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The Dance of Wellbeing: Defining the Musical Therapeutic Effect

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Abstract

Music making is a human activity that communicates motives – the underlying impulses for action, by which experience is gained, and which are accompanied by feelings. Music evokes narratives of experience, based on our innate ability to share the passing of expressive 'mind time', an ability that may be called 'musicality', which is inseparable from the impulse to move with anticipation of rhythmic sensory consequences and varied emotional evaluations. Communicative musicality is the source of the music therapeutic experience and its effects. An inborn musicality is clearly uncovered in acoustic analyses of parent/infant vocal interactions, where, independent of verbal communication, a shared sense of time and the shaping of jointly-created pitch contours describe phrases and narrative cycles of feeling. There is new evidence that the communication of motives and experience is supported by systems of 'sympathy neurones' in the regulatory core of the brain, and by the 'vitality affects' they generate. The music therapy relationship seeks a dance of human passion and well-being by fundamentally intuitive means. Its verbal/cognitive regulation is necessary for the

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cultivation and recording of its technique, but not the origin of its immediate power[1].

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Introduction: The Psychological Function of Music

> "Because music is an outward sign of human communication, and communication can be achieved with or without audible or visible signals, the inner meaning of a piece of music can sometimes be grasped intuitively. In this case, its structure need not be understood nor need its style be familiar to the listener. But if we are to understand fully its outward form as well as its inner meaning, and particularly the relationship between the two, we cannot study independently any of these things, because all three are interrelated. The function of music is to enhance in some way the quality of individual experience and human relationships; its structures are reflections of patterns of human relations, and the value of a piece of music is inseparable from its value as an expression of human experience." (Blacking, 1969).

A human being making any kind of musical sound – improvising, recreating from memory, reading a score, or responding in therapy – is expressing purposes that can communicate. Actually or potentially, making music is an act of intersubjectivity, a form of behaviour that offers direct information on human motives, from which other humans can sense what underlies a person's actions and experience. Humans who belong to what Blacking calls different 'affective cultures' (Blacking, 1969), who are educated in quite different conventions of music, nevertheless recognise and sympathise with these humanly organised sounds. We believe this is because all humans act and may sympathise with movements of both body and voice that are rhythmic and melodic, with gestures linked into narrative cycles of expression.

Research on how infants attend to and stimulate intuitive music in parents' vocal play, and how they can imitate and reciprocate intricately co-ordinated expressions, strongly suggests that we are born like this and that the infant's sympathy arises from an inborn rhythmic coherence of body movement and modulation of affective expressions. A paediatric neurologist can be trained to judge the health or distress of a premature newborn infant's brain choreographically, by evaluating the shape and timing, the rhythms and grace or non co-ordination of the spontaneous movements of the baby's limbs. We believe that underlying acquired musical motor skills and perception of cultivated musical forms is an intrinsic 'musicality', and this is an aspect of motivation and emotion that has power to communicate.

The remarkable efficacy of varieties of music therapy for immature infants, people under emotional stress, people with disabilities, and the aged, depends upon attainment of a degree of communication that was not present before. We believe that communication with the therapist in musical sound brings direct support for the central source of rhythms and gestures that enable each of us to express ourselves in relationship with other humans. As Blacking implies, belonging to any particular 'affective culture', of music or expressive art in general, depends on the socially approved 'composition' of elaborated forms, and these may become complex inventions and intellectually demanding. But a child enters the musical culture by having a natural talent for the 'outward signs of human communication'. The experience of music therapists, like that of parents engaging in musical play with infants and toddlers,

[1] This paper includes evidence for intuitive musicality presented in a group of papers published as a symposium, 'Rhythms, Musical Narrative, and the Origins of Human Communication', in *Musicae Scientiae*, The Journal of the European Society for the Cognitive Sciences of Music, Special Issue, 1999-2000, Liège: ESCOM. http://musicweb.hmt-hannover.de/escom

is that response to communication through improvisation of music does not relate to level of musical education. We believe the core phenomenon is a uniquely human motivation, part of our psycho-biological endowment that makes the cultural learning in companionship possible.

