Music therapy and neurological rehabilitation: Recognition and the performed body in an ecological niche.

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Traumatic brain injury is a major public health problem and an important challenge for neurological rehabilitation (Mazaux and Richer, 1998). Neuro-degenerative diseases are also an enormous public health problem (Brookmeyer et al., 1998; Hendrie et al., 1995). Interventions that can even modestly offer recovery or relief will have a major public health impact. We see a common core of loss of bodily integrity, failed cognitive competence and the demise of emotional coherence. To this we must add the potential for social isolation that deterioration or injury brings, and isolation is the road to despair. We do not suffer alone; these losses have an impact upon family and social life (Aldridge, 1998).

While there are numerous projects aimed at finding medical relief of suffering and the treatment of injury and disease, we are reminded that these problems are also illnesses. Behaviour is influenced. We are challenged as a society that people within our midst are suffering and it is our responsibility within the delivery of health care to meet that challenge with appropriate responses. A major confrontation for patients is that they awake the deepest fears of a consumer success-oriented society. Decline, physical and mental, is not readily faced within communities that expect youthful appearance, worldly success and physical ability as the outer signs of acceptable personhood (Aldridge, 2000b). Any adjuvant therapies that will address these factors of isolation and acceptance will offer a significant part of a modern treatment strategy in neurological rehabilitation. The expressive arts therapies are to be considered as a part of this strategy.

In this paper I will discuss the difficulties faced by patients in neurological rehabilitation. Essentially we are talking about people confronted by minds and bodies that are failing to perform as previously expected. This situation is for them and their families distressing (Gervasio and Kreutzer, 1997). The expectations will be that those persons will be indeed re-
habilitated; brought back to perform their previous habits or, from the mediaeval root *habilitare*, rendered fit again. Fit is a useful metaphor in this context, as I want to use the word as “fit” in an ecological sense. Our sensory organization must fit into the ecology of the person and the person in his or her environment (Aldridge, 2000b).

How experience is unified and organized is a central question. Behavioural integration is the key to experiential unity that opens the lock of mutual performance necessary for relationship. The experiencing person is not simply a set of brain activities but an embodied mind actively engaged with an environment, the ecology of events and ideas that we call consciousness (Aldridge, 2000b). We experience ourselves as active embodied beings intimately connected with the world as we act upon the world. And we too are acted upon. Habit is necessary as it leads to an economy of consciousness, that “the process of habit formation is a sinking down of knowledge to less conscious and more archaic levels” (Bateson 1978 p114). We do not always need to know how we perceive, simply what we perceive. In the process of rehabilitation, we must resurrect these habits to achieve the next levels of consciousness including cognition. Thus the return of gesture, as iconic communication, will be a singular step forward along the road to recovery.

What I will be proposing is that movements are generative of complete sequences of interactions that promote cognition. Perception and action are interwoven as activities. In the network of pre-motor actions, there is a repertoire of possible actions and action must be selected. Attention is necessary to perform an action. Performance focuses attention, thus the emphasis on music therapy as performance; a setting of musical activity that promotes attention from which meaningful coordinated sounds can be performed. In this sense, memory is a state of consciousness brought about by movement and integral to the developmental process.

Performance, movement in a temporal and relational context, will be a central concept at the centre of my thesis. Indeed, as I have written elsewhere, my contention is that we are improvised performed beings; that is, we realize ourselves in the world, mentally, physically and socially as performances *in* time and *of* time (Aldridge, 1991, 1999). What we see in the process of the neuro-rehabilitation is a restriction in performance of movement, of communication, of thinking and, for some, being a whole person. My contention is that music therapy promotes performance and retains residual performance as long as possible.

Memory is crucial to the process of human development, vital in theregaining cognition and central to our concerns about neuro-degenerative
disease. The foundation of memory is the coupling of events in time as an adjunct to bodily action. Through movement we have that tension of consciousness we call memory. Through memory we transcend our abilities beyond behavioural responses to those of an individual identity brought into dialogue. We are active in the world and perform that world. In the development of performance we move from habitual movements to those of choice, this is the development of consciousness and occurs in stages. Indeed, we recognise the world. Recognition is not simply the act of recognising others, but re-cognising ourselves in the world with others. Cognition, in this sense, is a achieved as an activity through dialogue beyond habit. We may wish to consider re-cognition as a sub-set of re-habilitation. And recognition is a dynamic process of adaptive relationship. We modify ourselves and others, as they in turn mutually modify us and themselves, through interaction. Even in the severely disabled, the possibility of action remains.

