Musical Narrative and Motives for Culture in Mother–Infant Vocal Interaction

[...] one of the most ubiquitous and powerful discourse forms in human communication is narrative. Narrative structure is even inherent in the praxis of social interaction before it achieves linguistic expression. (Bruner, 1990, p. 77).

It takes about twelve months before a linguistic consciousness begins to emerge in the human infant. But this momentous accession to a realm of meaning where sounds and relations between sounds stand for things and events in symbolic ways crucially depends on a prehistory of meaningful communication by more direct, or more essential, means. The mastery of language enabling the discrete labelling of intentions, desires and beliefs with precise reference to non-present objects and events is generally associated with the singular development of human culture. Language and cultural knowledge are deemed to be two of the most distinctively human abilities. Thus having a consciousness of culture might depend on the child being able to understand words and speak, to partake in the conversational negotiation of norms and plans of action in talk or text. But well before infants start experimenting with newly acquired sounds of language, before they attend to the specific syllables that must be strung together to form a word standing for something in a local world of meaning held-in-common, they are involved in a non verbal semiosis of mimetic expression and sympathetic action, which is already distinctly human (Trevarthen, 1990; 1994).

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In the vocal ‘protoconversations’ (Bateson, 1979; Trevarthen, 1974) that start to liven spontaneous interactions a few weeks after birth, infants show a precocious sense of rhythm and an interest in the qualities of intention and interest in mothers’ sounds. A growing control of breath and vocal projection enhances mastery over vocal production through modulation of pitch, intensity and timbre. In lively exchanges involving both vocal and whole body actions, infants begin to express their states of engagement and to sense feelings and purposeful states of mind in others (Reddy, 2008).

This paper is concerned with the forms of meaningful engagement that emerge in vocal interactions with preverbal infants, in particular with the narrative organisation of coordinated expression in time. We relate culture and meaning in preverbal exchange to an ‘implicit knowing’ involving nonconscious habits, procedures and patterns (Gratier, 2001; Stern, 2004) derived from direct perception of the purposeful and coordinated body movements of self and other, or what Stein Bråten (1988; 1998) has termed ‘felt immediacy’. Shared focus and affective involvement with the expressions of another in observable interpersonal interaction attest to the unique intersubjective awareness that leads infants to participate in the activity of culture. With Jerome Bruner (1990) we believe that narrative is a fundamental mode of human collective thinking — and acting — and that its basic function is the production of meaning or ‘world making’.

We first attempt to redefine the boundaries of the term ‘narrative’ to include ‘narratives without words’ based on processes of temporal organisation in language and music. In the second section of the paper, we describe what we take to be indices of a narrative organisation in live mother–infant interaction based on its ‘communicative musicality’. The third section presents the speculative claim that the interactions between young infants and adults are not only narrative in form but also present a narrative content of ‘common sense’ based on what we call a ‘proto-habitus’. In the fourth and fifth sections we present some empirical evidence for the narrative organisation of both spontaneous mother-infant vocal interaction and interaction based on singing for and with infants.

I. What is Narrative Without Words?

Narrative is most often considered a language-based way of telling a story, and studies of verbal narrative, including both written and oral forms of ‘telling’, are typically concerned with elements of structure, coherence-producing linguistic devices and individual modes of
production. Verbal narratives have been shown to present a number of central features, such as deliberate action, a plot including trouble and its resolution, protagonists and a narrator (Burke, 1945; Herman, 2007; Propp, 1928; Sartre, 1947), some of which have, however, been seriously challenged in sophisticated 20th century genres of fiction, theatre and poetry.

If we examine the history and variety of the activity of human storytelling we must assume that it is rooted in oral and mimetic traditions—as tales told in live talk by a ‘literary’ mind that must think and believe in parables (Turner, 1996). And as an oral tradition, the story is always situated within, and referring to, a specific socio-cultural context. Moreover, it is naturally a multi-modal activity involving whole-body communication of agency. In oral narrative, the narrator moves with the story, tells and ‘acts’ the story not only with words and propositions craftily strung together, but also with the complex and subtle inflections and cadences of voice and with well-coordinated gestures and body movements expressive of emotion. The narrator is engaged with an audience who become, through nonverbal participation and modulations of concentration and involvement, listening co-tellers of the story (Duranti, 1986). A narrator monitors the ebb and flow of attention among the listeners, regulates the building of tension and its release, speeds up or slows down and when necessary clarifies content. The music and dance of ‘telling’ the story, the performer’s present engagement, not just the linguistic construction of themes, motifs and plot lines as may be represented in the conventional grammar of text, are crucial aspects of live narrative. In live narrative, it is the musicality of voice and body that holds listeners’ attention so that they can be brought simultaneously to share in the experience of a dramatic, challenging moment, and brought back together to more familiar situations. Written narrative which came out of oral narrative may be seen as involving not only cognitive processes of understanding and remembering but also embodied perceptions of the tension and drama of shared emotion. Poetic stories link many minds in imagined space and time.

Narrative is perhaps best understood in the context of performance, drama and ritual, and there is evidence that these were the meaningful social activities from which more localized and personal processes of recounting emerged (Turner, 1982; Dissanayake, 2000). Aristotle saw the origins of narrative in mimetic behaviour, in the act of re-presentation as an active dynamic process. According to this view, echoed in Ricoeur’s important writings (Ricoeur, 1983) and in the theory of Merlin Donald (2001) who sees transmission of conscious ideas and
purposes by mimesis as the evolutionary precursor of communication in language, narrative must be seen as dynamic, temporally organised action or praxis, rather than as structure. In this sense, because verbal narrative invariably involves some form of action, or happening, it can be seen as being based on a sequencing of nonverbal acts. And this touches upon a first way in which narratives can be meaningful without words. Repeated chains of gesture, body movement and facial expression can stimulate shared narrative imagination — a sympathy for purposeful agency. The kind of wordless narrative we are concerned with, which we think supports infant experience through loving social interaction, involves reciprocal motivated ‘enactment’ based on intuitively regulated temporal contours of expressive sound and movement.

Narrative explains, coordinates and retraces trajectories of actions (Sartre, 1947), and its coherence and unity is based on the ways in which its parts are related temporally and causally (Ochs, 1997). But what are the actions or events that make up a narrative? And by what forces are they held together? The sequential pattern of beginning, middle and end appears to be a central frame for the narrative process (Bruner, 2002; Imberty, 2005; Labov, 2001; Ricoeur, 1983). In language-based narratives, ordered sequences of clauses are related to the organisation of past events reported by the narrator (Labov & Waletsky, 1967). It is the particular way in which the elements are ordered and given ‘energy’ that endows a sequence with narrative intent. Sequences of events can be considered as units, but they are inherently interdependent in an economy of energy or vitality (Bruner, 1990; Stern, 1998;1999).

