song and performances with musical instruments makes clear that there are fundamental temporal and affective principles at work in music and protoconversation, and that the infant shares expectations of how these principles should be shared to make a dialogue or duet (Papoušek & Papoušek 1981; Papoušek 1994; Stern 1984, 1985). A common rhythmic sense or ‘Intrinsic Motive Pulse’ (Trevarthen 1999; Osborne 2009a), the appreciation of a scale of pitch, and sensitivity to the timbre or quality of vocalizations are all shared by infant and adult (Malloch 1999; Malloch & Trevarthen 2009; Marwick & Murray 2009; Powers & Trevarthen 2009). Further observation shows that the dynamics of vocal expression are reflected in hand gestures as well, so the infant can ‘dance’ with hand gestures to accompany a mother’s song or share performance of an action game such as clapping song (Trevarthen 1999; Trevarthen et al. 2010).

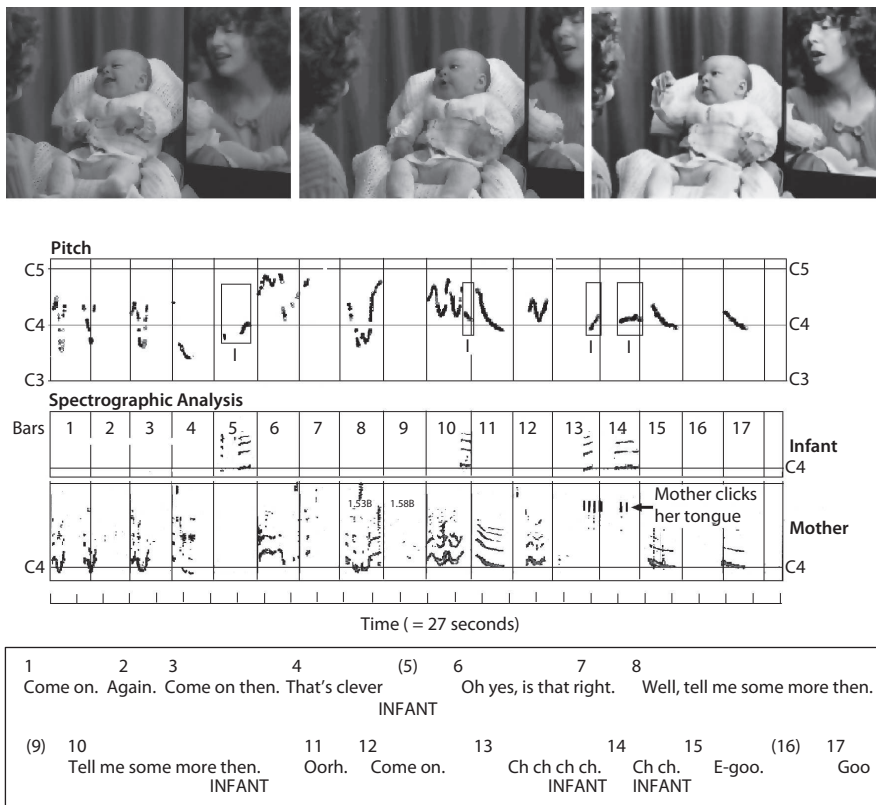


Figure 4. Protoconversation with a six-week-old. (Malloch & Trevarthen 2009).
Above - She looks at her mother speaking and smiles; she coos; and she gestures with her right hand.
Centre - Pitch plot and spectrographic analysis made by Stephen Malloch (1999), showing the melody of the mother's voice and vocalizations of the infant, both based on Middle C (C4). The regular bars lasting approximately 1.5 seconds are numbered. They are marked by accented components of the mother's speech and serve to give timing to the infant's utterances.
Below - The text of the mother's speech with the bar numbers placed in relation to the consonants that define them

Adults giving care for infants use rhythmic body movements, chants and songs to regulate or share the mood of an infant, varying the energy to excite or calm. Action songs and lullabies show similar dynamic and melodic features in different cultures with different languages (Trainor 1996; Trehub 1990; Trehub et al. 1997). A young infant is responsive to and influenced by the mother's emotional state. Depressed mothers fail to engage their infants and cause them to be depressed. Two-month-olds are sensitive to the immediate 'contingent' responsiveness of a partner. Perturbation experiments, such as the 'blank' or 'still' face test, or replay of a video of the mother

communicating, demonstrate that the infant is motivated to participate in a mutually responsive exchange, live (Tronick et al. 1978; Murray & Trevarthen 1985; Trevarthen 1998; Marwick & Murray 2009). The infant's responses are not simple reactions to stimulation. As with neonatal imitation, they are seeking reciprocal communication with two-way exchange of expressions.

Even though the infant has no comprehension of the words a mother may use, the melodic/gestural narrative is appreciated in the way she combines phrases of a song or poetic recitation in stanzas or verses that last several tens of seconds (Trevarthen 1999). Evidently the patterns of expressive sound stimulate expectations in the infant's mind and attract their participation at particularly marked moments, such as rhyming syllables. Finally, infants show rapid learning of the ritual of a repeated song or action game with recitation, and become highly motivated participants.

1.5 Increased playfulness, teasing and the performance of rituals and jokes for others' appreciation: Making imitative art

As the infant's body becomes stronger and the head and trunk are more self-supported around 3 and 4 months, they become more playful and seek more lively exchanges with strong emotions. With this increasing self-other-aware liveliness comes a capacity to engage in intensely sympathetic positive and negative engagements not only with the mother or other adult, but with unfamiliar infants, in groups (Bradley 2009). The infant is not merely capable of conversational play in a dyad, with a single partner – he or she is 'sociable' and can participate in the exchange of feelings and making of meaning in 'concert'. In games with persons of any age they negotiate at the boundaries of shared purpose and creativity, 'teasing' the other or others by varying timing and form of actions in exchange with powerfully expressed emotions of joy, surprise, and 'mock' annoyance and aggression (Reddy 2008). They can compose celebratory events, or learn the provocative rituals of traditional body games and songs and delight in repeating them, watching others' reactions closely (Eckerdal & Merker 2009; Powers & Trevarthen 2009). They make a communicative art of "ceremonial ritual" (Dissanayake, 2000, 2009; Miall & Dissanayake 2003).

Tests of reactions to mirrors and playful teasing prove that infants of this age have a strong self-awareness, and this 'self-consciousness' comes with sensitivity to the appraisal of others for actions they perform (Reddy 2008). By six months an infant who is well-supported by affectionate parents has a performer's personality or 'identity', which demonstrates *pride* and is sensitive to the identity of any person who attempts to share play, showing shyness with intrusive approach of a stranger, and *shame*, when unable to sustain a familiar performance to elicit approval (Trevarthen 1998, 2005).

At the same time as these social abilities are showing increased subtlety and power, around four months, infants also gain in manipulative dexterity and in interest in objects of manipulation (Trevarthen 1984). With increased control of their limbs they begin rhythmic banging of objects with their hands, and jumping, and they also start babbling with the same rhythms. At this age they may become intensely occupied with their investigations of objects of movements of their body, and while concentrating on the task they will close off their responses to persons who seek communication (Trevarthen & Hubley 1978; Trevarthen 1998).

1.6 Sharing tasks with person-person-object awareness
or secondary intersubjectivity

At 9 months the interest in objects for individual interest and manipulation becomes open to direction by another person's intentions and emotional appraisals, and this new cooperative awareness leads to performance of shared tasks regulated by compliance with requests, directives, and instructions and demonstrating affective control of compliance or refusal (Trevarthen & Hubley 1978; Hubley & Trevarthen 1979; Trevarthen 1998). The infant can combine gestures and vocalizations to perform 'acts of meaning' in a 'protolanguage' (Halliday 1975, 1979). At this age games involving objects may become more serious or 'business like', more concentrated 'cognitively' and methodical or, as Halliday puts it, more 'mathetic'.

Habits for use of mannerisms, objects and situations become part of a cultural 'proto-habitus' with familiar playmates – parents, siblings etc. This prepares the way for learning of a many new symbolic gestures and words to name agents, actions and objects of shared interest in the growing culture and language of the home community.

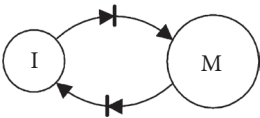
Table 1. How motives of infant change in the course of infancy

Developmental stages in inter subjectivity with infants

Months 1–2 Primary intersubjectivity:

Direct sensitivity to the expressions of feeling in intimate contact with an other. "Dialogic closure" in protoconversation sustained by two-way transmission of emotions. Identification of familiar affectionate partners.

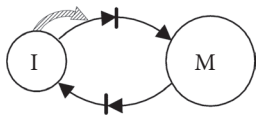
(1) PROTOCONVERSATIONS



Months 3–6 Games I:

Exploration of surroundings and manipulation of objects. Pleasure in body-action and in object manipulation is shared, and imitated, in play, including musical-poetic play. Laughter, mirror self-awareness and "showing off" as a "social Me" appear.

(2) GAMES & JOKES



(Continued)

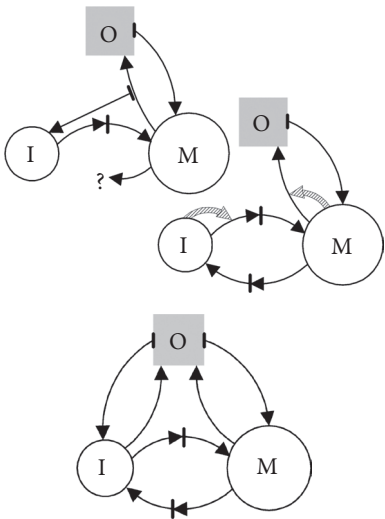
Table 1. Continued

Months 6–9 Games 11:

Lively socio-dramatic play and self-confident presentation with family increase, as does fear of strangers. The first ritualized ‘protosigns’ are learned in play. First “emotional referencing” and joint orientation to a locus of interest aided by pointing. Increased social awareness and self-consciousness as ‘knower’.

Months 9–14 Secondary Intersubjectivity:
Shared interest in tasks and the uses of objects; infant produces “protolanguage”. Learning of the conventional meanings of things. Use of objects to which others have given value “recreatively”, in fantasy play.

(3) GAMES & JOKES WITH OBJECTS



The diagrams summarise the changes communication and expressions of playful enjoyment or interest in objects described above. I = Infant, M = Mother, O = Object. Plain arrows indicate intentional movements or expressions. Arrows with a bar at the beginning indicate active perception of an object, or of a person’s expressions or actions. Shaded arrows are ‘meta-communicative’ expressive ways of moving that convey joy, tease or make a ‘joke’. The question mark indicates a request made by the mother as the infant observes her action toward an object, to elicit a cooperative response.

1.7 Narrative awareness of infants and toddlers leading to imaginative culture and its inventions

The inter-subjective and mimetic powers of infants prove that, before there are any words or propositions that refer to objects, agents or events in the world, the human mind in the human body is inherently ready for a ‘story telling’ society, imagining and remembering events and experiences for and with others beyond the psychological present (Bruner 1983, 1990; Donaldson 1992; Gratier & Trevarthen 2008). The rhythms and expressions of an infant’s voice and gesture seeking sympathetic response engage with the purposes and concerns of a parent in intrinsically motivated narrative cycles of enthusiasm, anticipation and satisfaction. The child is motivated to learn and practice approved rituals of performance. Their experiences are regulated by aesthetic

and moral emotions that evaluate the quality of messages sent and received and the 'courtesy' or 'respect' of the response from the other. Thus messages come to be stories that are believed, exchanged, imagined and recalled, and valued, in traditional forms, linking those that tell or receive them in imaginative as well as affectionate companionship (Trevarthen 1992, 1994, 2008).