Music therapy is an intimate way of communicating impulses of the self that creates benefits by transforming an active and intimate relationship with a therapist. While the primary mode of awareness for the music therapist is aural, touch and observed bodily gesture also play a part in the reception of interpersonal 'presentations' that hold therapist and client in relationship. The subtleties of meaning passed between them link the channels of a multi-modal expression within a time experience that they may eventually conceive and organise together. The communication is possible because music is an expression of the quality of feeling in human movement, and because there is a strong innate impulse to share feelings. That the practice of music therapy depends, consciously, on both musical skill and clinical training is clear, but the features of expression that are managed and transformed in the course of a treatment are also appreciated at an intuitive level that defies rational analysis and that may not be consciously realised. This intuitive appreciation of how music therapy improves the emotional and cognitive well-being of the client can be enriched, we believe, by accurate information on the dimensions of musicality that are inherent in all human motives and feelings, and in their sympathetic sharing. Research on the acoustic features of vocal interactions with infants has brought out these fundamental features. We advocate a comparable analysis of music therapy practice to clarify how motives and feelings of the human mind are engaged and transformed in the course of treatment.

We present our findings in outline as a foundation for a theory of music therapy. Music therapy is effective in diagnosis and for monitoring the course of treatment in so far as it can be reliably described and measured without distortion or undue reduction. The experience of research with parent-infant communication, applying 'conversational analysis' and acoustic methods, as well as more general ethological or clinical descriptive categories, helps define what needs to be observed in a music therapy session, and in its consequences.

The Temporal Frame of Communicative Musicality

What has been called 'conversational analysis' (Jaffe and Felstein, 1970; Siegman and Felstein, 1979, 1987), in which films or video recordings of spontaneous or staged engagements between persons are subjected to refined measurement and statistical processing, has long been in possession of evidence that humans commonly interact with one another at great speed, synchronising in subtle and unconscious rhythms of exchange. This research suggests that our bodies express impulses of our minds in compatible dimensions, and that we are able to react instantly to one another's expressions, to reflect their motives. It is inadequate to call this communication 'non-verbal'. Bodily and vocal expression is so powerful in the management of human relations that it deserves a better name. Extending the metaphor, we call it Communicative Musicality. To do so is to return to the more comprehensive concept of human emotional and emotive activity contained in the original Greek word 'mousiké', which, as has often been pointed out, was applied to all the temporal arts together, not just that part conveyed in sound.

Coherent mind time, a central and most versatile product of whole brain activity, is a largely neglected area in the discipline of an increasingly rational and structural psychology. Addressing this lack of investigation of the role of time in cognition, and specifically in interpersonal awareness, Wittman and Pöppel (1999) postulate «a general temporal principle of inter-personal communication.» They argue, from psychophysical evidence, that human time, in both

perception and motor behaviour, rests on two principal frequency levels: 1. A high-level frequency of around 30 milliseconds, which is the minimum time interval necessary for us to perceive two events as separate. 2. A low-level frequency of around 3 seconds, which is responsible for our perceptual integration of events into 3 second units of the "psychological present".

Wittman and Pöppel go on to say how they see the role of timing in human communication:

> "The expressive and the perceptual side [of human communication] are both embedded in a temporal framework in which the contents are transmitted. Communication, therefore, can be characterised as an interplay of temporal information segments exchanged between two persons (or a group of people). These information segments are constrained by the temporal integration mechanisms of the brain." (Wittman and Pöppel, 1999).

So, humans appear to exhibit one and the same brain-based sense of organised time, and this perceptual organisation of time is responsible for our mutual exchange of "temporal information segments" as one person communicates with another.

Trevarthen (1999) proposes a wider range of time intervals as foundations for both purposeful co-ordination of movements of different scope and power, and for integration of perceptual experiences with those purposes, in conscious awareness of the psychological present, as well as in shorter intervals beneath conscious discrimination, and over longer times that must be created in memory and imagination. He and Aitken identify the generator of the time hierarchy as an integrated body-imaging core system of the brain. This Intrinsic Motive Formation or IMF (Trevarthen and Aitken, 1994), which forms among the cells proliferating the brain of a human embryo, persists throughout life as neurochemical affective co-ordinator and regulator of human movement and experience (Panksepp, 1998). The Intrinsic Motive Formation comprises a system of generators of neural and body-moving time which Trevarthen (loc. cit.) calls the Intrinsic Motive Pulse – or IMP. While Wittman and Pöppel are suggesting that human communication is an interplay of temporal segments, Trevarthen is proposing that our whole being – thought, emotion and movement – is bound up with a system of pulse generators that govern co-ordination of our bodies, which has "radical consequences for human imagination, thinking, remembering and communicating".