Narrative is also the purposeful basis for making practical and social meaning in a human world of artefacts, techniques and conventions (Bruner, 1990). It is both rooted in shared histories and it creates new memories. History and memory, of course, are inherently narrative. Narrative, ‘about’ actors and actions, plays a central role in almost every conversation (Labov, 2001). Conversational narratives involve tellers and listeners who can either maintain their respective roles throughout the narrative episode or can exchange roles in active alternation as in the collaborative reconstruction of common past experiences. Elinor Ochs (Ochs, 1997; Ochs & Capps, 2001) has studied the interactional production of narrative in conversational discourse and she has shown how social relationships and identities are negotiated on-line through the collaborative shaping of the stories of every-day life. Personal identities and cultural histories are narrated and collaboratively shaped involving many protagonists, present or absent.
Typically, a narrative is about something worth telling (Bruner, 1990; Labov, 2001). It is about an event involving other persons that a person feels impelled to recount. A narrator strings together the events involving protagonists in some unusual state of affairs or ‘fate’. Bruner and Feldman (1993) describe the simplest form of narrative as a format involving a canonical steady-state, a precipitating event, a restoration and a coda. But, as they point out, the mere sequential nature of events does not in itself generate a narrative experience. The parts of a narrative sequence must be tied together in a motivating plot or ‘intrigue’ that sets the whole thing into motion, creating, or expressing, what Labov (1972) called ‘lines of dramatic tension’ leading to a point of closure. Plot can be seen as a motive force that creates the special time and energetic flow of narrative for living subjects. Plot lines connect the themes, motives and characters that make up a story told with words and bring about tension-creating changes in them. The basic constituents of a narrative sequence, that can be thought of as orientation, chorus, crises, resolution and coda, form a dynamic rise-and-decline energetic contour. We contend that this energetic contour is at the heart of nonverbal narrative activity. Although topic or ‘aboutness’ is a distinctive feature that is supposed to confine narrative to the realm of language, can’t sound and gesture, albeit patterned in a certain way, also be about something other than themselves?

Music does not tell us anything in particular about events, states of affairs or other people. Yet most would agree that music is personally and culturally meaningful — though its meanings are nomadic, shifting and fluid, it has moved people and organised social encounters throughout the history of humankind (Dissanayake, 2000; Falk, 2000; Freeman, 2000; Kühl, 2007). At times the sounds of music tell or recall stories that lie beyond them, and yet all the time their telling is confined to their own energetic trajectories. Music, at least until Schönberg, is thought of as being narrative (Imberty, 2005; 2008; Mâche, 1998), both because it has the power to involve listeners in a different time and world of meaning and because it can evoke known situations that sustain an orientation to the future. Music provides a powerful example of narrative without words, both in terms of form and in terms of content. Not only is it inherently sequential, it begins, progresses and ends and its modulations of tension and energy are its very fabric (Imberty, 1979; 1981), but it can also be related to things outside itself because it is situated in and itself contains historic remembered and imagined time.

In song, music is a natural partner for the cadenced language of poetry, the prosodic expression of emotions in dynamic
intersubjective synchrony that Ivan Fonagy (2001) calls ‘languages within language’, the ‘distant past … still present in live speech … [which] enables the speaker and the poet to express preconscious and subconscious mental contents that could not be conveyed by means of the grammar of any language’, employing a ‘proto-grammar’ transcending the differences between particular languages. This is what the Danish jazz musician and semiotician Ole Kühl (2007) has defined as ‘musical semantics’. It is the foundation for even the most rational and apparently unemotional and informative forms of communication cultivated in technically advanced forms of human cooperative activity — such as mathematics or philosophical logic.

Jazz musicians describe the feeling of ‘saying something’ with sound, of telling a story, in the course of improvising together (Monson, 1996). It is the narrative in music that involves and moves people, their minds and their bodies, so that their experiences flow in a common musical time in synchrony with the unfolding energies of the sound of moving in time. Like verbal stories they carry their audiences off to other worlds (Bruner, 1990) and into other times. Good narratives are by definition compelling and they are above all about sharing intention and agency — a narrator feels, as a ‘doer’, impelled to tell a compelling story. The narration is intended to produce in the audience a profound concentration of attention. Narrative in this fully alive sense is a sort of collective journey. It is a way of sharing persuasive experience in a ‘special’ time, with its own past, present and future, which is not the mundane time of everyday living.

Narrative tension creates dramatic moments that stand out and that are memorable as shared emotional experiences. Musical processes such as changes in dynamics, melody and harmonic progression, timbre or rhythmic structure, underlie subtle shifts in intensity and involvement in human engagement, even moral commitments. Climactic moments, based on building intensity through dynamic shaping of expectation based on familiar states of affairs, are associated with a discharge of tension and a resulting emotional response (Meyer, 1956). Daniel Stern (2004) describes the occurrence of similar moments in everyday and psychotherapeutic interactions.

Ingrid Monson (1996) suggests that the development of intensity (‘intensification’) through a musical performance combines ‘internal’ musical elements that build and release tension with ‘intermusical’ elements that situate the performance within its historical and cultural contexts, in relation to other musics and their stories. In other words, narrative involvement is derived from both a general, perhaps intuitive, way of structuring and processing experience and from
apprehending meaningful cultural material. In language-based narratives this cultural level of narrative involvement can be associated with ‘topic’ or the ‘aboutness’ of stories and clearly if readers or listeners do not share the cultural knowledge of the storyteller they will not experience the same energetics of narrative. In musical narratives, ‘topic’ is accessed through context-dependent indexical moves. What gets temporarily fixed as shareable knowledge in musical practice is derived from real life histories of performance, both personal and cultural (Gratier, 2008). The events that make up these histories themselves build narratives so that interactionally produced micro-narratives are built on historically produced macro-narratives. We remember our own life’s events by a process that Tulving (2001) has called auto-noesis, one that, because our memories are created in communication, becomes a collaborative socio-noesis beginning in infancy (Trevarthen, 2007). It is important to note that between jazz musicians, musical and verbal discourse together give form to the narrative construction of shared aesthetics (Duranti & Burell, 2004; Gratier & Stevanovic, 2008).

With these considerations of the pervasive currents of narrative energy in human affairs, both musical and conversational, what do we mean when we claim that mother-infant interaction is narrative — a narrative with ‘communicative musicality’? Clearly mothers and young infants do not relate events nor do they talk about other people’s actions, excepting those times the mother soliloquises as she addresses her uncomprehending but interested infant. What are the units or sections that make up a narrative exchange between mother and infant? And how are they held together? What is the plot? Who does the telling and who does the listening? Are the roles of teller and listener well defined or do mothers and babies tell or ‘make up’ stories together? If mothers use words to speak to their preverbal babies, how do they tell one another the same stories?