Rigorous analysis by musical acoustic techniques of the sound patterns created when an affectionate and responsive adult evokes infant calls proves that even a premature newborn has the time sense and emotional appraisal required to meet the adult as a partner in an improvised 'proto-conversation' (Trevarthen 2008). This has led musician Stephen Malloch (1999; Malloch & Trevarthen 2009) to formulate a theory of innate 'Communicative Musicality', to explain how non-verbal narratives are shared. In the first weeks after birth infant-adult communication coordinates all the expressive organs; eyes, face, mouth and voice, head and hands, in rhythmic patterns modulated by emotions.

Thereafter baby songs and action games build dramatic cooperation within traditional rituals with properties of music, poetry and dance. The young child's mastery of meaning in this play is regulated by the moral emotions of pride and shame, which evaluate how acquired knowledge and skill are appreciated by known others, and how misunderstandings can arise (Trevarthen 1999, 2008).

Near the end of the first year the child turns his or her confidence in sharing purposes to invite interpretations from others of the usefulness of objects and the accepted meanings of actions. This co-operative 'secondary inter-subjectivity' or 'person-person-object' awareness, finding other's goals to have compelling interest, lays the foundation for cultural learning, and for all sorts of symbolic ways of acting and believing language. It also animates new play with meanings in toddlers that can be shared with peers in 'imaginative play' (Nadel & Pezé 1993; Nadel, et al. 1999) which is intensely creative, poetically and musically, opening the door to 'children's musical culture' (Bjørkvold 1992). It is more than the acquisition of joint attention to objects in a 'common ground' of experience and the imitation of intentions towards signified goals (Tomasello, Kruger & Ratner 1993).

Infants lack all external knowledge of special or artificial things, but have internal or 'intuitive' knowledge which they can share as a 'universal language' with other humans – they sense tastes and odours that please or offend, see brightness and colour in light or radiant substance, hear pitch, loudness and timbre, feel soft or hard, hot or cold. They perceive form and space and measure change in time. All these perceptions are most sensitive to the qualities that identify the animate presence and sympathetic responsiveness of a person. This leads to intimate sharing of thoughts, imaginative experiences and memories, before these are put into words, by appreciation of their expressions in action.

1.8 First steps to proficiency in meaning need good company in a community

In the second year a toddler is highly expressive and intensely interested in the traffic of meanings for and with others (Trevvarthen & Marwick 1986). When observed with the mother in a new place, he or she does not take interest in objects just as accessories to sensory-motor schemata; they have creative symbolic attributes that are evaluated in transactions with the mother who also knows what the objects are usually for. His or her attention is caught quickly by any thing that makes this shared kind of sense. Dolls, toy animals, cars, cups, hats, books, food, etc. are noticed because they are living company or used to do something. Though the actual objects may have never been seen before, they are quickly recognized as representing beings or tools in daily life. This 'representation' is a product of shared and remembered intentions and emotions. It precedes a symbolic verbal code acquired by imitation, and the capacity to respond correctly to verbal interrogations (Ryan 1974; Halliday 1975).

It is obvious that the sociability of the toddler's curiosity depends on who is present. Even though 18 month olds exhibited strong-willed independence, often refusing to take advice or directions, they are guided by what is brought to their attention by a trusted companion and they understand many words used to name objects, as well as those that convey interpersonal attitudes. If the mother leaves, or if some event in the unfamiliar place frightens the child, play stops and the mother is sought. With a stranger the play is desultory, uninspired and uninventive. Many of the seemingly avoidant or 'disobedient' responses to the mother take the form of playful showing-off jokes that both infant and mother recognise as such. The child boldly asserts a right to choose how to act in a meaningful way, showing an independent pride in this confidence, but does so under the assumption that the mother is there and approving, or at least condoning what is going on.

Thus there are two sides to this relationship between child and mother. Usually it guides and supports the child's use of meanings, but it can weaken it. The negative aspect, called maternal insensitivity, has received examination by the attachment theorists. Mary Ainsworth's technique of watching the behaviour of children at one year when with their mother or alone in a strange room with toys, and watching what they do when the mother returns after absence, or when a stranger appears in her place, has shown that a good affective quality of the relationship is positively linked to the child's motivation to "explore" objects (Ainsworth & Bell 1970). In the normal, happy life of a mother with a child of this age, the meaningfulness of surroundings and actions is continuously shared. This is as much part of the relationship as the emotional quality of their communication under stress; indeed it explains the role of 'companionship' in meaning in the child's mental growth (Hublely & Trevvarthen 1979; Trevvarthen 2005).

There is increasing evidence that the ability to communicate about experience requires an intuitive response from affectionate caretakers that will give specific emotional reinforcement or “attunement” (Stern 1984, 1985, 2010) to initiatives and interests of the infant, and to expressions of self-consciousness and self-confidence.

At this stage, corresponding to Halliday’s Phases I and 2 of language development (Halliday 1975), there is an great increase in a securely attached child’s competence for dealing with the mini-culture of life at home, or in the well-known social contexts of the community (such as church, the garden, a park, a supermarket, a friend’s house), places that are frequented by the child with the familiar caretaker, who may now, in many cultures, be an older sibling (Weisner & Gallimore 2008). Cross-cultural studies show that even with very different styles of “mothering” and domestic life, this same rapid development in curiosity about the meaningful world is manifest in the second year.

In the transition between language Phases 1 and 2, at 18–20 months, there is an increase of the attachment to the caretaker as well as a peculiar awareness of oddness or defects in things that will have been given emotional evaluation by the significant adults, and a heightening of fear of a stranger who will not comprehend the protolanguage level of discourse, and who cannot grasp the significance of favourite “games” or “performances” (Kagan 1982). This increase of emotionality compares with an earlier increase of sensitivity to the threat posed by a stranger who cannot share meanings, at 7–8 months, just before the start of Phase 1 and secondary intersubjectivity (Trevarthen 1998; Trevarthen & Aitken 2003). Cross cultural studies show evidence for a change in children’s motives and abilities at 5 to 7 years, when there is increased structure and discipline with expectation that the child will have more ‘sense’ and be able to take responsibility for care of others (Rogoff et al. 2008). This is when schooling in intellectual and social ‘skills’ starts in complex industrial cultures, and the socio-linguistics of imaginative peer culture is very rich and passionate (Blum-Kulka 2005).

‘Critical periods’ in development, and including adolescence, where the young person’s temper seems most vulnerable and most demanding of support from familiar companions, give evidence of major transformations of motives that are being produced from inside the growing mind (Trevarthen & Aitken 2003). They are, as Brazelton says, ‘touch points’ important in the changing relations with parents (Brazelton 1993). Each “emotional” phase is followed by a new level of mental integration, new friendships, and a new power in “meaning”. Gradually the child is gaining freedom from particular relationships, but only by depending upon those relationships to give the required “leg up” when this is needed. The mastery of meanings is by an interpersonal symbiosis, regulated by feelings of affection. When relationships are stressed and caretaking is unsympathetic of the child’s needs, mastery of meanings and of the language that communicates them will suffer.

The early language of a child is clearly sensitive to the habits and beliefs of the human environment. Both cultural and social class differences in children’s speech

give evidence of the dependence of this learning on the style of cooperation that the children find. There are also marked differences that appear to relate to intrinsic temperamental characteristics of the children themselves, and psychologists are finding consistencies between the features of early mother-infant communication and the speech of three and four-year-olds (Bruner 1983; Locke 1993; Nelson 1981, 1996). Now it is clear that such correlations cannot be explained just as consequences of differences in "mothering". The active contribution of the child to early prelinguistic communication, the fact that infants exhibit differences in expressiveness and self-sufficiency in exploration of their surroundings and the marked differences children show in their taking of roles as toddlers, all testify to a source of individuality that is in the child's own constitution, as well as in the accidents of experience and the guidance of companions. Study of early language offers valuable evidence for both sides of the control in relations with caregivers. For example, as infants in different social worlds begin to grasp acts of meaning in the second six months of life, they may receive different responses from their mothers.

Trevarthen and Marwick compared two working class and five upper-middle class mothers in Edinburgh over the period from 16 to 41 weeks when their infants were gaining the capacity to share a task (Trevarthen & Marwick 1986). Between the 30th and 40th weeks, when the infants became more cooperative, mothers increased their directive or command forms of utterance, reduced their statements and asked fewer questions about what the infant was interested. The change in illocutionary acts showed the mothers' communicative intentions, or intuitions, were getting more specific in response to the changing motives of the child. Mothers varied widely in playfulness, as infants varied in liveliness, and some were more oriented to the objects while others made more references to feelings, interests or intentions of the infant. Working class mothers were much more ready to praise or criticise their infants than were middle-class mothers, but middle-class mothers made many more Statements of Fact and they asked more Questions, especially Tag Questions that mask declarative or imperative statements. Thus, in Halliday's terms, working-class mothers were being more active and "interpersonal", middle-class mothers were more "ideational", encouraging experiences of the environment.

In their second year, individual toddlers show different orientations towards expression of their interests in words, some referring to interpersonal engagements and personal feelings, others tending to refer more to objects (Barrett 1981; Nelson 1981; Dore 1983). It seems evident that such differences and how they relate to the social or human environment prove that the child as a seeker after meanings by engaging with what other human beings offer in the way of interest and appreciation. Social roles, artifacts, instruments, rituals and occasions offer so many possibilities for specialization. It would appear likely, also, that there are inherited mechanisms in human beings that would favour growth of individual differences in knowing how to mean.

Language and its acquisition is most comprehensively understood, not from a systematic analysis of the rules for skilled use of text, but in terms of functions that regulate of mutual awareness and cooperative action in human society (Mead 1934; Vygotsky 1962; Rommetveit 1968; Searle 1969; Habermas 1970; Bruner 1990; Brandt 2009). The motives for intersubjectivity evident in the behaviours of infants question a traditional bias to explain mental activities in terms only of the facts of individual experience, or rational systems that “process” information about reality outside the mind. They offer a better understanding of culture and how it is transmitted, and of the part language plays (Reddy 2008; Bråten 2009).

1.9 The human brain is motivated for relational interpersonal life, and for cultural learning

The behavioural evidence of the infant’s motivation for entry into meaningful communication is supported by remarkable findings from neurophysiology and functional brain imaging, which require a new map of the cerebral systems adapted for inter-subjective contact between humans, and new interpretations of the intentional, perceptual and emotional foundations for the learning of cultural conventions and language. Now we know there is a rich resonance of intentions and consciousness of acting between minds by entirely intuitive ‘mirroring’ of cerebral processes evident in movements, which includes an emotional evaluation of the effort and satisfactions associated with prospects of acting, all in the natural time of moving (Jeannerod 2006). This physiology of intersubjectivity and the evidence of its power in infancy make together a new *psychobiology of human sympathy* – the harmonisation between persons of conscious intentional states of moving, and of thinking about moving (Varela et al. 1991; Clark 1997; Gallese & Lakoff 2005; Gallese 2003; Schilbach et al. 2006; Rizzolatti et al. 2006). The theory of ‘communicative musicality’, which offers an account of the primary temporal and affective dimensions of human sympathy (Malloch 1999; Malloch & Trevarthen 2009), is changing concepts of how information is exchanged by means of body movement (Sacks 2007; Brandt 2009; Panksepp & Trevarthen 2009; Turner & Ioannides 2009).

However, the discovery of ‘mirror neurons’ that transfer instrumental intentions between minds illuminates only a part of the problem of how a young infant can enter so efficiently into an experience of moving in playful sympathy with an adult partner, exchanging and compounding motives, and sharing consciousness of meaning in activity with different companions. The perception and action of communication is richly active before language (Tzourio-Mazoyer et al. 2002). Cultural learning depends on interpersonal ‘moral’ communication, for which infants show powerful adaptations, as well as on the sharing of intentions to use objects in cooperative ways (Adolphs 2003; Decety & Chaminade 2003). It is essentially intersubjective (Bråten 2009).