The videotaped examples that I will show you are taken from therapy sessions where there has been severe neurological damage, where there is a recognized communication disorder, or from therapy with elderly patients suffering with various dementias. In most of these examples I will be showing performances where communication abilities have been assessed as being severely impaired. Indeed, in many of the examples patients cannot speak. But my contention is that they can, and do, communicate even without speech. Of course we have the concept of non-verbal communication. What I intend to show are the elements of that communication and the way in which such components prepare the way for verbal communication.

Furthermore, I intend to show that some of the symptoms that we see as of failing performance are, in the context of a performative paradigm, an attempt to achieve communication and an attempt to achieve cognition. The first time that I was alerted to this is in a small study that we completed with developmentally-delayed children (Aldridge, 1996). After music therapy, all the children scored on the cognitive ability sub-sections of a child development rating scale, whereas some had previously failed to score. On looking through the tests, the statistical interpretation of repeated measures showed an improvement in relationship scores, in hearing and hand-eye coordination. Music therapy is about these elements; the therapeutic relationship, within a specific hearing/listening environment involving the active performance of sounds using integrated movements, which promote development.

Essentially I will be arguing that the basis of human communication is musical. We know that the essential properties of human understanding regarding verbal communication are speech prosodics; tempo, timbre,
Volume and pitch. This is how we interpret the meaning of what people say to us, particularly in regard to emotional content. At the centre of recovery in rehabilitation is the problem of timing. Timing, I hardly need to add, is a central feature of musical performance (Aldridge, 1994).

The problem remains of how do we know that the other person is communicating or attempting to communicate? Again I return to our work with children where the coordination of hand and eye movements as gesture, in a listening environment of musical performance, where central to achieving communication. We also know from studies in child development and the study of communication in primates that gesture as a foundation of communicative ability. Gesture as a communicative essential brings, however, a dilemma. While we can see and hear what others do, and this is important for understanding, it is precisely the elements necessary for gesturing that begin to fail in neuro-degenerative diseases or are misplaced after a neurological insult. Timing is lost and movements fail to be coordinated, thus communication fails. However, we know from previous studies, that music therapy has the potential to promote coordination such that communication is achieved (Aldridge, 2000a).

**Breath, rhythm and consciousness**

In an intensive care situation, it appears that patients lose their own agency, the ability to perform intentional acts. That intentionality necessary for life becomes disoriented in time and space; the rhythm of breathing and consciousness is lost. For patients seeking to orient themselves then the basic rhythmic context of their own breathing is the focus for that re-orientation. Intentionality in human behaviour may occur even when consciousness appears to be absent, there are still vital rhythmic processes present.

We can speculate that the various body rhythms have become disassociated in such comatose states. The question remains then of how those behaviours can be integrated and where is the seat of such integration? My answer would be that it is breathing that provides the fundament of human communication, and it is the organisation of breathing, as performed in singing, that is the major agent in therapeutic recovery.

Central to the act of breathing, and in terms so healing, breathing together, is the concept of performance in the subjective now. The coordination of human activity that lends itself to the coherence that we experience of being healed is dependent upon a temporal concept. Time is structured and breath is the scaffolding of time in which the present is constructed.
The construction in time, that we call now, when extended, is the basis of cognition. That is how music therapy works, it offers a temporal structure for events that facilitates cognition.

At the heart of this temporal coherence is the rhythm of breathing, Through the control of breathing we achieve coherence. For those disorientated in time, then they become oriented through that non-material activity of breathing, although the material necessity of gaseous exchange is present. This is why some scientific approaches appear to be coarse as they concentrate on the coarse elements of breath not on the subtle qualities, and why some of us refer to the fact that patterning is what lies behind the explication of the pattern.