II. Narrative in Live Mother–Infant Interaction: Involvement in Telling Together in Time

Research on the development of human communication in infancy in the last 40 years has shown that infants enter the world with powerful motives for culture that lead them to meaningful involvement with adults and with the cultures they live in (Trevarthen, 1979; 1980; 1989; 1992; 1998). From birth, infants orient preferentially to the source of human initiative and responsiveness. They listen with intent to the affectionately modulated voices of their close kin, recognising
them as persons and recognising the particular cadences of the languages they speak based on a history of listening from life in the womb (De Casper & Fifer, 1980; Lecanuet, 1995; Nazzi et al., 1998). Neonatal imitation of arbitrary actions such as tongue protrusion (Metzoff & Moore, 1977; Maratos, 1973; 1982; Kugiumutzakis, 1998) can be considered as a transaction of motives to communicate ‘acts of meaning’ (Halliday, 1975) that indeed gain their meaning in local contexts precisely by virtue of being shared in little rituals of exchange (Heimann, 1989; Nagy & Molnar, 2004; Trevarthen, 2001a; 2005). In a sense reciprocal imitation of arbitrary gestures with a newborn is already a cultural act.

We define interpersonal interaction, not as the alternation of actions connected through chains of cause and effect, but rather as common action, as a coordination and joining of purposeful communicative expression. Vocal interactions that define a ‘protoconversational phase’ in infant development, starting around 6 to 8 weeks after birth and lasting at least a couple of months, are characterised by turn-taking antiphonic interchange as well as choral overlap (Stern et al., 1975); though the ratio of single turn vocalisation to choral vocalisation has been found to be culture specific, reflecting the norms of verbal conversation (Gratier, 2001; 2003). Interpersonal interaction intuitively creates contexts for affective involvement with others, bringing into play socio-culturally situated and embodied practices (Sterponi, 2004).

It is well established that adults, all over the world, spontaneously modify the cadence, pitch and intonation of their speech when addressing infants (Fernald & Simon, 1984; Papoušek et al., 1985; Stern et al., 1982). Their speech contains longer pauses, shorter utterances, more repetition, greater modulation and width of pitch range and enhanced articulation (Panneton et al., 2006). The unique musicality of ‘motherese’ or ‘infant-directed speech’ (IDS) dynamically guides the infant to intersubjective engagement, involving whole body synchronisation (Condon & Sander, 1974). By the second month after birth, infants respond with eloquent vocal sounds and expressions of interest and joy, and it is clear that they themselves are motivated to make a contribution. Adults in turn start to listen attentively to what young infants have to say, taking them seriously. They formulate questions to which they expect answers, they tell them about the people and events that surround them. They vary the prosody of their speech according to the infant’s mood, intent and attention (Pomerleau et al., 1993; Stern et al., 1982). Adults’ speech, therefore,
becomes expectant, feeling it must afford and acknowledge infant participation.

The dialogue between infant and parent undergoes developmental changes motivated by the changing motives and expectations of the child, related to important growth of bodily and psychological powers (Trevarthen and Aitken, 2003). A few studies have highlighted a marked change in the quality of IDS after the sixth month. It appears that ‘affective’ or melodic/poetic speech is gradually replaced by more ‘informative’ speech (Bornstein et al., 1992), that topics shift from talking about the infant’s internal states to events in the external world (Snow, 1977), that the forms and functions of questions change. These differences in the quality of IDS mark a transition from primary to secondary intersubjectivity, from interpersonal involvement to triadic person-person-object cooperative engagement (Trevarthen and Hubley, 1978; Hubley and Trevarthen, 1979; Trevarthen and Marwick, 1986; Trevarthen, 1993). We suggest that parents’ speech is compelling for infants because it is organised in narrative time and that infants are called to participate, as they ‘wish to do’, in the mutual ‘telling’ of the story of their special connectedness to each other in a common meaning filled world. Infant directed speech is musical and narrative, it is musically narrative, and so are the contributions of the infant.

An important body of research has shown in the last 20 years that infants have a great sensitivity to the subtle dimensions of expressive musical sound, to melody and rhythm, timbre and consonnance (Demany et al., 1977; Schellenberg & Trehub, 1996; Thorpe & Trehub, 1989; Trehub et al., 1984; Trehub & Thorpe, 1989). The mother’s voice, whether speaking or singing, is a musical instrument whose emotional and aesthetic impact is already felt by the foetus. And mothers around the world become passionate singers for their babies, to amuse them or to make them sleep (Trehub et al., 1997; Trevarthen, 1999; 2002). The musical structures of infant songs present great similarities around the word (Unyk et al., 1992), they change according to the ages of the infants they are made for and according to the activity they are meant to inspire. We know that adults sing in special ways for infants because they adjust the canonical frame of a traditional song to fit with infants’ moods and interests (Trehub & Trainor, 1998). The narrative structure of each verse of the song, which has a given beginning, climax or crisis and end, gains a musical narrativity through repetitive live co-performance with an infant, it acquires the lines of dramatic tension and vital pulse that fire the infant’s curiosity and imagination.
The temporal organisation and quality of vocalisation in mother–infant interaction has been described as a ‘communicative musicality’ based on the three coordinated dimensions of ‘pulse’, ‘quality’ and ‘narrative’ (Malloch, 1999; Malloch & Trevarthen, in press; Trevarthen, 1999). An intrinsic timing or pulse of expression, which is thought to stem from coupled oscillators of neurobiological ‘clocks’, innate in the human mind (Jones, 1976; Pöppel, 1997; Osborne, in press), drives the emotional energy of the moving subject. The dynamic quality of each component movement, its force, coherence, economy, modulation and harmony, signals and shapes the subject’s intent in getting across to the other. Finally the progress of movements over longer stretches of time, their grouping into phrases and longer episodes, defines a narrative (Malloch, 1999). There appears to be a deep autonomic cycle governing our physiology, creating fluctuations of vitality that rounds out the shareable drama of each narrative episode lasting tens of seconds (Trevarthen, 2008).

Narrative in this sense is seen as the energetic regulation of expression that holds and directs the whole ecology of interaction based on rhythmic engagement between mother and infant. The musicality of an adult’s spontaneous speech and song, including body movements, gestures and facial expressions, moves infants to rhythmic involvement (Mazokopaki and Kugiumutzakis, in press). And the effect of being swept up by sound in rhythm is also emotional. Daniel Stern (1999) suggests that the subject or substance of mother–infant interaction is provided by ‘vitality contours’, that is emotional ‘feeling forms’ that map onto prosodic contours in the voice, gestural phrases and, more generally, supramodal units of expression that are temporally shaped. He also describes these dynamic ‘vitality contours’ as ‘proto-narrative envelopes’ (Stern, 1998) because they are presented as fluctuations of intensity that begin and end and that draw ‘lines of dramatic tension’. What Stern describes is a kind of phrasing that is itself narrative and that builds longer narrative sequences. This phrasing is marked by various indices, some which are hard to quantify, such as sudden acceleration, pitch and intensity climaxes, final lengthening and, of course, silences or pauses (Delavenne et al., 2008; Gratier, 2001; 2003; Malloch, 1999). Silences give shape to the sound of heard movement just as pauses give shape to seen movement by imprinting rhythms of alternation. And silences between sounds, in spoken language, in music and perhaps also in mother–infant vocal interaction, also represent what is not said but can be sensed or potentially anticipated.
In an interactive situation, where the flux of organised sound is jointly produced, it is evident that participants come to be interdependently rhythmically attuned, in flow together. Thus, infants might lock into the rhythm of motherese (IDS) by focussing their attention on salient features in the stream of audible and visible expression, and infant participation is, we find, more likely to occur at rhythmically relevant points. Coordinated action-attention rhythms based on coordinated expression in mother–infant interaction might provide a common time dimension that supports experiences of togetherness and affective involvement, or what Schütz has called ‘the reciprocal sharing of the Other’s flux of experiences in inner time’ (Schütz, 1951/1977, p. 118). Rhythm and narrative are intimately connected in both music and in mother–infant interaction, as suggested by Malloch and Trevarthen’s ‘Theory of Communicative Musicality’.