2. The socio-sphere: The emergence of mature intimate and responsible cooperation

2.1 The collaborative life as the acquired habitus of meaning and identity

“Moreover, they involved in their structuring at every moment and phase not simply *thought* structuring, but the whole human vital repertoire of thinking, willing, desiring, and feeling, subtly and varyingly interpenetrating on many levels” (The anthropologist Victor Turner discussing Wilhelm Diltheys distinction between ‘experience’ and ‘having an experience’. Turner 1986: 35)

To understand what the ‘meaning of life’ of a person is, how it emerges from sympathetic human interaction, and how the languages and other “tools of meaning” can grow in society, is to enquire into the intricate relationship between “common sense” (Reid 1764/1997) and “habitus” (Bourdieu 1990) and how they are already present in the “field of interaction” or “proto-habitus” between mother and infant. This original interpersonal awareness is grounded in turn on an innate “field of emotions”, by which the actions and intentions of human contact are regulated (Macmurray 1959, 1961; Kellerman 1980; Trevarthen 1993) (Figure 2). The proto-habitus, the developmental source of habitus, can be defined as the awareness of a mutual level of knowing evident when babies are smiling, recognising songs or playful routines, or collaborating in creative tasks with their parents (Trevarthen 1994; Gratier & Trevarthen 2008, Gratier & Apter-Danon 2009).

‘Habitus’ is a term used by the French sociologist Pierre Bourdieu for a certain kind of “embodied attitude” to the affordances of the social surroundings, rooted in the structure of what Bourdieu calls “*space of social dispositions*” (Bourdieu 1998). He defines it as a generative principle of ‘distinct and distinctive practices’, for example practices of eating, doing sports, and especially the way these practices are done, the socially aware manner of their performance and display, or their grace and skill. Habitus is an intricate part of a social “structuring of structured structures”, which has influence on itself, sustaining the social structure (Bourdieu 1998). These practices are different between persons living in various ways of life, in distinct positions of social stratification among shared activities and roles: “Life-styles are thus the systematic products of habitus, which, perceived in their mutual relations through the schemes of the habitus, become sign systems that are socially qualified (as ‘distinguished’, ‘vulgar’ etc.)” (Bourdieu 1992). Habitus is a classificatory scheme for social status and social tasks. It contains “principles of vision and division”, of different tastes and responsibilities (Bourdieu 1998). For the owner of a certain position or level within the social stratification, habitus makes distinctions between what is ‘good’ and ‘what’ is bad for this person in this position, and ideas are given authority in laws and rules of procedure (Bruner 2002).

To explain how a culture or society develops through time we must seek for the emotional and *motivational preconditions* of human intersubjectivity, which are evident in *early intersubjectivity* when relationships and states of responsibility are naive and inarticulate (Trevarthen 1993, 1998). Human collective understanding has its intrinsic source in the sympathetic impulses of human brains in human bodies interacting, imitating and complementing one another's experience and capacity to act. Stein Bråten identifies the essential foundation for human intersubjectivity, all communication between persons who relate through their 'virtual others' in 'felt immediacy', with processes that are innate and already complex in the earliest phases of postnatal life (Bråten 1998, 2009). By this basic sympathy or resonance of purposes and feelings we may feel in relationship to another person, an intimate connection similar to the critical 'present moment' in psychotherapy described by Daniel Stern: "...when people move synchronously or in temporal coordination, they are participating in an aspect of the other's experience. They are partially living from the other's center" (Stern 2004: 81) and elsewhere he says: "Intersubjectivity is not simply a capacity, it is a condition of humanness from the phenomenological point of view." (Stern 2007: 36). It is also the process by which a person's identity and personality are established in relationships.



Figure 5. Three degrees of family intimacy. At home in Edinburgh, Scotland, in 1979, three months old Laura attends to her mother, Kay, in 'proto-conversation'. Her three-year-old sister Louise wishes to join in and seeks contact with Laura. Father, Ben, is a proud onlooker. Laura and Kay are the subjects of the recording shown in Figure 4, which was made in Edinburgh University two months previously. (Photo by Penelope and John Hubley)

A complete theory of human intersubjectivity and of its growth and elaboration must explain not only the transitory events of immediate human relating, but how they are sustained to become the emotional and political forces of society in their full

complexity (Trevarthen 1992). Any human society and its field of social relations is structured by conventional practices and productive forces, that make up the “life-world”, or *Lebenswelt*, as defined by the German sociologist Jürgen Habermas (1987). In all levels of this creation of a human social world, emotions are not only psychological effects of stimuli from encounters with the reality of objects and events, as they are seen to be in a rationalists perspective. They are the regulators of all kinds of human discovery and learning in social activities from their earliest beginnings (Trevarthen 1993).

Intimacy in families, and the negotiation of affections in relationships between children and their parents and siblings, has many implications for understanding how the *lifeworld* or *social sphere* of cultural practices is structured in the adult community (Figures 1 and 6).

“To understand how the family turns from a nominal fiction into a real group whose members are united by intense affective bonds, one has to take account of all the practical and symbolic work that transforms the obligation to love into a loving disposition and tends to endow each member of the family with ‘family feeling’ that generates devotion, generosity, and solidarity. This means both the countless ordinary and continuous exchanges of daily existence - exchange of gifts, services, assistance, visits, attention, kindnesses - and the extraordinary and solemn exchanges of family occasions, often sanctioned and memorialized by photographs consecrating the integration of the assembled family.... The structures of kinship and family as *bodies* can be perpetuated only through a continuous creation of family feeling, a cognitive principle of vision and division that is at the same time an affective principle of *cohesion*, that is, the adhesion that is vital to the existence of a family group and its interests.” (Bourdieu 1998: 68)

The *social sphere* of cultural and intercultural activities embraces and accompanies all initiatives and experiences we can have with objects and other humans, whether cooperative or competitive. Its narratives begin in adult-infant interactions with the ‘dynamic contours’ of Daniel Stern’s *proto-narratives envelopes* (Stern 2010). Developmental science demonstrates that every narrative or story-telling structure that is eventually adopted as a grammatical convention in language and literature is “inherent in the praxis of social interaction before it achieves linguistic expression.” (Bruner 1990).

Human experience includes not a mere “stark confrontation” of then and now, between “collective then and existential personal now” (Turner 1986: 34). At every stage of cultural social and political practice inherent motives and feelings transmitted between persons are structuring the whole “human vital repertoire of thinking, willing, desiring, and feeling, subtly and varyingly inter-penetrating on many levels” (Turner 1986: 35). The present, past and future, and the meanings they carry, flow at different paces and intermingle in the ‘stream of consciousness’ (James 1890/1981).

The habits of society bring separate consciousnesses into productive relationships and cooperative works.

2.2 How semiosphere and sociosphere interact

The signs and symbols of communication sustain and shape cultural practices. What Lotman calls the “semiosphere” (Lotman 1984; also see Lüdtke in this volume) is the subject matter of “sociosemiotics”, the natural science of the intersubjectivity of language (Halliday 1978; Trevarthen 1992, 1994; Thornborrow & Coates 2005; Zlatev et al. 2008; Brandt 2009). For Lotman the *semiosphere* is inseparable from the *social sphere* which has a real practical and historical structure. He studies *dialogue* as a generator of meaning, and, with Bakhtin (1986), presumes thought to be dialogic in nature. The semiotic mechanisms of “art and, more broadly, culture, which are meaning generators, fulfil a function for the social body that is analogous to the brain’s functioning in the individual.” (Lotman 1984: 41).

But, the *sociosphere* includes all the real and conceptual ‘tools’ or ‘toys’ of the collective human enterprise, not just language and other coded systems of signalling. It results from all the dispositional forces and experiences that connect members of a society, both stemming from and reflectively influencing the many intersubjective and interpersonal relations within it. It is, therefore, both the dynamic origin and the product of habitus and proto-habitus, of the ‘trajectory of the dynamic change’ of emotion, affect and meaning within that what Bourdieu calls the *space of social dispositions*. “The social space is indeed the first and last reality, since it still commands the representations that the social agent can have of it.” (Bourdieu 1998: 13). It is the living field of interpersonal relations that configures a particular community. It includes the truth value of what Habermas calls the *trans-subjective claim of validity*, referring not only to the objective aspect of reality, but more fundamentally to the ideas or beliefs that arise from *intersubjective negotiation*, in which ‘feelings’ about what social reality is, and what are the ‘identities’ or ‘personalities’ of individual players are always important.

The sociosphere of a child and the first mastery of language should be perceived as that sphere of intimate relationship in which guiding regulations or the encouraging influences of the adult ‘significant other’ (see Lüdtke, this volume) can aid development within the ‘zone of proximal development’ of the child’s own will and experiences and urgent desire to speak (Vygotsky 1962, 1967, 1978). It is the ‘playground’ of discovery where the ‘companion’, be they parent, teacher or therapist, ‘scaffolds’ the efforts of the child to move, and climb and manipulate – in reality, in imaginative conceptions, and in speaking (Bruner 1983; Wood et al. 1976), making learning in ‘intent participation’ with others (Rogoff 1990). It is the synonym for a field of shared intentions called *meaning* that creates culture. And it is also a synonym for that what Mead named ‘the generalized other.’ (Mead 1964, see also Habermas 1987: 37)

Taking a perspective on human speech from the evolution of vocal communication in birds and mammals, Bjorn Merker, a neuroscientist, explains how the ability to make language emerged as a development, unique to humans among primates, in the intentional and intersubjective parts of the brains – the ability for vocal learning. This evolutionary change “...turns the cerebral territories centered on Wernicke’s and Broca’s areas from their non-language uses in other primates to the service of human language by recruiting them to *the generative production and intergenerational transmission of culturally learned vocal lore*. To it we owe not only our developmental trajectory for language learning, infant babbling included, but our propensity for imitation and ritual culture more generally.” (Merker 2009a: 461, emphasis added). This is the cerebral key to the semiosphere, the sociosphere of language.

2.3 Language and interpersonal life

Affect and emotion give the innate driving force to early language and grammar development. But the affects and emotions of this early stage are also shaped by the acceptance of social standards and norms. With attention to acceptable ways of communicating by ‘correct’ signs, symbols and grammatical rules, and to their cognitive mastery, the importance of the core capacity of early emotional-affective connectedness, the roots of innate human sympathy, may be obscured, and then language learning is not understood.

The socio-linguist Michael Halliday has put it this way:

The important issue at the moment is not so much the particular intellectual model we choose to impose on the language learning process, as the search for a greater understanding of the nature of early infancy, as we try to interpret the ontogenesis of language: how children begin to exchange meanings, to make sense of their experience and organize it into a picture of the world that is likewise shared with the others. In understanding this we also begin to see more deeply into the nature of language itself, since ultimately language has been shaped by the functions it has to serve in the actions and reflections on reality by a child.
(Halliday 1979: 181)

Halliday explains the semiotic process as a consequence of adaptive processes in language use, and these are tightly interwoven with the structure and conditions on the social level. In short: “The system of natural language can best be explained in the light of the social functions which language has evolved to serve” (Kress 1976: 17; see also Halliday 1978).

Human social functions, including language, depend on how persons perceive one another (Bråten 2009). In studies of early mother-infant interaction it has been shown, that the motivating processes for emotional and sympathetic interaction are innate and may be active in the first day of life. Newborn babies not only *imitate* in

interaction with other persons, by mimesis of the face, hands or voice; they able to *provoke* their partner to engage in a reciprocal dialogue (Nagy & Molnar 2004). A core ability that makes this intuitive sympathy of expressions is the sensitivity for dynamic features of movement that Stern names ‘vitally affects’. The “grammatical” structure inherent in early human transactions, later elaborated in speech and language, has its basis in sympathetic affective response to emotionally expressive movement. The grammatical structure of a language itself has no meaning and no function without this evaluation of intimate responsiveness, be it positive (pride) or negative (shame) (Trevarthen 1992).