Sympathetic Musicality in Communication with Infants

Malloch proposes that the emergent human capacity for Communicative Musicality (CM) can be observed as an intrinsic organising principle in healthy parent-infant interactions (Malloch, 1999; Stevens et al., 2000). He proposes that CM facilitates turn-taking, regulates the pitch-contours of the vocalisations of both parent and infant, and inflects the timbre of vocalisations. Thus, Malloch hypothesises that the capacity to generate and participate in CM gives us our ability to be with an other person in one texture of time, regardless of age, and allows this time to be shaped into mutually satisfying narratives of interaction through the inflection of vocal and bodily gesture (Malloch, 1999).

We believe CM is favourably observed in early parent-infant communication because the meaning of words cannot play a role, and due to the infant's and parent's desire to 'attune' with each other (Stern et al, 1985). Parent and infant make use of the parameters of pulse, pitch-gesture and timbre-gesture, so vital to music, to form vocal narratives of shared emotion and experience. When parent and infant are communicating in a way satisfying to both, they are sustaining a co-ordinated relationship through time. In a similar way, we believe, when music therapist and client are communicating with sounds in a way satisfying to both, they too are creating a co-ordinated relationship through time.

Researchers curious about the non-verbal aspect of the mother-infant relationship have stressed the importance of intuitive 'sympathy'. The Papouseks describe the mother's specially attentive behaviour as 'intuitive parenting' (Papousek, H., 1996; Papousek, M., 1996; Papousek and Papousek, 1981, 1987). They conclude that parental sympathy for the infant's expressions is the essential external regulator of the infant's cognitive development responsible for the induction of the child into a culture, as well as the modulator of the infant's emotional states of arousal and physiological activity. Daniel Stern (1993, 2000) has pioneered a theory of the infant's 'dynamic emotions', and has described how the mother helps develop these into 'narratives of the experiencing self', giving the infant confirmation of consciousness, by reflecting, or, as he puts it, 'attuning to' the inner trans-modal or multi-sensory impulses of moving and noticing (Stern et al., 1985). He and his colleagues have microanalysed the delicate timing and synchronising of mother-infant exchanges (Stern et al., 1977). This work supports both a theory of self-awareness emerging in an emotionally supportive attachment relationship, and a formula for sensitive therapeutic practices. We believe that humans, of all ages, not just infants, need to have the impulses of sympathy attuned. They need to share experiences in order to help make sense of them. They need to feel pride in this accomplishment and to experience the admiration of affectionate, generous companions.

As noted above, parent/infant communication, as in the arts of dance and music, cannot rely on linguistic meaning. Communication takes place through the prosody of the infant-directed speech, the infant's participation in this (Trehub et al., 1993; Malloch, 1999), and the facial and gestural movements of both parent and infant (Fogel & Thelen, 1987; Weinberg & Tronick, 1994). Infants are capable of learning the sound of their mother's voice from before birth, and can recognise melodies and poetic verses that were presented to them pre-natally (DeCasper & Fifer, 1980; Fifer & Moon, 1995; Hepper, 1995). We have shown (Malloch, 1999) that infants as young as 6 weeks of age will participate vocally in the contours and regularities of their parent's vocalisations. This ability for an infant to participate in vocal regularities implies that at a very early age humans are able to sense regular time units. Young infants anticipate the timing and emotional quality of parental responses, and are highly sensitive to the contingency of these responses, as has been demonstrated in experiments which modify the natural sympathetic responses of a mother to whom the baby is attending (Murray and Trevarthen, 1985; Nadel et al, 1999). Infants are not passive recipients of a mother's instruction in 'conversational' turntaking.

The human way of perceiving and acting that is manifest at such an early stage of human life is, we propose, a regulator and generator of coherent and sharable experience — a cause of meaning. Non-verbal patterns of protoconversations and games with infants, which demonstrate a shared sense of time between adult and infant, clearly serve in cultural learning and, specifically, in the awareness and learning of natural, conversational language (Locke, 1993).

Measuring the Parameters of Infant Musicality

Communicative Musicality is defined by three dimensions: Pulse, Quality and Narrative (Malloch, 1999). The term was coined in work aiming to map out rhythms, forms and affective qualities in mother-infant vocal communication, from which examples of its occurrence are drawn.

Pulse

is the regular succession of discrete behavioural events through time, representing the process by which a subject may anticipate what might happen and when. The use of pulse in mother-infant interactions is shown in figure 1.