Conversational narratives are characterised by repeated phrases (Labov, 1972), powerful scenic images and ellipsis that call on speakers and listeners to actively co-construct the story as it unfolds (Tannen, 1989). Rhythm and poetics play an important part in spoken interaction through the use of alliteration, carefully coordinated sound and energy (Tannen, 1989). Coordinated rhythms and harmonies of the voice and body hold speakers together in mutual attention. In fact the sociolinguist Ron Scollon (1982) likens verbal conversation to musical ensemble when he writes (p. 342–43) ‘Ensemble in music refers to the extent to which the performers have achieved one mind, or … one body, in the performance of their work. Of the elements which contribute to the achievement of ensemble, tempo is the guiding element.’ Shared rhythm, capturing the essential pulse that governs all animal movement, making the future of action predictable, is perhaps the most fundamental distributed structure for human communication.

Mari Riess Jones’ ‘Dynamic Attending Theory’ (Jones, 1976; Jones & Boltz, 1989) provides a plausible explanatory model for this connection between rhythm and narrative in intersubjective experience. Jones defines attending as a dynamic temporal process that is adjusted to the temporalities of perceptual phenomena. Her basic thesis is that the focus of attention is rhythmical and that it initially entrains to a particular level of periodicity in the perceived world based on the recurrence of salient events or moments. Subjects become ‘rhythmically attuned’ to external phenomena. Rhythmic attunement at a ‘referent’ level enables the subject to shift the focus of attention to other rhythm levels that may be hierarchically superior or inferior. Jones suggests that rhythmic attunement depends on the existence of
internal biologically based oscillators. In a sense dynamic attending explains why we feel we are moved into shared time when listening to streams of humanly produced sound like speech or music. There is a ‘quasi-simultaneity’ (Schütz, 1951) between the subject’s stream of consciousness and the temporal object’s dynamic structure so that the boundary between subject and object recedes and gives way to an experience of ‘now’. In this way, the perceiver becomes an intently involved co-performer.

We suggest that coordinated interaction leads mothers and infants to imagined worlds through shared time that are not only narrative in structure but also convey narrative content based on a history of meaningful communication that holds sedimented motifs and routines, stimulating anticipatory action and contributing to making the intersubjective experience an emotional experience of belonging. We turn to this issue in the next section.

### III. Narratives of Belonging:
Proto-Habitus as Living Memory-In-Action

We can now define nonverbal interactive narrative along four interconnected axes: first, it can be seen as the embodied enactment of communicative intent; second, it is delineated by a particular sequencing of framed episodes tied together in energetic contours involving a ‘crisis’ and a ‘resolution’; third, it requires the rhythmic and affective involvement of co-participants and, finally, it brings about meaningful intersubjective experiences that ‘thicken’ relationships of togetherness. We would like to discuss the idea that the temporal framing of moments and episodes in emotionally shared narrative sequences founds cultural experience. However, we do not provide any empirical evidence for this claim in the present paper.

The temporal sequencing that defines narrative fulfils another important function for both verbal and nonverbal sense making: it frames experience by segmenting its flow into memorable events. New events, happening ‘now’, must be embedded in narrative frames in order to be remembered (Mandler, 1984). There they gain status by virtue of being connected to other events within known situations. Human minds are built on memories that grow from the present in widening circles of involvement with both private and shared consciousness, tracing lines of meaning beyond known places and times until belief and expectation of events that can occur ‘somewhere sometime’ transforms experience, assisted by language (Donaldson, 1992). We reconstruct the past to make sense of the present. This is
perhaps the basis of our feeling of continuity, of existence. ‘Framing pursues experience into memories’ (Bruner, 1990, p. 56).

We have described how, on one level, mothers and infants communicate within common time frames, in periods of the near present that are made special through processes of slowing and speeding up, qualities of silence and salient moments that stand out in time. Vitality contours are involved in the temporal framing of communicative experience. On another level, narratives of sound and gesture in mother–infant interaction frame and ‘make special’ present experiences to give them a past existence, making sure they will keep alive in memory. Narrative activity supports multiple temporalities like strands that cross and intertwine or separate and vanish. Written and conversational narratives are full of ‘stories within stories’. Ricoeur pointed out that narrative time has a different quality to ‘real’ time, it passes at different speeds and it does not drag us inexorably from end to end. According to Ricoeur (1983) narrative founds the experience of time itself. It is the present perspective of storytelling, the shared experience of a ‘here and now’ that enables people to escape mentally to imagined places in imagined time. And, as Adam Smith (1777/1982) famously said, narrative articulates memory and imagination, and he was writing about music as one of the ‘imitative arts’. Imagined worlds are built out of familiar worlds whose contours can be anticipated and recalled.

By creating ‘special time’ with its own internal coherence, narratives without words open up horizons of possibility that support the projections into the future of developing identities based on histories of everyday encounters. However, the special time of a story depends on its moving towards an anticipated end. Ending, in fact, drives the whole narrative process (Ricoeur, 1983). A story becomes a whole, exists as a separate unity, only once it has ended. Like a bubble that forms and lifts into the air, the encapsulated temporality of a story becomes detached from mundane time of continuous experience (with no end) only once it has ended. Its ontological status changes once it has achieved its goal and so the imaginative drive of narrative is also a drive to make memory, to accumulate and organise past experience in what Margaret Donaldson (1992) calls ‘transcendent consciousness’. Narrative creates memory but it also draws past experience into the present. It provides memorable information on which future collaborations and relationships may be built.

The sort of framing and parsing of intention that is provided by narrative organisation in mother–infant interaction, we contend, supports a developing ‘synbiographical’ self whose identity and memories are
formed in processes of shared and mutual engagement. The young infant’s ability to remember dynamic ‘musical’ events that involve motivated action over relatively long periods of time has gained wide support from experimental research (Courage & Cowan, 2008; Hane & Rovee-Collier, 1995). Early musicality marks with emotional signatures the identity of persons and ritual events (Trevarthen, 2002). Everyday social interactions are driven by a desire to perform the signs of a cultural ‘belonging’. The perfecting of intrinsic skills for musicality is a way of declaring allegiance and affiliation. A newborn knows the mother by the tone and inflections of her voice. A six-month-old who smiles at the recognition of a favourite song or playful routine displays an awareness of a collective level of knowing, of what we call a ‘proto-habitus’ (Gratier, 2007; Gratier & Apter-Danon, in press).