This ‘human sense’ (Donaldson 1978, 1992) emerges in every-day life and is created within every interaction and accompanies the generation of every meaning. For Habermas, humans are using “dialogue-constitutive universals” for regulating interpersonal *contracts* and necessary requirement of a speaker’s capacity to communicate (Habermas 1970, 1987) There are different views of these constitutive universals: must they have a “formal quality” (in a more rationalists perspective) or are they more deeply grounded in the origins of intimate sympathetic human relationship?

The role and moral value of interpersonal feelings in sharing purposes and interests is made clear from the way infants “offer” learned “signs” in two situations where human contact is broken or strained. If the mother of an infant 6 months old or older, who has been behaving as the familiar loved playmate, is asked to keep still, compose an inexpressive face and cease to engage in response to the baby, her infant will often put on a “performance”, repeating a learned trick or a funny expression with insistence and looking hard at the mother as if expecting to excite some reaction, thereby making it very difficult for the mother to keep sober and unresponsive. She averts her gaze and struggles not to laugh. Similar challenging performances or displays may also appear when the baby is with a stranger, the “showing off” being made as a brief impulsive emission of friendliness in the course of an awkward, embarrassed or fearful contact with the stranger, who is usually puzzled and uncomfortable. Almost always the infant’s brave challenges or “jokes” receive a mixed, amused or sarcastic response that tends to decrease, rather than increase, their mutual confidence and pleasure.

The above learned fragments of behaviour, offered to others to motivate a shared understanding as well as to invite appreciative response, thus have the motive and function of “protosigns” (Trevarthen 1994; Trevarthen et al. 2010). They are conventional in the mini-society of the family where they confirm a bond of understanding. Their use with strangers, while inappropriate, is particularly interesting, because it demonstrates that these acts are, for the baby, something that may be exchanged in a wider social context. The presentation of these “messages” or “offerings” in a difficult social encounter with an unfamiliar person, or as “jokes” to tempt an unresponsive mother reveals that they possess a special psychological character. They are oriented towards the partner and they tend to capture the partner’s interest and feelings (see

Trevarthen 1992: 114–115). They prove that the infants are sociable, culture seeking, human beings who want meaningful engagement of purposes and pleasures with other persons (Reddy 2008; Merker 2009b). This is an essential foundation for learning language.

2.4 Genesis of sociosemiosis in intimate, affect-rich interaction: Concentration and marginalisation of meaning

There is an endless circulation of meaning, of relationships, and of social status or validity between persons in society, between more ‘orthodox’ and ‘regulated’, ‘rational and reasonable’ codes and practices, and more spontaneous and ‘instinctive’ forces of sympathy, or ‘moral sentiments’ (Smith 1759). The totality of all meaning-transmitting signs of body language, the visual and musical arts as well as verbal language, constitutes a trans-individual semiotic space – the “semiosphere” (Lotman 1984), in which manifold communicative structures and processes are generated, shown and regulated. This dynamic space or process of meaning in society may be conceived to have a hierarchical, concentric organisation – consisting of a centre, a periphery and an intermediate or transitional zone (see Lüdtkke this volume, and Figure 6). In the education of language and advanced social skills or tools of meaning (Lüdtkke & Frank 2007), the purely cognitive and “affect-free” conventionalised semiotic structures, e.g. grammars and norms, become active and validated in the centre. The primary “affect-loaded” relational systems of embodied social life, with their inhomogeneous, amorphous motivated organization, are relegated to the periphery.

Consider, for example, the slang of marginalized social groups with their insecure affective configurations, loyalties and conflicts, which can be the result of longstanding traumatizing processes – the so-called “relational traumata” (Schoore 2003). The permanently ongoing fractures, experiments and violations of semiotic and linguistic norms, conventions and grammars generate accelerated, dynamic and creative processes of communication in ‘felt immediacy’ (Bråten 2009). The linguistic discourses of marginalized youth can be defined socio-linguistically as an ensemble of specific registers and styles, which display their ‘post-modern’ character, for example by injecting sampled fragments of the centre in a diffuse, eclectic way, which in turn act as a catalyst for the de- and re-construction of linguistic centre-structures. Between border and centre in every society exists a kind of *bilingual or multilingual area of transition* in which the agents (e.g. teachers, pedagogues, therapists, systems of social care) are mediating between the domains of the semiosphere, between practical and interpersonal realities and the ideal rules of legality and governance (Keeffe 2003).

Building on this general socio-semiotic concept and considering the *relational development of speech and abilities for communication of a child*, it becomes increasingly clear in research on speech and language development that the

intuitive socio-semiotic forces – attitudes, habitus, the need for *trans-subjective claim of validity* as an *organizing force* within a given social situation – can have effects at all stages of a person’s development (Trevarthen et al. 2006). They can influence the foetus of pregnant women who occupy low socioeconomic levels in the hierarchy of a institution, and this influence may persist in varying manner through the whole of the child’s development. If a mother suffers from postnatal depression, which is often related to a difficult pregnancy, this is likely to affect the progress of the child in early infancy and through school years (Murray & Cooper 1997; Gratier & Apter-Danon 2009)

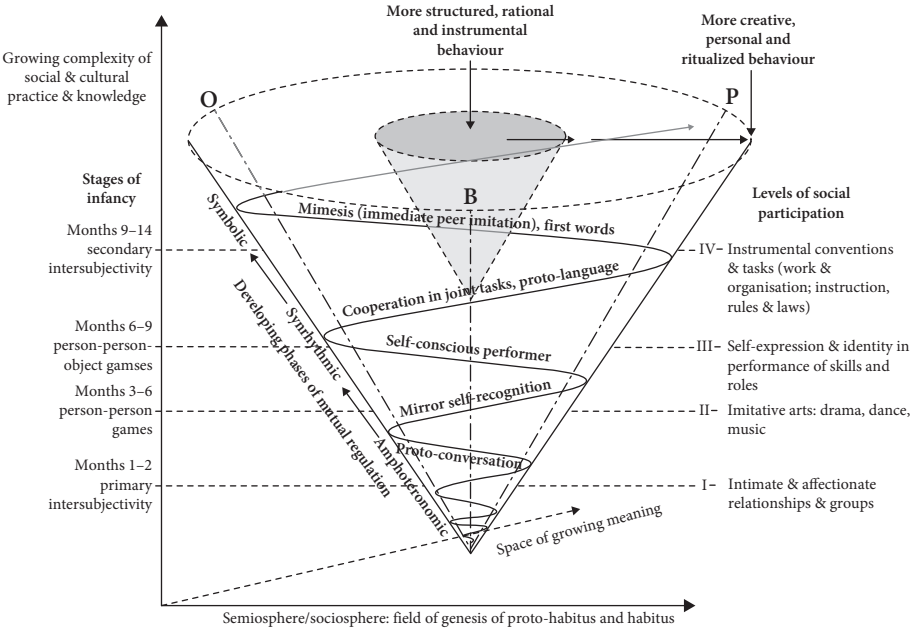


Figure 6. The developmental stages of the Self in early intersubjectivity, through infancy (Left), and in the life-time socio-semiosis of human interaction in society (Right), generate cultural forms. The motives of a person in an increasingly complex social world are closely interwoven with manifold influences from this world. Shared meaning grows and proliferates, first with *amphoteronomic* regulations (mutual physiological or autonomic state control as between mother and foetus), then through *synrhythmic* engagement (joint dynamic control of the rhythm of moving in ‘mind time’) to the mastery of *symbolic* communication and the mastery of words to describe the shared cultural world (Trevarthen et al. 2006). It is a development from an intimate the *proto-habitus* to individual forms of *habitus* within what Bourdieu (1998) calls the *space of social dispositions*. The more ritualized behaviours of each particular cultural practice ensure the interactional background for each *trans-subjective claim of validity* (Merker 2009b; Habermas 1987) giving rise to the *intersubjective qualities of overlapping* lifeworlds (see Table 2 on Levels of Intimacy and ‘Structure’: Practices and Rules)

The main sociosemiotic processes described in Lotman's terms are *marginalization* towards the exterior regions (e.g. as the consequence of speech and language-disorder, or mental handicap) and *integration* towards the interior region (as in the effects of adequate and compensatory education or therapy). Processes of marginalization take place e.g. in immigration situation of mothers living in foreign countries and disconnected from society or community: the very often have serious problems to create the *kind of belonging for their child which is necessary for normal psychological development* (see Gratier 2003).

Table 2. Developmental stages of the *social human mind*, see also Table 1 and Figure 6

Intersubjectivity in Human Society Levels of Intimacy and 'Structure' (Practices and Rules) (Trevarthen 1992)

Level One: In *Intimate Intersubjectivity*, self-related emotions of persons interact directly. The inherent "self-other" duality of the individual's affect and motivation shown at birth remains as a foundation for later intimate relationships: in family life, in direct emotional and physical attachment or conflict, when changes occur in close attachments, and when the sick or weak are given sympathetic care.

Level Two: Playful intersubjectivity and Ritual Performance In secure trust, a humorous testing of interaction, communicated by teasing with affection, creates "communitas" (Turner 1986) in art, drama and ritual, strengthening and defining the bonds of community. Awareness of the body in play, leads to expression of the rhythms and accents of gymnastics, dance and music. Attention to the sharing of control of contingencies in action on physical objects and events generates competitive sport. Infants show the beginning of playful ritual performance with 'musicality' from the second month (Malloch 1999; Malloch & Trevarthen 2009).

Level Three: Socially Conscious Self-Presentation. Human beings learn a social "me" (James 1890; Mead 1934), and perceive others as "personalities" with identity and character. Self-referred expressions and initiatives present a personal identity and define "roles" and "offices" in society. Each self creates a 'personal narrative history' by 'auto-noesis' (Tulving 2005). Regulated pretence and deception, separate one's own consciousness from others. Difficulties in presentation cause timidity, shame or guilt, unstable, painful and potentially destructive emotions most acute with unfamiliar persons. Artists explore their own experience and creations, making "aesthetic objects", representations that appeal to others' feelings of their experience. In the culture of art, beauty and aesthetic excitement are recognized collectively, negotiated and codified. Self-conscious mannerisms and sensitivity to their appreciation are evident in infancy after 4 months (Reddy 2008).

Level Four: World-Knowledge and Material Culture depend on pragmatic communication about reality and how to act on it. This peculiarly human kind of *person-person-object communication*, or *secondary intersubjectivity*, appears at the end of an infant's first year. Cooperation in action, seeking to understand the interests and evaluations others are giving to objects, and learning how instruments and practices are to be used require an enquiry into all kinds of motive in other people, including those whose lives are in other places and other generations. It is enriched by language that can refer accurately to aspects of reality not present, and that can define possible actions and the effects they will have. It leads to the proliferation of structures of culture that may limit individual freedom by conformity of actions in work and beliefs in educated society.

3. Reduced social and cultural development, loss of belonging and how companionship of the generalized other may be discovered

As an example of what it means to belong to a habitus or sociosphere of meaningful relationships and activities, and particularly what it means to lose this 'validity', studies of immigrant mothers and of mothers diagnosed with borderline personality disorder have shown that the experience of *loss of belonging* causes a woman to be unresponsive and highly predictable and repetitive in her interactions with her baby. In both cases the mothers' communication is 'devitalised' and they have the feeling of living in a 'disconnected world' with a 'confused perception of self' (Gratier & Apter-Danon 2009). This causes a type of dysfunctional 'proto-habitus' or weakened 'narrative of living together' to emerge, generated by mother and baby together, and this carries an "implicit relation" to the larger social world. "A sense of belonging, or of sharing implicit and embodied ways-of-being-together, constitutes the springboard from which creative variations can take form; and at the same time, it is through new and efficient forms of expression that belonging and what we have called 'protohabitus' are dynamically renewed." (Gratier & Apter-Danon 2009: 322).

To inquire for the origins for the feelings a person may have of living in a "disconnected world" in which social and cultural development are more and more restricted we consult the "Critique of Functionalist Reason" (Habermas 1987) to see how Habermas delineates the 'decoupling' of a social and political system and the "implicit and embodied ways-of-being-together" in the time of a lifeworld.