A spectrograph is a visual representation of the physical make-up of sound over time – the vertical axis represents frequency data, and the

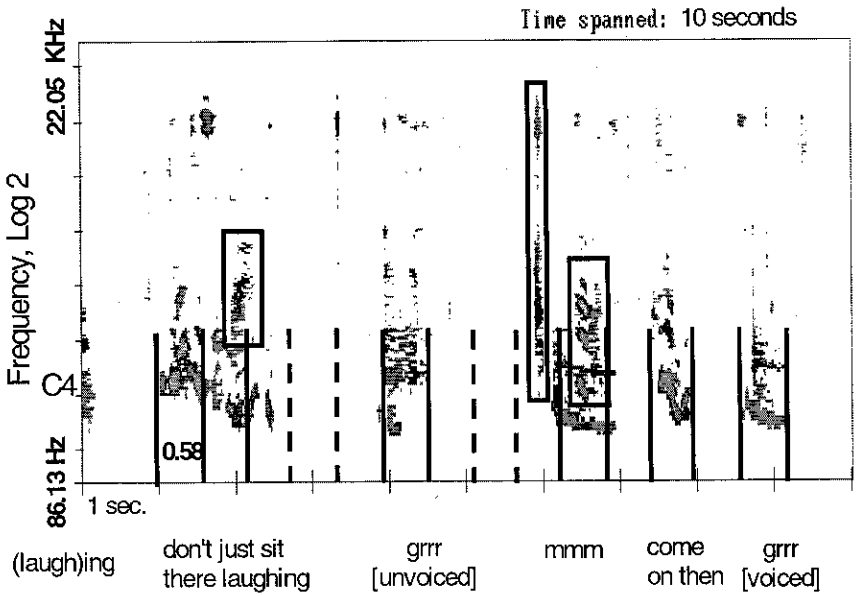

Figure 1. Spectrograph of 12-week old girl vocalising with her mother

horizontal axis represents time. It shows all the frequencies that are present as bands of energy, and is useful for calculating timing information regarding the gestures of the throat and mouth that cause the sound to vary. The spectrograph shown in figure 1 is of a 12-week old girl vocalising with her mother. The mother's words are placed below the spectrograph, and the infant's vocalisations are identified by placing a box around them. The 'bar-lines' show timing regularities in both the mother's and infants vocalisations – the interval between each bar-line is 0.58 seconds. Unbroken bar-lines mark regular time-intervals through the spectrograph that align with important aural events – the beginning of a vocalisation, the end of a vocalisation, and the change of direction of the pitch contour of a vocalisation. Broken bar-lines represent the continuation of the same periodicity, but which do not coincide with a vocal event. We can see that over this whole 10 second period the timing and the pitch contour of the mother's vocalisations fit into a 'bar-structure' of 0.58 seconds. The regularity allows both mother and infant to anticipate and share a single sense of the steps of passing time.

Quality

consists of the contours of expression moving through time.

In figure 2 we see a pitch-plot of another 12-week old girl vocalising with her mother – contours of changing pitch contribute to the quality of the expression. Pitch, which is a psychophysical derivative that corresponds to what is heard of the fundamental frequency of the physical sound, is represented by the vertical axis, and time by the horizontal axis. To distinguish between the mother's and infant's vocalisations, the infant's vocalisations have a box drawn around them as