In order to be shareable, to produce a shared dramatic tension, a narrative must include the reiteration of known forms. These in turn can accommodate new and unexpected events. Culture is based on agreed ‘norms’ that connect people through the excitement of shared anticipation, but it also needs interpretive procedures for making sense of departures from what is commonly expected. ‘The function of the story is to find an intentional state that mitigates or at least makes comprehensible a deviation from a canonical cultural pattern’ (Bruner, 1990, pp. 49–50) (cf. Apter, this volume). Young infants and their partners learn to ‘mess around’ with expectations together and this ability attests to the subtle and direct perception infants have of other people’s intentions (Reddy, 2008). We do not need a ‘Theory of Mind’ to be aware of intentions, specially when they are woven into the socio-cultural fabric of meaningful and playful exchange (Zlatev et al., 2008).

It is the back and forth relating between the past within the present and its possible futures in the course of social engagement with knowing partners that establishes a common ground for cultural experience. Just as verbal narratives relate ‘now’ past events or happenings, non-verbal narratives bring the past into the present by recalling known forms, figures or patterns that must unfold in shared present experience. Narrative emerges from the past with a drive toward a future ending, and thus shapes present experience; perhaps it makes time, as Ricoeur (1983) has suggested. The musical narratives we describe in interactions between mothers and infants are not just ways of organising expression - into sequences that draw lines of tension - that support communication. They have a form of ‘aboutness’ because they also have content. ‘Phrases’ (Gratier, 2003; Delavenne et al., 2008)
‘vitality contours’ or ‘protonarrative envelopes’ perhaps constitute the events that build narrative. As Stern writes, ‘the protonarrative envelope is [...] a time envelope as well as an event envelope’ (Stern, 1995, p. 91).

In the preceding section we described the way in which rhythmic involvement was a crucial dimension of narrative but involvement with talk, text, movement and image, which Deborah Tannen (1989) considers to be the driving force of narrative, is also based on ‘patterns of sense’. If sound patterns are the basis for rhythmic and musical involvement, sense patterns create involvement through participation in processes of sense-making. The two together, according to Tannen, create emotional involvement. Narrative involvement between mothers and infants, we contend, is based on intuitive rhythmic musical forms of engagement as well as on cultural meaningful contents of engagement.

Mothers and their preverbal infants rapidly build rapport, a sense of intimate connectedness and of ‘knowing’ each other. Language is clearly quite superfluous to this building of rapport and intimacy. In fact, even between people who can talk to each other, rapport is perhaps most fundamentally based on nonverbal or ‘unverbaliseable’ communication (cf. Weisbuch & Ambady, this volume). A sense of rapport often comes from being ‘understood’ without explicitly saying what one means. Tacit understanding between people is related to their sharing cultural knowledge and habits of practice (Condon, 1982; Gumperz, 1982) and it calls forth mutual participation in sense making (Tannen, 1989). What mother and infant share in communication is unsayable, yet in the course of their everyday interactions they are narrating their rapport, their connectedness and togetherness in time; in short, their mutual sense of ‘belonging’.

We propose that in the first six months of an infant’s life a ‘proto-habitus’, which is both derived from and precedes what Bourdieu (1972; 1990) has called ‘habitus’, plays a crucial role in holding together narratives of involvement with close partners. We focus here only on certain features of ‘habitus’ as it is defined and analysed by Pierre Bourdieu (1972; 1990). Habitus comprises organised sets of dispositions that generate and regulate social practice. These dispositions that regulate or ‘spontaneously and collectively orchestrate’ social life are historically rooted and they also in turn actively produce and shape newer dispositions. (It is important to note that Bourdieu rejects structuralist positions when he describes habitus as ‘structuring structured structures’.) A central feature of ‘habitus’ is that it is body-based, it is considered as a ‘second nature’ or embodied
social learning — a history that is forgotten and transformed into natural state. Habitus can be seen, for our purposes, as a nonverbally grounded embodied cultural knowing that is expressed in practice by people connected through time within real life communities.

While habitus concerns communities of people living together and exists both collectively and individually, proto-habitus concerns micro-cultural units made of a few specific partners. It is only indirectly related to the community of like-minded — and like-bodied — others that surrounds the intimate circle of interaction through the ‘habitus’ of parents and close kin. For example, the particular cadences of mother’s speech that the infant becomes familiar with starting in utero are the result of the mother’s social practice of speaking a certain language in a certain way. Proto-habitus exists only in interactive practice and in the intersubjective time of musical narrative involvement that frames the interactional exchanges themselves.

Proto-habitus represents the locally meaningful and situationally specific particulars of the developing relationships the infant enters. Later, during more cooperative games in secondary intersubjectivity (Trevarthen and Hubley, 1978; Hubley and Trevarthen, 1979), infants acquire the so-called socio-intentional abilities such as ‘joint attention’ and ‘pointing’ that very clearly pave the road to language — because they mark or draw attention to critical moments and events in a shared narration — and that therefore have been considered to be the building blocks of a revolutionary ‘cultural learning’ (Tomasello et al., 1993).

Before they are interested, or have the ‘confidence’, to really cooperate in some task intended by another, infants ‘discover’ with great excitement and pride that some of the particulars that formed the ‘proto-habitus’ of their intimate relationships can in fact be shared with members of their community at large and attract their pleasure and admiration. Thus from around 6 months parents play and sing more vigorously the canonical songs, rhymes and games they have learned from their own parents (Eckerdal & Merker, in press), and infants learn these ‘rituals’ eagerly, becoming proud of their ‘identity’ as performers (Trevarthen, 2002). But the ‘grounding signs of culture’ (Cowley et al., 2004) based on a semiosis of organised embodied ‘feeling forms’ (Trevarthen, 1987; 1992; 1994) are, we believe, to be found in the earliest interactions of coordinated motive states between mother and baby.

Finally, we wish the make clear an important connection between proto-habitus, emotion and culture by suggesting that the recognition and physical anticipation of the projected styles and routines the
infant has come to know induce strong emotions of belonging, pride and confidence. Proto-habitus may also provide an ‘interpretive context’ for mother–infant narratives within the framework of a ‘shared micro-culture’. Events in verbal stories gain meaning by being embedded in ‘interpretive contexts’ based on past experience so that in a bakhtinian sense every story is linked to all the other stories (Bakhtin, 1986). Bruner (1990), too, is committed to the idea that narratives derive meaning from being embedded in cultures of shared representation and expectation. And that by virtue of this, narratives also make culture and identity. Most narratives are about life experience and how people relate to each other, purposefully and with feeling. We suggest that the first narratives, the nonverbal musical stories mothers and babies spin together, are about finding oneself in the other, about the special ways in which understanding the other means losing oneself or about the reciprocal attribution of intentionality and agency (Bruner & Feldman, 1993). Katherine Nelson’s (1989) famous work on the bed-time narrative accounts that toddlers make to themselves about the day’s events sheds light on the importance of life experience for shaping narrative. Narratives of self can also be based on telling stories without words, which, according to Damasio (1999), involves the coordination of nonverbal images produced by the brain. Sacks (2007) would identify this process of creating meaning in the brain with music itself.