Habermas understands social evolution as "second-order-process of differentiation" in which "lifeworld" and "system" grow in different ways. Lifeworld, the sphere of more immediate human relations, responsibilities, of actions in every-day-life, becomes more and more complex as the "rationality" of the social and political system, the "system" that sustains society and that includes *institutional forces*, is constructed.

"It has become conventional for sociologists to distinguish the stages of social evolution as tribal societies, traditional societies or societies organized around a state, and modern societies (where the economic system has been differentiated out). From the system perspective, these stages are marked by the appearance of new systemic mechanisms and corresponding levels of complexity. On this plane of analysis, the uncoupling of 'system' and 'lifeworld' is depicted in such a way that the lifeworld, which is at first coextensive with a scarcely differentiated social system, gets cut down more and more to one subsystem among others. In the process, *system mechanisms get further and further detached from the social structures through which social integration takes place.*"

(Habermas 1987: 153 f.; italics added)

With this analysis, reasons for the *disconnection lifeworlds* described above become apparent. The problem for modern societies is that they are attaining a "level of system

differentiation” in which “increasingly autonomous organizations are connected with another via delinguistified media of communication”: the system mechanics are more and more constituting a social intercourse “that has been largely disconnected from norms and values” (Habermas 1987: 154) thus constituting a social intercourse that has reduced the possibilities of human interaction based on *moral feelings*. But at the same time the lifeworld remains, “the subsystem that defines the pattern of a social system as a whole. Thus, system mechanics need to be anchored in the lifeworld: they have to be institutionalized” (Habermas 1987: ib.). Institutionalizing is based on authority that has the power to define rules for *multiple connected lifeworlds*. This raises the question of the *directional quality* of institutional forces.

This institutionalization of “new levels of system differentiation”, which can also be perceived from the “internal perspective of the lifeworld” (Habermas 1987: ib.), includes conditions and pre-conditions of social dispositions, of *habitus*, and they have influences down to the emerging *proto-habitus* in intimate mother-infant-dyads. There is an institutional side to the problem of belonging in immigrant mother-infant-interaction. As institutions grow social process in the *lifeworld*, reducing of the negative effects of institutionalization requires attention to the question of the moral quality of human activity to help combat *social desintegration*, for example in immigrant populations, or of youths traumatized by war where life situations disconnected from the surrounding world lose dynamic coherence or ‘narrative musicality’ (Osborne 2009b).

3.1 Disorders of action and awareness in infancy may disturb the learning of meaning

Observations of the development of very early signs of autism (Trevvarthen & Daniel 2005; St. Clair et al. 2007), of the effects of deafness and blindness, of neglect and abuse, or of severe atrophy or malfunction of the brain (Dawson & Fisher 1994; Trevvarthen & Aitken 1994; Merker 2007), as well as studies of the effects of emotional illness that limits communication of a mother with her infant (Murray & Cooper 1997), lead to two complementary conclusions. First, the rapidly growing brain of an infant can be changed by a deficient or toxic environment, as well as ‘genetic’ faults in regulation of development and differentiation, and early changes can lead to permanent weakness or disorder. Secondly, the intrinsic ‘epigenetic’ self-organising and developmental powers of the young brain, even that of a premature infant (Als 1995), have remarkable power to respond to benefits that compensate for deficiencies or insults. Most important are benefits that result from human care that seeks to sustain the affective ‘moral quality’ of communication in spite of handicaps. Attempts to stimulate or train compensatory behaviours as desirable ‘structures’ for living may have negative effects. The best therapy or treatment acts to find ways that release motives of the child, or adult, to

share experience and achieve sympathetic engagement with other persons in creative activity. Remarkable results can result from such practice (Hughes 2006; Trevarthen & Aitken 2001; Trevarthen et al. 2006; Caldwell 2008; Zeedyk 2008).

3.2 Intersubjective therapies

What we have learned about the interpersonal talents of infants can be applied to help children with developmental disorders. However, many regimes for professional intervention with psycho-affective problems of children do not directly or overtly address the interpersonal and expressive functions. They rely more on the traditional medical concept of treatment for organic disease by medication to a patient, or educational models of instruction to the child as a pupil. In statistical assessment required by clinical trials, data on many individuals is grouped to provide a description of a population based on what are inevitably rather limited measures of psychological status and performance. At the same time, it is the experience of practitioners and families that benefits may be obtained by directly addressing, for each child and for their particular condition, the quality and receptivity of immediate and direct communication in treatment or teaching, and its management in the family or school. Adherence to 'regulations' may not suffice (Keeffe 2003).

Cognitive or behavioural therapies are aimed to control behaviour and establish acceptable routines or 'structure' to benefit the child's physical and emotional health and to facilitate easier relations with family caregivers, teachers and school partners. It is recognised that learning in such regimes depends on positive motivations, but the range of pleasurable rewards is generally not sensed from the 'patient's' position. Appreciation of emotive 'subjective' experiences of communication requires specialised methods of continuous and repeated observation and qualitative assessment that are capable of identifying what characterises most effective practice, and that is responsive or '**respectful**' (Selby & Bradley 2003; Zeedyk 2008). The theory of non-verbal communication with emotionally disturbed or cognitively disorganised children is not explicit. We believe that evidence from the study of how infants enter communication and progress to language has given valuable pointers to the kind of models and techniques required.

There is considerable disagreement concerning the efficacy of therapies for autism, and differences in the estimation of the improvement which can be generated (Howlin 1997; Trevarthen, et al. 1998). Nevertheless, it is accepted that earlier interventions are likely to produce greater improvement than the same approaches used at a later stage. The Lovaas method of behavioural training (Lovaas 1987) has been demonstrated to have beneficial effects in a number of independent studies (e.g. Fenske, et al. 1985; Harris et al. 1991; Birnbauer & Leach 1993), but there is uncertainty concerning in what way it is effective, and how general and lasting the benefits

are. It is also not clear how far the expressive manner of communicating reinforcements and negotiating routine procedures is critical to success, though 'high affect' speech by therapists is encouraged. A wide range of other approaches focus more specifically on early aspects of interaction (Alvarez 1996; Trevarthen, et al. 1998; Waterhouse 2000). Most of these have not received controlled assessment. Their operation is not captured by measurements of performance on pre-defined measures of intelligence, rational beliefs or cognitive flexibility. In the study of special education for autism, instruction in speech and language is naturally given great importance. However, speech therapy is not, by itself, generally effective, except for high-functioning cases who need assistance with semantic and pragmatic difficulties (Jordan 1993).

For children with greater problems in communication, an approach that addresses the underlying interpersonal problems is more effective. Emotional engagement and joint attention appear to have a more fundamental role in furthering language development in autism than instrumental use of language (Rollins 1999), and this approach may be applied for clinical intervention to enhance communication skills in autistic children more effectively than any training in thinking or beliefs (Rollins et al. 1998; Astington & Jenkins 1999). Improvisation music therapy is gaining acceptance as a remarkably effective way of gaining and regulating communication with even the most recalcitrant autistic youngsters (Robarts 1998; see also Robarts 2009). It employs techniques of mirroring and enhancement or modulation of expression with the benefit of a trained musician's sensitivity for pulse and expression in gestures made by the patient. Imitative responses are found to be attractive to autistic children and can act as a bridge to collaborative play or communication, and improving the child's access to language (Tiergerman & Primavera 1981, 1984; Dawson & Galpert 1990; Nadel & Pezé, 1993). The intensive training of parents by the Option method in responsive care and education of autistic children, which has proved of great benefit to many families, employs systematic imitation to achieve joint attention and motivation to learn collaboratively (Kaufman 1994)

Play means interaction with any impulses for adventurous and enjoyable movement and experience. It means sharing expressions of joy and surprise (Panksepp & Burgdorf 2003). It taps a basic emotion in social sharing, on that is close to a supportive of the basic emotions for pleasure in attachment. As the ethologists have discovered by studying the instinctive movements of young animals casing and 'pretend fighting', play is affiliative (Bekoff & Byers 1998). It strengthens and develops social bonds while sorting out social hierarchies. Play therapy draws on these psychobiological principles in a systematic way (Jernberg & Booth 2001). For a troubled child making happy and trusting friendships in playful and intimately affectionate responsive ways is a key to positive learning and emotional security. The play is creative by means of an interpersonal improvisation in which partners are at the same time free to be expressive in

themselves and instantly reactive to what others do, and therefore open to guidance and learning. Real intuitive engagement is necessary for the emotions between them to flourish, as with infants (Reddy & Trevarthen 2004).

Specific memories and verbal explanations guide awareness and direct interests. In normal life, these cognitive components, built up through experiences in established relationships, strengthen the prospective control of attentions and intentions and lead to more knowledgeable and skilful action. In psychopathology, the cognitive contents of memory intrude in imagination and carry affective material that blocks effective consciousness and action. Therapy for adults requires work with these contents. At the same time, engaging with the emotions and a clear focus on the interpersonal motives that direct movements in the present can regulate disturbing or inhibiting material from memory and imagination, finding a path to more rewarding and creative purposes in relationships that are affectionate and trusting (Kohut 1984; Kerr 2005).

A therapist aiming to help a child with developmental psychopathology by inter-subjective or interpersonal means has responsibility to stay with the child through periods of resistance or rejection to find this path (Archer & Burnell 2003), he or she has responsibility to find a path to create the “generalized other”¹ anew, to change the conditions of and for a changed “shared lifeworld”.

3.3 An example of sympathetic engagement for autism: Re-Discovering the ‘generalized other’

Berusz is a young man with autism who has had severe problems living in a institution for mental handicapped people in Germany. He seemed to be isolated from the world, frequently showing highly stereotypic behaviour, and sometimes destroying what took his attention. Berusz often sat on the floor of the corridor or in his chamber ripping paper with slow movements. He seems to be in a trance, recognizing nothing in his immediate surroundings but the paper, making no reaction to communication offered by the staff. After a couple of hours a pile of paper lies about him with no apparent meaning for him or for any other person.

When I (B.F.) placed myself on the floor next to him, Berusz did not notice me at first and he continued tearing paper. After trying to gain eye contact with him, I turned attention to the paper and did the same as he was doing, attempting to match my posture and movements to his. After around 30 minutes Berusz paid some attention to my imitative actions. I was sitting very close to him, and 10 and 20 minutes later he touched the piece of paper I was holding in my hands intending to put on my own pile

1. See also Lüdtkes therapeutic concept of the “significant other” in this book.

of paper. He did this several times, then, instead of just touching my piece of paper, he grasped it and put it on his pile.

Then I *touch*ed the hand in which he held the piece of paper taken from me, before he threw it on his pile. I repeated this, trying to mirror the shape of his movements as he took each piece of paper from me. He paused for a moment and slowly gave back to me the piece he had just taken out of my hands, and I then placed it on my pile...

We can suggest that in the circumscribed socio-sphere of intimate interaction with Berusz, making a kind of *intersubjective claim of validity* for the shared moment, a social event was created in which objects gained new meaning. It was a validity not just for the actions of one subject, but of actions validated by both of us in this situation. After this event Berusz stopped tearing paper. He made a transition into the “world of meaning” of the staff members and the other handicapped persons in the institution, *broadening step by step his claim of validity*.