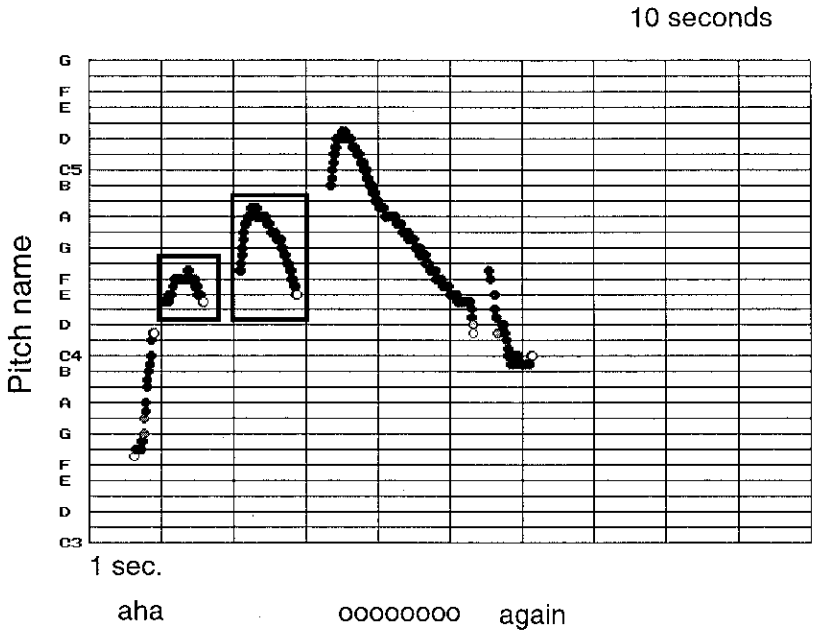

Figure 2. Pitch plot of a 12 week-old girl vocalising with her mother

before. A parent tends to listen very attentively to the pitch contour of an infant's vocalisations, and will usually respond 'appropriately' – that is, will respond musically. The parent may imitate the infant's pitch contour, or repeat it with variation – which is what we see here, the mother exaggerating the inverted U-shaped pitch contour of the infant. Or the parent may answer with a contrasting pitch contour. In a healthy parent-infant relationship, there will be a sense of dynamic balance between the degree of imitation and the degree of contrast in their vocal games.

Narratives

of individual experience and of companionship are built from the sequence of units of pulse and quality found in the jointly created gestures — how they are strung together in affecting chains of expression.

The narrative shape of the sequence of vocalisations by two mothers can be seen in figures 3a and 3b. In 3a the pitch changes of a mother vocalising to her 5-week old female infant are shown; in 3b we see a different mother vocalising to her 6-week old female infant (once more, the infant's vocalisations are enclosed in rectangles).

In both cases, slow changes in the energy or excitement are expressed, each mother's voice swelling to a wider range of pitch, then subsiding, over a period of approximately half a minute. In Figure 3a there are two of these cycles over a period of about 50 seconds; in Figure 3b, one cycle over a period of around 27 seconds. These slow changes form what seem to be 'emotional narratives' of pitch movement – reflecting the modulated Pulse and Quality of the vocalisations. Variety of pitch movement in the octave above middle C (C4) and this large-scale shaping of a parent's vocalisations appear to be common in