Time and space

To act in the world we need the vital coordinates of time and space. We exist in the now and here. While we consider chronological time as important for what we do in terms of co-ordination, it is the idea of time as kairos that is significant. If chronos is time as measured, kairos is time considered as the right or opportune moment. It contains elements of appropriateness and purpose; that is, intention. Inherent within the term is the concepts of decisiveness, there is tension within the moment that calls for a decision. In addition, there is also the expectation that a purpose will be accomplished. Rhythm demands intention.

Patients in rehabilitation are often prisoners of mechanical time. They have not a chronic illness but a kairotic illness. While the various physiological elements may be in place, initiation of those activities to promote coherence cannot take place, Acts cannot be brought into being and therefore purposes remain uncompleted. In this way, being in a coma is not something that makes sense, it is something that no longer makes time. Sensory abilities may well be present but they have no context of coherence. While sufferers are in time, as chronological events amongst the rest of the world and its myriad of happenings, they are no longer of time. Mentation for the coma patient is a kairotic process not solely understandable as chronology. Dementation is the decoupling in kairotic time of physiological events. Achieving consciousness then is becoming in time, and this is facilitated by the intentional breath of the healer. In this way, physiological events and psychological events are woven together into that fabric we know as memory. The warp of which is time.

Maintaining dialogue

Communication is based upon linking behaviours together, our own and those of others. This dialogue, which constitutes a sense of coherence to what we are as “selves”, is narrative in nature. It is personal and social. If this breaks down then we lose a sense of meaning for ourselves, and we lose
meaning as a person in a social context. We lose the meaning of what we do and what we do with others. What we do literally makes no sense; this is the process of de-
m entation.

The maintenance of meaning on an everyday level demands a sense of coherence between events (Crossley, 2000). When disorder happens, then coherence must be rebuilt. Music therapy is one was of establishing a short-term coherence and thereby of re-establishing identity (Aldridge, 1989). Meaning is an activity; it demands a temporal structure of connectivity and relationship between events that we call consciousness (Aldridge, 2000b). Trauma, whatever its sources, disrupts this coherence and the horizon of time is limited.

A subjective sense of self is dynamic and multi-faceted composed of interactions within the individual and with others (Lysaker and Lysaker, 2001). Thus, the existence of self is dependent upon a rich context of dialogical interaction. This is what fails in dementia, and it fails progressively. My contention is that we may speak of dialogic-degenerative diseases as much as neuro-degenerative disease. The restricted communicative environments in which people find themselves further compound the stigma of dementia, and indeed of chronic illness. A therapeutic environment will necessarily promote a rich diversity of dialogic possibilities sensitive to a broad range communicative possibilities; therefore, the range of creative arts therapies including music therapy, art therapy and dance/movement therapy.

Through dialogue we achieve the social. While many authors predicate dialogue on language, my argument is that dialogue is performance like music. It is common play together that overcomes our differences and promotes plurality. Gurevitch (Gurevitch, 2000), writing about dialogue, emphasises that when dialogue breaks down it does so in silence. However, for music al communication, the very core of performance is the tension between sound and silence. Gurevitch writes,

“..the possibility of dialogue as poetics where the plurality of sociality is informed by the breaks of conversation” (p247).

I would reinterpret this as

“..the possibility of dialogue as performance where the plurality of sociality is informed by the pauses of play”

Silence, is the basis for the meaning of what becomes evident. What makes sound and silence coherent is a sense of time. When timing fails then we loose coherence. Melody then will become the mutual topic of communication and provide a state of closure for the discourse; it is achieved in the betweeness of the participants and is the manifestation of the social. If language influences
the self that we present, then certain linguistic forms will influence the discourse that we use. For our patients with a severely curtailed repertoire of linguistic resources, then we are challenged to provide them with a rich communicative repertoire, that is, musical. An enhance repertoire of musical resources will promote a variety of potential discourses.