References

- Adolphs R. (2003). Investigating the cognitive neuroscience of social behavior. *Neuropsychologia* 41, 119–126.
- Ainsworth, M.D.S. & S. Bell (1970). Attachment, exploration, and separation illustrated by the behavior of one-year-olds in a strange situation. *Child Development* 41, 49–67.
- Als, H. (1995). The preterm infant: a model for the study of fetal brain expectation. In: J.-P. Lecanuet, W.P. Fifer, N.A. Krasnegor, & W.P. Smotherman (Eds.) *Fetal development: a psychobiological perspective* (439–471). Hillsdale, NJ/Hove, UK: Erlbaum.
- Alvarez, A. (1996). Addressing the element of deficit in children with autism: psychotherapy which is both psychoanalytically and developmentally informed. *Clinical Child Psychology and Psychiatry*, 1, 4, 525–537.
- Anisfeld, M. (1979). Interpreting “imitative” responses in early infancy. *Science*, 205, 214–215.
- Archer, C., & A. Burnell (2003). *Trauma, attachment and family permanence: fear can stop you loving*. London: Jessica Kingsley.
- Astington, J.W. & J.M. Jenkins (1999). A longitudinal study of the relation between language and theory-of-mind development. *Developmental Psychology*, 35, 1311–1320.
- Bakhtin, M.M. (1986). *Speech genres and other late essays*. Austin: University of Texas Press.
- Barrett, M.D. (1981). The communicative functions of early child language. *Linguistics* 19, 273–305.
- Bateson, M.C. (1975). Mother-infant exchanges: the epigenesis of conversational interaction. In D. Aaronson & R.W. Rieber (Eds.), *Developmental Psycholinguistics and Communication Disorders; Annals of the New York Academy of Sciences*, 263, 101–113. New York: New York Academy of Sciences.
- Bateson, M.C. (1979). The epigenesis of conversational interaction: a personal account of research development. In M. Bullowa (Ed.): *Before speech: the beginning of human communication* (63–77). London: Cambridge University Press.
- Bekoff, M. & J.A. Byers (1998). *Animal play: evolutionary, comparative and ecological approaches*. New York: Cambridge University Press.

- Bernstein, N. (1967). *Coordination and regulation of movements*. New York: Pergamon.
- Birnbaumer, J.S., & D.J. Leach (1993). The Murdoch early intervention program after 2 years. *Behaviour Change*, 10, 63–74.
- Bjørkvold, J.R. (1992). *The muse within: creativity and communication, song and play from childhood through maturity*. New York: Harper Collins.
- Blum-Kulka, S. (2005). Modes of meaning making in young children's conversational narratives. In J. Thornborrow & J. Coates (Eds.) *The sociolinguistics of narrative* (149–170). Antwerp: John Benjamins.
- Bourdieu, P. (1990). *The logic of practice*. Palo Alto, CA: Stanford University Press.
- Bourdieu, P. (1992). *Language and symbolic power*. Cambridge: Polity Press.
- Bourdieu, P. (1998). *Practical reason*. Cambridge: Polity Press.
- Bradley, B.S. (2009). Early trios: patterns of sound and movement in the genesis of meaning between infants. In S. Malloch, & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (263–280). Oxford: Oxford University Press.
- Brandt, P.A. (2009). Music and how we became human – a view from cognitive semiotics: exploring imaginative hypotheses. In S. Malloch, & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (31–44). Oxford: Oxford University Press.
- Bråten, S. (1998). Intersubjective communion and understanding: development and perturbation. In S. Bråten (Ed.), *Intersubjective communication and emotion in early ontogeny* (372–382). Cambridge: Cambridge University Press.
- Bråten, S. (2009). *The intersubjective mirror in infant learning and evolution of speech*. Amsterdam/Philadelphia: John Benjamins.
- Brazelton, T.B. (1993). *Touchpoints: your child's emotional and behavioral development*. New York: Viking.
- Bruner, J.S. (1983). *Child's talk. Learning to use language*. New York: Norton.
- Bruner, J.S. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.
- Bruner, J. (2002). *Making stories: law, literature, life*. New York: Farrar, Strauss & Giroux.
- Caldwell, P. (2008). Intensive interaction: getting in touch with a child with severe autism. In S. Zeedyk (Ed.) *Promoting social interaction for individuals with communicative impairments: making contact* (170–184). London: Jessica Kingsley.
- Clark, A. (1997). *Being there: putting brain, body and world together again*. Cambridge, MA: MIT Press.
- Csikszentmihalyi, M. (1990). *Flow: the psychology of optimal experience*. New York: Harper & Row.
- Damasio, A.R. (1999). *The Feeling of what happens, body and emotion in the making of consciousness*. New York: Harcourt Brace.
- Dawson, G. & K.W. Fischer (1994). *Human behavior and the developing brain*. New York: The Guilford Press.
- Dawson, G., & L. Galpert (1990). Mothers' use of imitative play for facilitating social responsiveness and toy play in young autistic children. *Development and Psychopathology*, 2, 151–162.
- Decety J. & T. Chaminade (2003). Neural correlates of feeling sympathy. *Neuropsychologia*, 41, 127–138.
- Dissanayake, E. (2000). *Art and intimacy: how the arts began*. University of Washington Press, Seattle and London.
- Dissanayake, E. (2009). Bodies swayed to music: the temporal arts as integral to ceremonial ritual. In S. Malloch & C. Trevarthen (Eds.) *Communicative musicality: exploring the basis of human companionship* (533–544).

- Donaldson, M. (1978). *Children's minds*. Glasgow: Fontana/Collins.
- Donaldson, M. (1992). *Human minds: an exploration*. London: Allen Lane/Penguin Books.
- Dore, J. (1983). Feeling, Form and Intention in the Baby's Transition to Language. R. Golinkoff (Ed.), *The transition from pre-linguistic communication*. Hillsdale, N.J.: Erlbaum.
- Eckerdal, P. & B. Merker (2009). 'Music' and the 'action song' in infant development: An interpretation. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (241–262). Oxford: Oxford University Press.
- Fenske, E.C., S. Zalenski, P.J. Krantz & L.E. McClannahan (1985). Age at intervention and treatment outcome for autistic children in a comprehensive intervention program. *Analysis and Intervention in Developmental Disabilities*, 5, 49–58.
- Fernald, A. (1989). Intonation and communicative interest in mother's speech to infants: Is the melody the message? *Child Development*, 60, 1497–1510.
- Fernald, A., & T. Simon (1984). Expanded intonation contours in mothers' speech to newborns. *Developmental Psychology*, 20, 104–113.
- Field, T.M., R. Woodson, D. Cohen, R. Greenberg, R. Garcia & E. Collins (1983). Discrimination and imitation of facial expressions by term and preterm neonates. *Infant Behavior and Development*, 6, 485–9.
- Field, T.N. (1985). Neonatal perception of people: maturational and individual differences. In T.N. Field & N. Fox (Eds.), *Social perception in infants* (177–197).
- Fonagy, I. (2001). Languages within language. An evolutive approach. *Foundations of Semiotics* 13. Amsterdam/Philadelphia: John Benjamins.
- Gallagher, S. (2008). How to undress the affective mind: an interview with Jaak Panksepp. *Journal of Consciousness Studies*, 15, 2, 89–119.
- Gallese, V. (2003). The roots of empathy: the shared manifold hypothesis and the neural basis of intersubjectivity. *Psychopathology*, 36, 4, 171–180.
- Gallese, V. & G. Lakoff (2005). The brain's concepts: the role of the sensory-motor system in reason and language. *Cognitive Neuropsychology*, 22, 455–479.
- Gibson, J.J. (1977). The theory of affordances. In R. Shaw & J. Bransford (Eds.), *Perceiving, acting, and knowing: toward an ecological psychology*. (67–82). Hillsdale, NJ: Lawrence Erlbaum.
- Gratier, M. (2003). Expressive timing and interactional synchrony between mothers and infants: cultural similarities, cultural differences, and the immigration experience. *Cognitive Development*, 18, 533–554.
- Gratier, M. & G. Apter-Danon (2009). The improvised musicality of belonging: repetition and variation in mother–infant vocal interaction. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (301–327). Oxford: Oxford University Press.
- Gratier, M. & C. Trevarthen (2008). Musical narrative and motives for culture in mother–infant vocal interaction. *Journal of Consciousness Studies*, 15, 10–11, 122–158, and in C. Whitehead (Ed.) *The origin of consciousness in the social world* (122–158). Exeter, UK/Charlottesville, VA: Imprint Academic.
- Grieser, D.L., & P.K. Kuhl (1988). Maternal speech to infants in a tonal language: Support for universal prosodic features in motherese. *Developmental Psychology*, 24, 14–20.
- Habermas, J. (1970). Towards a theory of communicative competence. In H.P. Dreitzel (Ed.), *Recent Sociology* 12 (115–148). London: Macmillan.
- Habermas, J. (1987). The theory of communicative action. *The Critique of Functionalist Reason*, Vol. 2. Cambridge, Polity Press.

- Halliday, M.A.K. (1975). *Learning how to mean: explorations in the development of language*. London: Edward Arnold.
- Halliday, M.A.K. (1978). *Language as social semiotic*. London: Edward Arnold.
- Halliday, M.A.K. (1979). One child's protolanguage. In M. Bullowa (Ed.), *Before speech: the beginning of human communication* (171–190). London: Cambridge University Press.
- Harris, S.L., J.S. Handleman, R. Gordon, B. Kristoff & F. Fuentes (1991). Changes in cognitive and language functioning of preschool children with autism. *Journal of Autism and Developmental Disorders*, 21, 3, 281–290.
- Hess, W.R. (1954). *Diencephalon: autonomic and extrapyramidal functions*. Orlando, FL: Grune & Stratton.
- Howlin, P. (1997). Prognosis in autism: do specialist treatments affect long-term outcome? *European Child & Adolescent Psychiatry*, 6, 55–72.
- Hubley, P., & C. Trevarthen (1979). Sharing a task in infancy. In I. Uzgiris (Ed.), *Social interaction during infancy, New Directions for Child Development*, 4 (57–80). San Francisco: Jossey-Bass.
- Hughes, D. (2006). *Building the bonds of attachment: awakening love in deeply traumatized children*. 2nd Ed. Lanham, Md.: Rowman & Littlefield.
- Jaffe, J., B. Beebe, S. Felstein, C. Crown & M.D. Jasnow (2001). Rhythms of dialogue in infancy: coordinated timing and social development. *Society of Child Development Monographs*, 264, 66, 2, 1–7. Oxford: Blackwell.
- James W. (1890/1981). The stream of consciousness, Chapter XI in *The principles of psychology*, Cambridge, MA: Harvard University Press, 1981. Originally published in 1890.
- Jeannerod, M. (2006). *Motor cognition: what actions tell the self*. Oxford: Oxford University Press.
- Jernberg, A.M., & P.B. Booth (2001). *Theraplay: helping parents and children build better relationships through attachment-based play*. San Francisco: Jossey-Bass.
- Jordan, R. (1993). The nature of linguistic and communication difficulties of children with autism. In D.J. Messer & G.J. Turner (Eds), *Critical influences on child language acquisition and development*. New York: St. Martin's Press.
- Kagan, J. (1982). The emergence of self. *Journal of Child Psychology and Psychiatry*, 23, 363–381.
- Kaufman, B.N. (1994). *Son rise: the miracle continues*. Tiberon, CA: H.J. Kramer Inc.
- Keeffe, M. (2003). Habermas and the principal's lifeworld in the lawful governance of inclusion in schools. In *Joint Conference of the Australian Association of Research in Education & Australian and New Zealand Association of Educational Research*, 29 November - 3 December 2003, New Zealand, Auckland.
- Kellerman, H. (1980). A structural model of emotion and personality. In R. Plutchik & H. Kellerman (Eds.): *Emotion: theory, research and experience*, Vol. 1: *Theories of emotion*. New York: Academic Press.
- Kerr, I. (2005). Cognitive analytic therapy. *Psychiatry*, 4, 5, 28–33.
- Key, M.R. (Ed.) (1980). *The relationship of verbal and nonverbal communication*. New York: Mouton.
- Kipp, D.R. (1996). Blackfoot. In F.E. Hoxie, *Encyclopedia of North American Indians. Native American history, culture, and life from Paleo-Indians to the present* (74–76). New York: Houghton Mifflin Company.
- Kohut, H. (1984). *How does analysis cure?* Chicago: University of Chicago Press.
- Kress, G. (Ed.) (1976). *Halliday: system and function in Language*. Oxford: Oxford University Press.