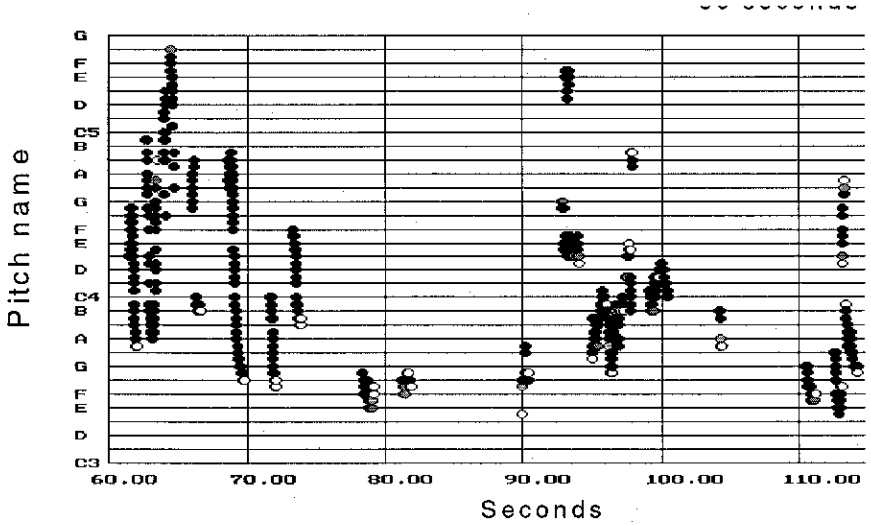

Figure 3a. A mother vocalising to her 5-week old female infant

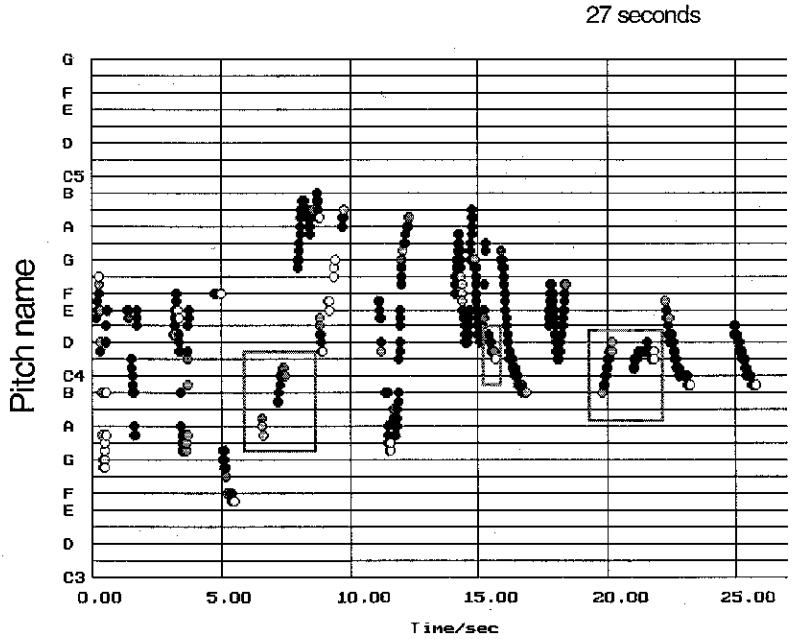

Figure 3b. A mother vocalising with her 6-week old female infant

situations where the relationship between parent and infant is secure and mutually satisfying. Mother and infant, closely attentive to one another, move together through the phases of expression.

In research investigating the effects of a mother's insecurity when she is an immigrant to a strange culture (Gratier, 1999), or the effects of maternal post-natal depression (Robb, 1999), it is found that the overall expressive coherence of interactions with infants is lost, and narratives such as those represented here do not appear.

The Moving Body in Relationship

We believe that the music-like behaviour that we have seen in play between parent and infant explains the motive sympathy generated in music therapy. We also believe that parent-infant musicality shows the same intuitive attraction as that which animates the music therapy relationship. For example, in casual observation by the second author of this paper of music therapy with very young infants in a Neonatal Intensive Care Unit, the therapist was seen to provide patterns of stimulation resembling those that a happy, observant mother would usually give – the training of the therapist enabling her to provide this stimulation under the very adverse conditions of environment and initial infant unresponsiveness. Thus, given the music-like nature of parent-infant interactions as seen in the previous examples, given that we communicate in 'temporal information segments,' in other words, given that the elements conventionally represented in music appear to be an intrinsic part of spontaneous human communication, it is to be expected that music therapy can be effective in enabling a client to express himself to, and with, another, especially in cases where the client is not able to articulate language, and has to find a non-verbal means of establishing contact.

We believe that music is therapeutic because it attunes to the essential efforts that the mind makes to regulate the body, both in its inner neurochemical, hormonal and metabolic processes, and in its purposeful engagements with the objects of the world, and with other people. Music, with dance and all the expressive arts, offers a direct way of engaging the human need to be sympathised with – to have what is going on inside appreciated intuitively by another who may give aid and encouragement. Indeed, Dissanayake (2000) proposes that all the arts are generated out of the processes of affective intimacy to be seen in parent-infant communication.

We have discussed the role of vocalisations in parent-infant communication, and drawn parallels with the therapist-client relationship. We have claimed that vocal and instrumental sounds and bodily gestures express a motivational Gestalt of communication in the therapeutic relationship. Let us now look at how bodily gesture seen, felt or heard may excite communication between brains.

The Expressive and Receptive Brain

Recent neurophysiological findings appear to have identified at least part of a mechanism that allows us to 'read' the movements of another. Neurones have been identified in the frontal cerebral cortex of both monkeys and humans that fire in association with particular goal-directed actions of the hands and mouth, rather than with the individual movements that form them. Furthermore, Di Pellegrino et al. (1992) have shown that a class of these same 'mirror neurones' fire when a matching action is observed being performed by an other. Rizzolatti and Arbib (1998) suggest that a mirror system represents in an observer's brain the actions of an other. The research concerns visually observed actions, but the principles of 'mirroring', or sympathetic motor response, are amodal, and are likely to apply to any other activity of an organ of sense by which the affective vitality or 'sentic form' of a movement may be apprehended (Clynes, 1973, 1980). It is significant that the frontal cortex is also richly connected to the motive system by which affects and anticipatory mind states are generated in the individual (Damasio, 1994). At our present state

of knowledge, it is impossible to estimate how far mirror systems are created by social learning, but it is known that frontal parts of the brain make a crucial contribution to the development of infants' awareness of other persons' intentions.

In the neuropsychological literature, a specific body schema device has been invoked to explain a variety of spatial disorders after brain damage, and Reed and Farah (1995) propose that this body schema is supramodal, applying to both visual and proprioceptive (body-sensing) inputs, being used both for encoding the body position of the self and the body position of the other. This finding supports the role suggested for mirror neurones, or more generally, and more accurately, extensive systems of 'sympathy neurones'.