Mother–infant interaction is narrative in form and content and this makes it meaningful. And we accept, with Mark Johnson (2007, p. 260), that ‘the mechanisms of human meaning extend far beyond the capacity for language’. The ‘felt immediacy’ (Bråten, 1998) of the musical phrases of a mother’s Infant Directed Speech draws the infant into a fictionalized space where known shapes of time are recounted and conjure up emotions of belonging. Meaning grows out of the experienced flow of shared embodied narratives.

IV. Ways of Telling: How a Mother and Infant Orchestrate a ‘Dénouement’ In Vocal Exchange

We now present some examples of narrative organisation in mother–infant vocal interaction. The analyses that follow are based on a corpus of video and audio recordings of mothers and two- to three-month-old infants interacting in their home environments. Mothers were asked to communicate with their babies the way they normally do using the disposition they find most comfortable. Mothers were also encouraged to sing rhymes, action songs or lullabies.
Spectrograms, pitch plots and intensity curves were obtained for the sequences analyzed using the acoustic analysis software Praat, version 4.4.17 (Boersma & Weeninck, 2002). Spectrograms provide real time information about fundamental frequency, amplitude and harmonics in the form of frequency bands (formants) corresponding to a resonance in the vocal tract. The darker formant bands have higher energy. A ‘pitch plot’ derived from the fundamental frequency (measured in Hertz) represents the perceived ‘height’ of sound contoured over time, i.e., it gives us a reading of the variation of melody in real time. Intensity curves plot changes in amplitude (measured in decibels) over time. The plots are presented with annotations that illustrate the analysis techniques we use to study mother–infant vocal interaction.

The first example (Figure 1) reveals the rhythmic pulse in a short segment of interaction between a Parisian mother and her
2-month-old son. It shows how the mother establishes a regular pulse, through the timing of her utterances, and how it supports a rhythmic involvement between her and her baby. Mother and infant appear to be ‘together in time’ or, as jazz musicians say, sharing ‘good time’ (Monson, 1996). A large-scale study of the vocal interaction between 60 mothers and their young infants has shown that pulse is generally flexible, with a periodicity around 900 milliseconds on average with a standard deviation of 150 milliseconds (Gratier, 2001; 2003). This corresponds with the lower portion of the range of a metronome — from andante to adagio. Interacting partners come in around the beat, sometimes just before and sometimes just after. We have called this the ‘expressive timing’ of mother–infant interaction (Gratier, 2003). Fluctuations of pulse probably play a key role in maintaining involvement through stimulating variations of anticipatory attention. The pulse durations for the example shown in Figure 1. are variable and we may note what looks like ‘phrase final lengthening’ in the 5th and the 11th pulses.
The second example (Figure 2) shows a 43 second narrative episode of lively vocal interaction between the same Parisian mother and her 2-month-old son. The sequences of the narrative episode have been highlighted on a pitch plot showing that mother and infant explore pitch space around a baseline middle C. A more detailed view is given of what we call the narrative ‘crisis’. An intensity curve shows the general trajectory of energy or intensity over time, culminating at the point of crisis and gradually returning to its initial level. Table 1 provides a more detailed analysis of the phrases that make up the narrative sequences visible on the pitch plots in Figure 2. Note that the verbalizations of the mother in this example suggest that she thinks of her infant as capable of ‘telling her about something’. And she seems to find it interesting. Phrases are defined as bouts of vocalization followed by a pause. In this example, phrases last between 1200 and 5300 milliseconds. Again, this example corroborates our findings based on larger samples of recorded interactions (Delavenne et al., 2008; Gratier, 2001; 2003). It is interesting to note that the phrases that end the sequences making up the narrative episode are generally longer than the others — except for the ‘crisis’ phrase which is the second longest in the entire episode.

<table>
<thead>
<tr>
<th>Phrase</th>
<th>Transcription</th>
<th>Sequence</th>
<th>Length of utterance + pause</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Est-ce que t’as envie de parler à maman?</em> Do you want to speak with mummy?</td>
<td>Orientation</td>
<td>1900 ms</td>
</tr>
<tr>
<td>2</td>
<td><em>Hein Riann</em> Huh Raïnn</td>
<td>Orientation</td>
<td>1800 ms</td>
</tr>
<tr>
<td>3</td>
<td><em>Qu’est ce tu racontes?</em> What do you have to tell?</td>
<td>Orientation</td>
<td>1200 ms</td>
</tr>
<tr>
<td>4</td>
<td><em>Qu’est ce tu racontes à maman?</em> [inf. voc.] oh ben oui [inf. voc.] oh What do you have to tell mummy? [inf. voc.] oh well yes [inf. voc.] oh</td>
<td>Orientation</td>
<td>5300 ms</td>
</tr>
<tr>
<td>Phrase</td>
<td>Transcription</td>
<td>Sequence</td>
<td>Length of utterance + pause</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>----------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>5</td>
<td>Tout ça tu racontes? [inf. voc.] You have all of that to tell? [inf. voc.]</td>
<td>Chorus 1</td>
<td>1700 ms</td>
</tr>
<tr>
<td>6</td>
<td>Ah oui [overlapping inf. voc.] oh oui [inf. voc.] Ah yes [overlapping inf. voc.] oh yes [inf. voc.]</td>
<td>Chorus 1</td>
<td>2600 ms</td>
</tr>
<tr>
<td>7</td>
<td>[inf. voc.] oh ben oui t’avais envie de parler ce matin [inf. voc.] oh well yes you wanted to talk this morning</td>
<td>Chorus 1</td>
<td>2800 ms</td>
</tr>
<tr>
<td>8</td>
<td>[inf. vocs] oh [inf. voc.]</td>
<td>Chorus 1</td>
<td>3500 ms</td>
</tr>
<tr>
<td>9</td>
<td>Oh ben dis donc [inf. voc.] Oh is that so [inf. voc.]</td>
<td>Chorus 2</td>
<td>3100 ms</td>
</tr>
<tr>
<td>10</td>
<td>[inf. voc.] oh [inf. voc.] [overlapping vocs] oh là c’est fort! [inf. voc.] of [inf. voc.] [overlapping vocs] Wow that’s powerful/that’s great!</td>
<td>Chorus 2 CRISIS</td>
<td>4900 ms</td>
</tr>
<tr>
<td>11</td>
<td>Ah [inf. voc.] ah oui [overlapping inf. voc.] Ah [inf. voc.] ah yes [overlapping inf. voc.]</td>
<td>Chorus 2 RESOLUTION</td>
<td>2400 ms</td>
</tr>
<tr>
<td>12</td>
<td>Eh oui [inf. voc.] Well yes [inf. voc.]</td>
<td>Chorus 2 RESOLUTION</td>
<td>3500 ms</td>
</tr>
<tr>
<td>13</td>
<td>Oh ben dis donc Oh well really</td>
<td>Coda</td>
<td>1300 ms</td>
</tr>
<tr>
<td>14</td>
<td>C’est parce que t’avais bien dormi que tu voulais me raconter [overlapping inf. voc. ]? It’s because you slept well that you wanted to tell me [overlapping inf. voc.]?</td>
<td>Coda</td>
<td>2200 ms</td>
</tr>
<tr>
<td>15</td>
<td>Oh</td>
<td>Coda</td>
<td>1500 ms</td>
</tr>
<tr>
<td>16</td>
<td>Ben dis donc (stretched) Well really (stretched)</td>
<td>Coda</td>
<td>3200 ms</td>
</tr>
</tbody>
</table>
There is today growing evidence that the ways in which young infants and mothers engage with each other, their forms of interacting, are, or become, to some extent, culture-specific (Cowley et al., 2004; Gratier, 2001; 2003; Keller, 2003; Stork, 1986; Trevarthen, 1988). If proto-habitus provides a developing repertoire of embodied habits, motifs, and recursive formula, rooted in the cultural styles a mother brings with her from her own community, how does it influence the narrative musicality of mother–infant interaction? Can proto-habitus be described and analysed in the visible traces of the on-going intersubjective encounters that ‘thicken’ relationships?