- Kugiumutzakis, G. (1998). Neonatal imitation in the intersubjective companion space. In S. Bråten, (Ed.), *Intersubjective communication and emotion in early ontogeny* (63–88). Cambridge: Cambridge University Press.
- Kugiumutzakis, G. (1999). Genesis and development of early infant mimesis to facial and vocal models. In J. Nadel & G. Butterworth (Eds.), *Imitation in infancy* (127–185). Cambridge: Cambridge University Press.
- Kühl, O. (2007). Musical semantics. *European semiotics: language, cognition and culture*, 7. Bern: Peter Lang.
- Langer, S. (1953). *Feeling and form: a theory of art developed from philosophy in a new key*. London: Routledge & Kegan Paul.
- Lashley, K.S. (1951). The problems of serial order in behavior. In L.A. Jeffress (Ed.), *Cerebral mechanisms in behavior* (112–136). New York: Wiley.
- Lee, D.N. (1998). Guiding movement by coupling taus. *Ecological Psychology*, 10, 3–4, 221–250.
- Lee, D. & B. Schögler (2009). Tau in musical expression. In S. Malloch, & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (83–104). Oxford: Oxford University Press.
- Locke, J.L. (1993). *The child's path to spoken language*. Cambridge MA and London: Harvard U. Press.
- Lorenz, K.Z. (1966). Evolution of ritualization in the biological and cultural spheres. In Julian Huxley (Ed.), *A discussion of ritualization of behaviour in animals and man philosophical transactions of the Royal Society of London, Series B. Biological Sciences*, 772/251 (273–284).
- Lotman, Y. (1984). The semiosphere. *Soviet Psychology*, 27, 1, 40–61.
- Lovaas, O.I. (1987). Behavioural treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting & Clinical Psychology*, 55, 1, 3–9.
- Lüdtke, U. & B. Frank (2007). Die Sprache der Gefühle – Gefühle in der Sprache: Ausdruck, Entwicklung und pädagogische Regulation von Emotionen am Beispiel der Jugendsprache. In: R. Arnold & G. Holzapfel (2007). *Die vergessenen Gefühle in der Erwachsenenpädagogik*. Hohengrehren: Schneider.
- MacLean, P.D. (1958). Contrasting functions of limbic and neocortical systems of the brain and their relevance to psycho-social aspects of medicine. *American Journal of Medicine*, 25, 611–626.
- Macmurray, J. (1959). *The self as agent (Volume I of the form of the personal)*. London: Faber & Faber.
- Macmurray, J. (1961). *Persons in relation (Volume II of The form of the personal)*. London: Faber & Faber.
- Malloch, S. (1999). Mother and infants and communicative musicality. In I. Deliège (Ed.) *Rhythms, musical narrative, and the origins of human communication. Musicae Scientiae, Special Issue, 1999–2000*(29–57). Liège, Belgium: European Society for the Cognitive Sciences of Music.
- Malloch, S. & C. Trevarthen (2009). Musicality: communicating the vitality and interests of life. In S. Malloch & C. Trevarthen (Eds.) *Communicative musicality: exploring the basis of human companionship* (1–11). Oxford: Oxford University Press.
- Maratos, O. (1973). *The origin and development of imitation in the first six months of life*. PhD Thesis, Department of Psychology, University of Geneva.
- Maratos, O. (1982). Trends in development of imitation in early infancy. In T.G. Bever (Ed.), *Regressions in mental development: basic phenomena and theories* (81–101). Hillsdale, NJ: Erlbaum.

- Marwick, H. & L. Murray (2009). The effects of maternal depression on the 'musicality' of infant-directed speech and conversational engagement. In S. Malloch & C. Trevarthen (Eds.) *Communicative musicality: exploring the basis of human companionship* (281–300). Oxford: Oxford University Press.
- Mead, G.H. (1934). *Mind, self, and society from the standpoint of a social behaviorist*. Chicago: University of Chicago Press.
- Mead, G.H. (1964). *Selected writings*. Edition A.J. Reck. University of Chicago Press.
- Meltzoff, A.N. & M.K. Moore (1977). Imitation of facial and manual gestures by human neonates. *Science*, 198, 75–78.
- Meltzoff, A.N., & M.K. Moore (1983). Newborn infants imitate adult facial gestures. *Child Development*, 54, 702–709.
- Meltzoff, A.N., & M.K. Moore (1999). Persons and representation: why infant imitation is important for theories of human development. In J. Nadel & G. Butterworth (Eds.), *Imitation in infancy* (9–35). Cambridge: Cambridge University Press.
- Merker, B. (2007). Consciousness without a cerebral cortex: a challenge for neuroscience and medicine. *Behavioral and Brain Sciences*, 30, 63–134.
- Merker, B. (2009a). Returning language to culture by way of biology. *Behavioral and Brain Sciences*, 32, 460–461.
- Merker, B. (2009b). Ritual foundations of human uniqueness. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (45–60). Oxford: Oxford University Press.
- Miall, D.S. & E. Dissanayake (2003). The poetics of babytalk. *Human Nature*, 14, 337–64.
- Murray, L., & P.J. Cooper (Eds.) (1997). *Postpartum depression and child development*. New York: Guilford Press.
- Murray, L., & C. Trevarthen (1985). Emotional regulation of interactions between two-month-olds and their mothers. In T.M. Field & N.A. Fox (Eds.), *Social perception in infants* (177–197). Norwood, NJ: Ablex.
- Nadel, J. & A. Pezé (1993). Immediate imitation as a basis for primary communication in toddlers and autistic children. In J. Nadel & L. Camioni (Eds.), *New perspectives in early communicative development*, (139–156). London: Routledge.
- Nadel, J., C. Guérini, A. Pezé & C. Rivet (1999). The evolving nature of imitation as a format for communication. In J. Nadel & G. Butterworth (Eds.), *Imitation in infancy* (209–234). Cambridge: Cambridge University Press.
- Nagy, E. & P. Molnár (2004). Homo imitans or homo provocans? The phenomenon of neonatal initiation. *Infant Behavior and Development*, 27, 57–63.
- Nelson, K. (1981). Individual differences in language development: implications for development and language. *Developmental Psychology*, 17, 170–187.
- Nelson, K. (1996) *Language in cognitive development: emergence of the mediated mind*. New York: Cambridge University Press.
- Osborne, N. (2009a). Towards a chronobiology of musical rhythm. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (545–564). Oxford: Oxford University Press.
- Osborne, N. (2009b). Music for children in zones of conflict and post-conflict: A psychobiological approach. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (331–356). Oxford: Oxford University Press.
- Panksepp, J. (1998). *Affective neuroscience: the foundations of human and animal emotions*. New York: Oxford University Press.

- Panksepp, J. (2007). Can PLAY diminish ADHD and facilitate the construction of the social brain? *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, 16, 2, 57–66.
- Panksepp, J. & J. Burgdorf (2003). “Laughing” rats and the evolutionary antecedents of human joy? *Physiology and Behavior*, 79, 533–547.
- Panksepp, J. & C. Trevarthen (2009). The neuroscience of emotion in music. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (105–146). Oxford: Oxford University Press.
- Papoušek, H. (1967). Experimental studies of appetitional behaviour in human newborns and infants. In H.W. Stevenson, E.H. Hess & H.L. Rheingold (Eds.), *Early behaviour: comparative and developmental approaches* (249–277). New York: John Wiley.
- Papoušek, M. (1994). Melodies in caregivers’ speech: a species specific guidance towards language. *Early Development and Parenting*, 3, 5–17.
- Papoušek, M. & H. Papoušek (1981). Musical elements in the infant’s vocalization: their significance for communication, cognition, and creativity. In L.P. Lipsitt & C.K. Rovee-Collier (Eds.), *Advances in infancy research*, Vol. 1, 163–224. Norwood, NJ: Ablex.
- Piaget, J. (1954). *The construction of reality in the child*. Translated by M. Cook. New York: Basic Books.
- Piaget, J. (1962). *Play, dreams and imitation in childhood*. London: Routledge & Kegan Paul.
- Porges, S.W. (1997). Emotion: an evolutionary by-product of the neural regulation of the autonomic nervous system. In C.S. Carter, I.I. Lederhendler & B. Kirkpatrick (Eds.), *The integrative neurobiology of affiliation*. *Annals of the New York Academy of Sciences*, 807 (62–78). New York: New York Academy of Sciences.
- Powers, N. & C. Trevarthen (2009). Voices of shared emotion and meaning: young infants and their mothers in Scotland and Japan. In S. Malloch & C. Trevarthen (Eds.) *Communicative musicality: exploring the basis of human companionship* (209–240). Oxford: Oxford University Press.
- Reddy, V. (2008). *How infants know minds*. Cambridge MA: Harvard University Press.
- Reddy, V. & C. Trevarthen (2004). What we learn about babies from engaging with their emotions. *Zero to Three*, 24, 3, 9–15.
- Reid, T. (1764/1997). *An inquiry into the human mind on the principles of common sense*. Edited by R. Brookes, University Park: Pennsylvania State University Press.
- Rizzolatti, G., L. Fogassi & V. Gallese (2006). Mirrors in the mind. *Scientific American*, 295, 5, 30–37.
- Robarts, J.Z. (1998). Music therapy for children with autism. In C. Trevarthen, K.J., Aitken, D. Papoudi, & J.Z. Robarts (Eds.), *Children with autism: diagnosis and interventions to meet their needs. (Second Edition)* (172–202). London: Jessica Kingsley.
- Robarts, J.Z. (2009). Supporting the development of mindfulness and meaning: clinical pathways in music therapy with a sexually abused child. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (377–400). Oxford: Oxford University Press.
- Rogoff, B. (1990). *Apprenticeship in thinking: cognitive development in social context*. New York: Oxford University Press.
- Rogoff, B., M.J. Sellers, S. Pirrotta, N. Fox & S.H. White (2008). Age and responsibility. In R.A. LeVine & R.S. New (Eds.), *Anthropology and child development: a cross-cultural reader* (251–263). Malden, MA/Oxford, UK: Blackwell.
- Rollins, P.R. (1999). Early pragmatic accomplishments and vocabulary development in pre-school children with autism. *American Journal of Speech-Language Pathology*, 8, 181–190.