There is experimental evidence that infants at three-months have an understanding of their body's inherent organisation (Morgan & Rochat, 1997), at five-months they can detect their limb movements through the co-ordination of visual and proprioceptive inputs, that toddlers have self knowledge of their body movements and their action capabilities, and that children know about their bodies' upright orientation from perceptual action system information (reported in Schmuckler, 1995). It has been shown that a child under 5 years is able to identify emotional meaning in expressive body movement, and its intensity (Boone & Cunningham, 1998; Van Meel, Verburgh & DeMiejer, 1993). The developmental growth of children's ability to decode the expression in body movement is directly related to their achievement of particular motoric skills (Bushnell & Boudreau, 1993; Lockman, 1990).

We suggest that these experimentally validated findings, dependent as they are on the maturation of the child's ability to make the movements defined as measurable responses, are built upon an awareness of the body as a moving and sensing whole that is already present at birth — that they are not charting the original formation of such awareness. Clearly infants are sensitive to emotions and their intensity, and two-month-olds are sensitive to the contingency, or appropriateness of timing, of a partner's expressive behaviours in protoconversation (Murray and Trevarthen, 1985; Nadel et al, 1999).

Embodied Emotional Expression, and Feelings of Relationship.

To mimic an other implies we are attentive to his or her behaviour. However, to abstract a communicative motive from that movement and to relay it back to the initiator in a changed yet emotionally appropriate form implies we are not simply mimicking, but creating an attitude or evaluation of what has been given to us by the other. In responding, some of one's inner emotional life is added to the relationship. It can move the relationship to one of companionship, which we define as the wish to share knowing and skilful action with an other, not just a dependency on comfort and care. Companionship requires exchanging feelings that accompany the effort to co-operate by sharing impulses of motivation (Trevarthen, in press).

Stern explains what he observes in mother-infant interaction with a theory of 'vitality contours' and 'affect attunement'. Affect attunement is the mechanism by which vocal and body gestures (which express vitality contours) carry emotional meaning in parent/infant communication – it is "the performance of behaviours that express the *quality of feeling* of a shared affect state, but without imitating the exact behavioural expression of the inner state" (Stern et al, 1985, our emphasis). Affect attunement is a multi-modal or trans-modal phenomenon, in which the affect of a vocal and/or bodily gesture is attuned to by another and expressed in a different form from the original. According to Stern, this largely unconscious 'recasting' of events is necessary to "shift the focus of attention to the quality of feeling that is being shared."

For example, an infant excitedly vocalises an upward then downward pitch movement, and the mother smiles and moves her head with the vocalisation so that the tip of her nose describes an inverted-U. This attunement of body movement

to the vitality contour of an expression by the other can also go the other way — infants, even newborns, may attune to the expressions of their partners in communication. A remarkable example of this is given by a 5-month-old baby, born totally blind, who, without prompting or training, and, indeed, without her mother being aware of her graceful rhythmic gestures, conducts portions of the melodies of famous Swedish baby songs, "Ekorr'n satt i granen" and "Mors lilla Olle", with her left arm and hand. Her mother is singing for her while giving her the bottle. Microanalysis of the video reveals a marvellous instinctive performance of transmodal musicality, which suggests that the infant is making an original performance with parts of her body she has never seen. Performing gestures that creatively complement the mother's song, she raises her arm and spreads her fingers as the verses swell in excitement and drops her closed hand at the wrist when a stanza ends (Trevarthen, 1999). She is not slavishly imitating any structure — they are performing an audible/visible duet together in harmony. The baby hears the mother's song and moves with it, and the mother is unaware of her clever partner's dance.

Stern would say that the vocalisation and the mother's expression and head movement, or the mother's melody and the blind baby's gesture, share the same vitality contour, composed of the amodal qualities intensity and timing. This same theory can explain how the bodily gestures of both music therapist and client can convey affect, and how communication with a deaf-blind child can be mediated by other senses (Tønsberg and Hauge, 1996). In Stern's concept of 'intermodal fluency' (Stern et al., 1985) (Stern, 1985/2000) we find the image of a single 'flame' of vitality, an animus at a person's centre causing vocalisations and bodily gestures to be part of the same complex of non-verbal affective communication. The interplay between vocalisations, sounds and bodily movement is the medium of the music therapeutic relationship.

Conclusion: Conflicting Interpretations, and a Fundamental Theory of Music Therapy

We believe that the dominant cognitive theory of psychology, and its contemporary elaboration in 'evolutionary cognitive neuroscience', gives a partial, and reductive, explanation of human communication, and music in particular. Attention to the intricate technology of Western musical culture – in musical scores, the instrumental or electronic production of musical sounds, and in highly cultivated and skilled expressions of musical art – can obscure the fundamental impulses that make humans communicate with musicality. In like manner, a rational focus on the structure of human language through logical and statistical analysis of perceptual and cognitive processes hypothesised to explain text syntax, or phonological patterns, tends to lose sight of natural motives for communication expressed in the melody and rhythms of bodily gesture, a talent that Merlin Donald calls 'mimesis', a cognitive and communicative ability that he considers to be the evolutionary precursor for language in hominids (Donald, 1991).