Comparative research has highlighted unique features of mother–infant interaction in diverse communities and has questioned some of the assumptions underlying research on early interaction carried out in European and North American contexts. In many parts of the world face-to-face interaction is much less frequent or even absent, at least in contexts observed by researchers. Communication may take place predominantly through tactile and kinesic modes rather than through visual, vocal and gestural ones and mothers are not necessarily infants’ primary interactive partners (Field et al., 1981; Hewlett et al., 1998; Konner, 1976; LeVine and LeVine, 1966; Levine et al., 1994; Stork, 1986; Trevarthen, 1988; Tronick et al., 1989). Despite the attention drawn to important differences in the overall interactive style of mothers and infants around the world, communicative exchange based on coordinated timing appears to be pervasive, and to follow intuitively known principles.

Differences in interaction style have been found in a comparative study of face-to-face interaction between mothers and very young infants in Scotland and Nigeria, where Nigerian mothers were found to be more coercive, directive, boisterous and physical with their infants whereas Scottish mothers were more inclined to let their infants express themselves spontaneously, used more talk and less touching (Trevarthen, 1988). A similar study of interaction style differences between Indian, French and North American mothers’ vocal interactions with 2- to 5-month olds showed that the turn-taking patterns were most different for Indian dyads as compared with French and North American dyads (Gratier, 1999; 2001; 2003). More specifically Indian mothers and infants vocalised together (rather than in clear alternation) more than the other two groups, and the pauses between their turns were shorter than those in the two other groups. Indian mothers also verbalized less, producing more modulated vocal sounds. In a study of mother–infant interaction at 14 weeks in South-Africa (among isiZulu and
English-speaking dyads), Cowley et al. (2004) go so far as to describe a precocious body-based semiotic activity based on iconic signs acquiring indexical functions in the course of on-going interaction. A controlled comparison of mother–infant interaction among older infants in Guatemala and the US examining the ways in which mothers and babies organize their behaviour during the joint exploration of a novel object showed that while North American mothers used talk in their interactions, Guatemalan mothers relied more on non-verbal communication (Rogoff & Mosier, 1993).

There can be conspicuous differences of timing and expression in the ways mothers in different cultures share emotions and vitality in their dialogues. For example, Powers has found that vowels in the speech of Japanese mothers to their four-month-olds has a wider range of durations and pitch levels than the speech of Scottish mothers to their young infants, and the infants vocalised differently too, like their mothers. The differences might be related to the contrasting moral attitudes or beliefs, and the differences in speech prosody, in these two cultures. They appear to be influenced by the importance given in traditional Japanese society to respect for the emotions of other persons, and to concepts of how infants feel and how they should be addressed (Powers and Trevarthen, in press).

These types of large-scale cross-cultural studies address the issue of the progressive development of shared cultural styles in interaction. How does a very young infant come to anticipate the particular prosodic signature in the mother’s speech that signals the end of a narrative episode or a new beginning? We need to trace the trajectories of these local habits of communication that foster intimacy, rapport and shared understanding. How does an infant learn to recognise patterns of prosody, dynamics and rhythm, and more importantly, how does the infant indicate (iconically and indexically) his or her recognition of them?

We believe the kind of rhythmic involvement and narrative musicality, made visible in our acoustic analysis mother–infant vocal interaction, inevitably generate cultural grooves, akin to the licks, riffs and gimmicks that improvising musicians call on in their ‘musical conversations’ (Gratier, 2008) and that these in turn support the emotions of belonging that enable mothers and babies to be in synch and to share in imagined times and spaces.
V. Story-telling and Story-Listening in Action-Songs and Musical Games

The building up of local histories of relating between mothers and infants — as well as fathers and other family members — are also supported by the rich musical cultures of baby songs that infants inspire their parents to reproduce. Parents often feel compelled to sing for their infants (Trehub & Trainor, 1998) regardless of whether they think they *can* sing or not. And most of the time the songs they sing and the games they play are taken from the ancient histories of their own cultural traditions (Custodero and Johnson-Green, 2003; Merker, 2005), drawing on personal memory, the recollections of grandparents, or on examples from books or the internet. North-American parents sing to their babies several times a day, in playful interaction and during daily activities such as bathing, feeding and putting to sleep (Trehub *et al*., 1997).

This musical inheritance is well adapted to the needs and appetites of infants. Infants appear to prefer infant-directed song to infant-directed speech (Trehub & Nataka, 2002). Baby songs, action-games and lullabies around the world share remarkable rhythmic and structural similarities (Trevarthen, 2002; Unyk *et al*., 1992). They present simple melodic contours, repeated motifs and a relatively narrow pitch range (Trehub & Trainor, 1998). Baby songs and even spontaneous nonsense chants are typically composed of groups of verses or stanzas each lasting between 15 and 30 seconds. They are inherently narrative in their form, comprising sequences that regulate the progression of energy towards a joyful climax and down again (Trevarthen, 1999). Lines in the verses of most baby songs last around 3 seconds on average. This is also the mean duration of a ‘phrase’ in spontaneous interaction which has been shown to correspond to the average length of musical phrases, lines of poetry and conversational stretches of talk and to the subjective experience of a ‘present moment’ (Fraisse, 1978; Gratier, 2001; Trevarthen, 1999). And adults’ singing style when they sing for infants, regardless of the genre of the song itself, is characterized by slower tempo, higher pitch and marked intensification (Trainor, 1996; Trehub *et al*., 1997). In our corpus of recordings we have many examples of mothers singing energetic popular tunes to their infants that they have tailored to their infants’ needs so that their musical features resemble those of traditional baby songs.