- Rollins, P.R., I. Wambacq, D. Dowell, L. Mathews & P.B. Reese (1998). An intervention technique for children with autistic spectrum disorder: joint attentional routines. *Journal of Communicative Disorder*, 31, 181–192.
- Rommetveit, R. (1968). *Words, meanings and messages*. New York and London: Academic Press.
- Ryan, J. (1974). Early language development: towards a communicational analysis. In M.P.M. Richards (Ed.), *The integration of a child into a social world* (185–213). London: Cambridge University Press.
- Sacks, O. (2007). *Musicophilia: tales of music and the brain*. New York/ London: Random House/ Picador.
- Schilbach, L., A.M. Wohlschläger, A. Newen, N. Krämer, N.J. Shah, G.R. Fink & K. Vogeley (2006). Being with others: neural correlates of social interaction. *Neuropsychologia*, 44, 5, 718–730.
- Schore, A.N. (2003) *Affect regulation and the repair of the self*. New York: Norton.
- Searle, J.R. (1969). *Speech acts: an essay in the philosophy of language*. London: Cambridge University Press.
- Selby, J.M. & B.S. Bradley (2003). Infants in groups: a paradigm for study of early social experience. *Human Development*, 46, 197–221.
- Sherrington, C.S. (1906). *The integrative action of the nervous system*. New York: Charles Scribner's Sons.
- Smith, A. (1759). *The theory of moral sentiments*. Edinburgh: A. Kinkaid & J. Bell. (Modern Revised Edition: D.D. Raphael & A.L. Macfie (1976), General Editors, Glasgow Edition. Oxford: Clarendon).
- Sperry, R.W. (1952). Neurology and the mind-brain problem. *American Scientist*, 40, 291–312.
- St. Clair, C., L. Danon-Boileau & C. Trevarthen (2007). Signs of autism in infancy: sensitivity for rhythms of expression in communication. In S. Acquarone (Ed.), *Signs of autism in infants: recognition and early intervention*, 21–45. London: Karnac.
- Stern, D.N. (1984). Affect attunement. In J.D. Call, E. Galenson & R. Tyson (Eds.), *Frontiers of infant psychiatry*. New York : Basic Books.
- Stern, D.N. (1985). *The interpersonal world of the infant: a view from psychoanalysis and development psychology*. New York: Basic Books.
- Stern, D.N. (2004). *The present moment: in psychotherapy and everyday life*. New York: Norton.
- Stern, D.N. (2007). *Applying developmental and neuroscience findings on other-centered participation to the process of change in psychotherapy*. In S. Bråten (Ed.), *On being moved. From mirror neurons to empathy*. Advances in Consciousness Research. (35–47). Amsterdam/ Philadelphia: John Benjamins.
- Stern, D.N. (2010). *Forms of vitality: exploring dynamic experience in psychology, the arts, psychotherapy and development*. Oxford: Oxford University Press.
- Thompson, E. (Ed.) (2001). *Between ourselves: second-person issues in the study of consciousness*. Charlottesville, VA/Thorverton, UK: Imprint Academic.
- Thornborrow, J. & J. Coates (2005) (Eds.). *The sociolinguistics of narrative*. Antwerp: John Benjamins.
- Tiergerman, E. & L. Primavera (1981). Object manipulation: an interactional strategy with autistic children. *Journal of Autism and Developmental Disorders*, 11, 427–438.
- Tiergerman, E. & L. Primavera (1984). Imitating the autistic child: facilitating communicative gaze behaviour. *Journal of Autism and Developmental Disorders*, 14, 27–38.
- Tinbergen, N. (1951). *The study of instinct*. Oxford: Clarendon Press.
- Tomasello, M., A.C. Kruger & H.H. Ratner (1993). Cultural learning. *Behavioral and Brain Sciences*, 16, 3, 495–552.

- Trainor, L.J. (1996). Infant preferences for infant-directed versus non-infant-directed play songs and lullabies. *Infant Behavior and Development*, 19, 83–92.
- Trehub, S.E. (1990). The perception of musical patterns by human infants: the provision of similar patterns by their parents. In M.A. Berkley & W.C. Stebbins (Eds.), *Comparative Perception; Vol. 1, Mechanisms* (429–459). New York: Wiley.
- Trehub, S.E., A.M. Unyk, S.B. Kamenetsky, D.S. Hill, L.J. Trainor, J.L. Henderson & M. Saraza (1997). Mothers' and fathers' singing to infants. *Developmental Psychology*, 33, 500–507.
- Trevarthen, C. (1977). Descriptive analyses of infant communication behavior. In H.R. Schaffer (Ed.), *Studies in mother-infant interaction: the Loch Lomond symposium*, (227–270). London: Academic Press.
- Trevarthen, C. (1979). Communication and cooperation in early infancy. A description of primary intersubjectivity. In M. Bullowa (Ed.), *Before speech: the beginning of human communication* (321–347). London, Cambridge University Press.
- Trevarthen, C. (1984). How control of movements develops. In H.T.A. Whiting (Ed.), *Human motor actions: Bernstein reassessed* (223–261). Amsterdam: Elsevier.
- Trevarthen, C. (1986). Development of intersubjective motor control in infants. In M.G. Wade & H.T.A. Whiting (Eds.), *Motor development in children: aspects of coordination and control*, (209–261). Dordrecht, Martinus Nijhof.
- Trevarthen, C. (1988). Universal cooperative motives: how infants begin to know language and skills of culture. In G. Jahoda & I.M. Lewis (Eds.), *Acquiring culture: ethnographic perspectives on cognitive development* (37–90). London: Croom Helm.
- Trevarthen, C. (1992). An infant's motives for speaking and thinking in the culture. In A.H. Wold (Ed.), *The dialogical alternative: towards a theory of language and mind (Festschrift for Ragnar Rommetveit)* (99–137). Oslo/Oxford: Scandanavian University Press/Oxford University Press.
- Trevarthen, C. (1993). The function of emotions in early infant communication and development. In J. Nadel & L. Camaioni (Eds.), *New perspectives in early communicative development*. (48–81). London: Routledge.
- Trevarthen, C. (1994). Infant semiosis. In W. Noth (Ed.), *Origins of semiosis* (219–252). Berlin: Mouton de Gruyter.
- Trevarthen, C. (1998). The concept and foundations of infant intersubjectivity. In S. Bråten (Ed.), *Intersubjective communication and emotion in early ontogeny* (15–46). Cambridge: Cambridge University Press.
- Trevarthen, C. (1999). Musicality and the intrinsic motive pulse: evidence from human psychology and infant communication. In I. Deliège (Ed.), *Rhythms, musical narrative, and the origins of human communication. Musicae Scientiae, Special Issue, 1999–2000*(157–213). Liège: European Society for the Cognitive Sciences of Music.
- Trevarthen, C. (2001). The neurobiology of early communication: intersubjective regulations in human brain development. In A.F. Kalverboer & A. Gramsbergen (Eds.), *Handbook on brain and behavior in human development* (841–882). The Netherlands: Kluwer.
- Trevarthen, C. (2005). Stepping away from the mirror: pride and shame in adventures of companionship reflections on the nature and emotional needs of infant intersubjectivity. In C.S. Carter, L. Ahnert, K.E. Grossman, S.B. Hardy, M.E. Lamb, S.W. Porges, & N. Sachser (Eds.), *Attachment and bonding: a new synthesis. Dahlem Workshop Report 92* (55–84). Cambridge, MA: The MIT Press.
- Trevarthen, C. (2006). Wer schreibt die Autobiographie eines Kindes. Warum Menschen Sich Erinnern Können. H. Markowitsch & H. Welzer (Eds.), *Fortschritte der Interdisziplinären Gedächtnisforschung* (225–255). Stuttgart: Klett-Cotta. Translated by Karoline Tschuggnall.

- Trevarthen, C. (2008). The musical art of infant conversation: narrating in the time of sympathetic experience, without rational interpretation, before words. In M. Imberty & M. Gratier (Eds.), *Musicae Scientiae, special issue 'Narrative in music and interaction'*, 15–48. Liège: European Society for the Cognitive Sciences of Music.
- Trevarthen, C. (2010). What is it like to be a person who knows nothing? Defining the active intersubjective mind of a newborn human being. E. Nagy (Ed.), *Infant and Child Development, special issue, "the intersubjective newborn"*.
- Trevarthen, C. & K.J. Aitken (1994). Brain development, infant communication, and empathy disorders: intrinsic factors in child mental health. *Development and Psychopathology*, 6, 599–635.
- Trevarthen, C. & K.J. Aitken (2001). Infant intersubjectivity: research, theory, and clinical applications. *Annual Research Review. The Journal of Child Psychology and Psychiatry and Allied Disciplines*, 42, 1, 3–48.
- Trevarthen, C. & K.J. Aitken (2003). Regulation of brain development and age-related changes in infants' motives: the developmental function of "regressive" periods. In M. Heimann & F. Plooij (Eds.) *Regression periods in human infancy* (107–184). Mahwah, NJ: Erlbaum.
- Trevarthen, C. & S. Daniel (2005). Rhythm and synchrony in early development, and signs of autism and Rett syndrome in infancy. *Brain and Development*, 27, 25–34.
- Trevarthen, C. & P. Hubley (1978). Secondary intersubjectivity: confidence, confiding and acts of meaning in the first year. In A. Lock (Ed.), *Action, gesture and symbol: the emergence of language* (183–229). London, New York, San Francisco: Academic Press.
- Trevarthen, C. & H. Marwick (1986). Signs of motivation for speech in infants, and the nature of a mother's support for development of language. In B. Lindblom & R. Zetterstrom (Eds.), *Precursors of early speech*. (279–308). Basingstoke, Hampshire: Macmillan.
- Trevarthen, C., K.J. Aitken, D. Papoudi & J.Z. Robarts (1998). *Children with autism: diagnosis and interventions to meet their needs*. London: Jessica Kingsley.
- Trevarthen, C., K.J. Aitken, M. Vandekerckhove, J. Delafield-Butt & E. Nagy (2006). Collaborative regulations of vitality in early childhood: stress in intimate relationships and postnatal psychopathology. In D. Cicchetti & D.J. Cohen (Eds.), *Developmental psychopathology, volume 2, developmental neuroscience* (65–126), Second Edition. New York: Wiley.
- Trevarthen, C., J. Delafield-Butt & B. Schögler (2010). Psychobiology of musical gesture: innate rhythm, harmony and melody in movements of narration. In A. Gritten & E. King (Eds.), *Music and Gesture*, 2. Aldershot, UK: Ashgate.
- Tronick E.Z., H. Als, L. Adamson, S. Wise & T.B. Brazelton (1978). The infant's response to entrapment between contradictory messages in face-to face interaction. *Journal of the American Academy of Child Psychiatry*, 17, 1–13.
- Tulving, E. (2005). Episodic memory and autonoesis: uniquely human? In H.S. Terrace & J. Metcalf (Eds.), *The missing link in cognition: self-knowing consciousness in man and animals* (3–56). New York: Oxford University Press.
- Turner, R. & A. Ioannides (2009). Brain, music and musicality: inferences from neuroimaging. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: exploring the basis of human companionship* (147–181). Oxford: Oxford University Press.
- Turner, V.W. (1986). Dewey, Dilthey, and Drama: an essay in the anthropology of experience. In V.W. Turner & E.M. Bruner (Eds.), *The anthropology of experience*. University of Illinois Press.

- Tzourio-Mazoyer N., S. De Schonen, F. Crivello, B. Reutter, et al. (2002). Neural correlates of woman face processing by 2-month-old infants. *Neuroimage*, 15, 454–461.
- Varela, F.J., E. Thompson & E. Rosch (1991). *The embodied mind*. Cambridge, MA: MIT Press.
- von Frisch, K. (1923). über die “Sprache” der Bienen. Eine tierpsychologische Untersuchung. *Zoologischer Jahrbücher (Physiologie)* 40, 1–186. (Bee’s ‘language’- an examination of animal psychology.).
- von Holst, E. (1936). Versuche zur Theorie der relativen Koordination. *Archives für Gesamte Physiologie*, 236, 93–121.
- von Holst, E., & H. Mittelstaedt (1950). Das Reafferenzprinzip. *Naturwissenschaften*, 37, 256–272.
- Vygotsky, L.S. (1962). *Thought and language*. Cambridge, Mass.: The M.I.T. Press.
- Vygotsky, L.S. (1967). Play and its role in the mental development of the child. *Soviet Psychology*, 5, 3, 6–18.
- Vygotsky, L.S. (1978). *Mind in society: the development of higher psychological processes*. Edited by M. Cole, V. Steiner, S. Scribner & E. Souberman. Cambridge, Mass: Harvard University Press.
- Waterhouse, S. (2000). *A positive approach to autism*. London: Jessica Kingsley.
- Weisner, T.S. & R. Gallimore (2008). Child and sibling caregiving. In R.A. LeVine & R.S. New (Eds.) *Anthropology and child development: a cross-cultural reader* (264–269). Malden, MA/ Oxford, UK: Blackwell.
- Wood, D., J. Bruner & G. Ross (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry*, 17, 89–100.
- Zeedyk, S. (Ed.) (2008). *Promoting social interaction for individuals with communicative impairments: making contact*. London: Jessica Kingsley.
- Zlatev, J., T.P. Racine, C. Sinha & E. Itkonen (Eds.). (2008). *The shared mind: perspectives on intersubjectivity*. Amsterdam: Benjamins.