We use the term 'musicality' to distinguish the underlying forms and qualities of expression in time that characterise and give meaning to all kinds of music – sung, or performed on instruments. Pinker (1994), who dismisses the idea that music could be a natural human activity in any way comparable to language, and others who conceive artificially made music as just a spin-off of supposed foundational cognitive processes, miss the motivating source of communication. All musics speak to human motives that move the body and express a communicative will. All humans have this music (Blacking, 1976).

The quantitative evidence assembled in experimental psychology is necessarily artificial — it tends to treat the mind 'out of body', 'out of time', 'out of emotion', and 'out of ordinary working experience' and 'common sense' (Damasio, 1999). And it does not fit with what we know of the design of the whole brain, and the

dependence of cognition on the animations of emotion (Panksepp, 1998). It encourages the idea that development of the human mind is a gradual accumulation of representations of processed experiences, driven by rather limited biological and self-regulatory motives.

A psychobiological account that comprehensively takes account of the natural history of human personalities and their relationships in everyday life, and that observes the abilities of young children for communication of all kinds of purposes and interests, and not just for language and rational problem solving, brings a different view. The spontaneous vitality in infants' movements, and their sympathetic engagement with movements of others through a preferential awareness of human signals in their natural dynamic form, shows that the early stage of human psychological growth is powerfully motivated by needs in the human brain that anticipate sympathetic human company. This readiness for human company has great generative or creative power. In normal happy circumstances it drives rapid learning of culture-related skills, including language — it makes sense of education. But, the emotions involved in establishing shared human understanding and trust in relationships also bring risks, if the anticipated support is not forthcoming.

In his search for understanding of unconscious emotional factors in human mental health, Freud remained a rationalist. His therapy puts great reliance on language and cognitive appraisal. He did not study or understand the emotions of infants, and psychodynamic theory has, we agree, generated elaborate intellectually taxing meta-theories of the dependent state of the infant psyche. Daniel Stern (1985/2000) has a very different conception of psychiatric problems and how to treat them, one that does not deny the role of language and symbolic thought in the adult mind, but is informed by detailed observation of the dynamic 'vitality affects', and the 'narrative envelopes' that characterise rich and creative play between parents and children. His theory naturally appeals to those who find the non-verbal processes of improvised music therapy effective in eliciting and guiding powerful emotions.

Music is much more than just 'non-verbal' or 'pre-verbal,' and its use in therapy is based in the life-long human trait of creating companionship with another by structuring expressive time together – not by music appealing to a pre-verbal stage of human development that is especially vulnerable to psychopathology. It is not, we would add, a cognitive by-product of a language instinct, or riding on the back of an evolutionary drive for inclusive fitness, survival of selfish genes and parent-offspring conflict, as appears to be argued by Kennair (2000).

We have described possible mechanisms that may explain how the relationship between music therapist and client can be firmly based solely on contact by sounds and gestures, without the need for words. We recall that this use of sound and gesture is transparently evident in the parent-infant relationship, and that the infant cannot use the meaning of words to regulate and maintain the relationship. Therapy by 'conversational improvisation' of music is an art and clinical technique that directly addresses human intersubjective feelings and expressions in time. Its strength for both diagnosis and treatment of human difficulties in emotions of relating and pride in self-actualisation derives from its deliberate acceptance of innate human motives for collaborative creation of meaning with emotion. It gains confidence as scientific evidence accumulates for the rich sympathetic impulses in all human beings to make expressive movement, and for sensitivity for the emotions that regulate all action and experience. Musical sound, sympathetically shared, is capable of engaging and supporting these motives and emotions with persons of any age or state of mind, as recent publications richly demonstrate (Aldridge, 1996, 1998, 2000; Alvin and Warwick, 1991; Ansdell, 1995; Boyce-Tillman, 2000; Pavlicevic, 1997, 1999; Robarts, 1998; Tønsberg and Hauge, 1996; Wigram and De Backer, 1999a,b). It communicates a dance of human wellbeing, an activity that taps the musicality of both therapist and client. It is dancing with the impulses of our humanness that facilitate compassion for rage and sadness, as well

as the joy of human company in action and understanding.

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