Mothers often make rhythmic displays of hand movements while they sing to the baby. Infants soon partake in these multi-modal musical activities with rhythmic bouncing of their own body, movements
of the arms and hands and a variety of well-timed vocal productions (Mazakopaki and Kugiumutzakis, in press). In these situations the infant can be considered as an, albeit novice, co-performer rather than as an audience (Eckerdal & Merker, in press). In the case of action-songs and musical rhymes, parents do not so much sing for the infant as they sing with the infant and the singing styles they adopt are geared towards infant participation. In this sense the infant’s status as co-performer does not depend on any actual, physical contribution to the song. The ritualised performances infants and their loved ones regularly partake in must contribute to shaping the narrative mind with a culturally grounded sense of self (Trevarthen, 2002).

An example of a 3-month-old infant participating in the musical narrative of a well known traditional French baby song sung by his mother is presented in Figures 3 and 4. ‘Les marionnettes’ is organised in multiple repeating 4 line stanzas where rhythmically rotating hand gestures accompany the musical pulse. We have analysed a stretch of mother–infant engagement in which the mother repeats the same two stanzas of ‘Les Marionnettes’ twice with a short segment of talk between them. The entire sequence in presented as a pitch plot at the top of both figures. Spectrograms, pitch plots and intensity curves are presented for each of the two-stanza songs. The lines and stanzas and their durations in each version of the song are presented in table 2. The lines range from 2400 to 3850 milliseconds, a range that matches natural phrase length in mother–infant vocal interaction. The first set of two stanzas lasts 22.2 seconds and the second set lasts 23.65 seconds suggesting there is a slowing down at the end of the cycle. The infant intervenes vocally in each of the 4 stanzas, towards the beginning of each stanza in the first version and towards the end of each stanza in the second version, each time at a musically salient moment corresponding to a phrase boundary. And in both versions the infant’s involvement around the mid-point of the song sequence brings about an intensity peak that can be considered as the focal point of a narrative episode.

The little boy in our example is already well versed. He knows what to expect when his mother sings this particular song and he knows what she expects of him. This experience of singing a well-known song together is constitutive of the infant’s proto-habitus. And because the mother is connected through this song and others, through her ways of talking and moving, to the cultural habitus of her community (or communities — for infants can handle plurality), the infant will come to anticipate and participate in interactions with a wider and
Figure 3
Figure 4
wider array of partners who share the same tacit, embodied, much larger and much older culture.

Table 2 [* = Infant vocalises]

<table>
<thead>
<tr>
<th>Stanza 1</th>
<th>Line length</th>
<th>Line length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Song 1</strong></td>
<td><strong>Song 2</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td><em>Ainsi font font font</em>&lt;br&gt;That’s how they go, go, go</td>
<td>2500 ms</td>
</tr>
<tr>
<td>2</td>
<td><em>Les petites marionnettes</em>&lt;br&gt;The little puppets</td>
<td>2500 ms*</td>
</tr>
<tr>
<td>3</td>
<td><em>Ainsi font font font</em>&lt;br&gt;That’s how they go, go, go</td>
<td>2500 ms</td>
</tr>
<tr>
<td>4</td>
<td><em>Trois p’tits tours et puis s’en vont</em>&lt;br&gt;Three little twirls and then they’re gone</td>
<td>3000 ms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stanza 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Song 1</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

Conclusion: On the Human Readiness for Narratives of Relating, and for Making Culture Meaningful

By carefully watching and analysing the intimate encounters of mothers and infants, and remembering the ability of young children to find companionship before they speak in play and at work with an increasing circle of companions, we have learned to accept a paradox. It appears that the need to tell and accept the story of culture, the history of meanings we must learn, is innate. Educational reformers, like the 17th-century teacher Comenius (2003), are right — one has to accept
the child as a ‘reasonable person’, willing to be a partner in the making and remembering of meaning. Babies are born to find meaning in intent participation with the imaginings and ambitions of older minds. They have a musical sense of time, and a language of emotions that matches that of the wisest adult, including sensitive feelings about the contingent appropriateness of other persons’ behaviours. And they soon build a ‘personal narrative history’ that connects moments of the present to an imagined future as well as a remembered past.

With this new idea of the human mind as motivated for the ‘poetry’ or creative stories of culture (Trevarthen, 2004a), we see evidence that preparations are made for an intermental life in prenatal growth of organs for regulating agency and experience, and for making the regulations public or intersubjective. A human foetus, months before birth, has a body, sensory and motor organs, and a brain already adapted in intricate ways to share acting and experiencing — with hearing for the rhythms and tones of human voice, with eyes that signal looking for others to see, with more muscles than any other creature for expressions of the face that tell of appetites and aversions of great sublety, with two hands that are ready to indicate how the material world may be used and with a delicately hirsute skin made to respond emotionally to the dynamics of human touch (Trevarthen, 2001b; 2004b). Infants start life looking for ways to make conversation by expressing what they want and how they feel, and soon they are trying to create compositions, to share the plot of artful games and make them into legends.

A new science of human sympathy is beginning to give a neurobiological account of the mimetic abilities that intrigued Aristotle and the moral sentiments described so richly by Adam Smith. One remarkable study using electroencephalography has proved that the cerebral hemispheres of an 8-week-old baby already possess organs for the appreciation of a known person’s face, for accepting the sound of their speech and for being in readiness for expressing a reply with face and voice (Tzourio-Mazoyer et al., 2002). And we begin to learn that the brain is a time machine, that it imagines whole plans for moving in ways the phenomenologists appreciated, and that it shares these with sympathy of emotions (Gallese, 2005; Panksepp, 2005). No longer do we have to imagine the cerebral circuits as some great calculator or tape machine competent only to process sensory information and learn new algorithms for driving motor action in more intelligent ways. The neurobiology of sympathy appears to be the primary regulator of development for moving purposes and conscious appraisal of the likely consequences of action.
We have reviewed evidence that the making of meaning in culture depends on an innate drive for narrative that anticipates and regulates the drama of interpersonal engagements and brings a foretaste of how to come to a conclusion that will lead to new beginnings. We have compared the inventions of jazz with the gently nuanced exchanges of a mother with a newborn. We have found that writing the story of life needs the sense of belonging to a community and that this is vital for well being. We have identified the motives and emotions for culture in narratives of mother–infant vocal interaction.

**References**


Smith, A. (1777/1982), ‘Of the nature of that imitation which takes place in what are called the imitative arts’, in *Essays on Philosophical Subjects*, pp. 176–213,