What music therapy offers for the patient is a voice from out of this silence. I am using voice in a broad sense here; as utterance, as gesture, as beat on an instrument, as tone. It is through voicing ourselves that we achieve recognition by others and that we recognize the presence of others. I use “re-cognise” deliberately here as pointing to the achievement of cognition. But we need a site for these voices to perform; these are the dialogues in context. When we limit the sites of these performances then we impoverish the possible dialogues and restrict the ability of patients to achieve their “selves”. Dialogue then is existential and necessary for the achievement of health in the sense of becoming whole (Aldridge, 2000b).

Dialogue is not simply given, it has to be achieved and negotiated. And meanings within this dialogue are never forced. We are constantly involved in interpreting the meaning of what others are doing. We do this constantly in clinical practice, first in diagnosis as understanding what the problem is, and then in understanding what is happening through the course of the therapy. These negotiated meanings are fragile, and performance has to be maintained in its mutuality. While we talk of degenerative disease, we must also be aware of the adequacy of our own performative abilities in the context of our therapeutic dialogues such that we are adequate in our performance to meet the needs of others. This performance is based upon what we as practitioners bring to the dialogue as an ability to exist in time; the expressions on our faces, the postures of our bodies, the repertoire of our utterances, the prosodics of speech.

When dialogue fails then we have alienation and despair (Aldridge, 1998, 2000b). The maintenance of the self degenerates through isolation, as I mentioned earlier we have the potential for dialogic degenerative disease. Patients may be forced into a silence that they have no possibilities to neither transform nor structure, they are banished from the social to an isolated and degenerated self.

To resume dialogue however is to achieve reciprocal recognition (Gurevitch, 2001). We invite communication and require the “yes” of participation. This is exactly what happens in music therapy, there is an invitation to participate. It is in the performance of both parties that we have the dynamics if interaction. To achieve plurality, we need two voices (Gurevitch, 2001).
We have then a shift from the self to the other, the act of mutual recognition. Achieving cognition is not simply a personal act. It is social.

Rehabilitation and the family; a communicative context

In addition, we do not live our lives alone, and that means we have to enter into dialogue with others around us. That is what communication is for. Communication is not located in one person alone, we have to establish communicative relationships. Music therapy is a prime example of how, when speech fails, we establish meaningful communication and interpret what the needs of the other are. This is essentially an hermeneutic; the interpretation of meaning and is not restricted to a verbal competence. For those seemingly with damaged capacities, we can retain significant communication such they can express themselves and such that we can understand each other.

In Gervasio and Kreutzer’s study (Gervasio and Kreutzer, 1997) describing the psychological distress experienced by live-in relatives of people with traumatic brain injury comparing the distress of spouses with that of other relatives, family caregivers of people felt alienated, isolated, overwhelmed, and mentally preoccupied. Spouses experienced more distress than parents. Bos (Bos, 1997) has suggested that coma stimulation as a treatment in which a health care professional or a patient's family member systematically applies stimulation to one or more of the patient's five senses for the purpose of increasing patient responsiveness. Furthering this field of stimulation and responsiveness, but concentrating on auditory stimulation, music, the voices of family members and friends have been used as interventions (Jones et al., 1994; Seibert et al., 2000). My argument is that music therapy incorporates these elements of relationship, sensory stimulation and appropriate response in a systematic manner based upon the developing communicative needs of the patient as consciousness changes and cognition is achieved (Aldridge, 1991; Aldridge et al., 1990). Communication, in this perspective, is not located within the individual but is an interpersonal phenomenon.

Utterance

When the means of producing language is in the process of being lost then we become aware of the restricted means of presenting self. Music therapy is a means of producing communication and it is based on gesture, which is the basis of communication in a variety of species. We know that communication without language is possible in primates (Bond and Corner, 2001), for example. An essential feature of gesture is the concept of “utterance”. We do make sounds outside the range of lexical language. Utterances are linked together in a grammatical form such
that meaning is understood. This linking together as grammatical form in time is the basis of song and we are able to understand the general meanings of songs sung in other languages.

Structure, as form, is a way of schematising experience and this is the way that we learn to think. We achieve cognition through linking together events in time; it is the achievement of memory. We link sounds together into phrases, and this is the basis of musical meaning in that sounds begin to function as music when we discern a structure between the tones. Utterances then are a positive sign of the producer attempting regain cognition, to mentate out of the de-mentation by providing an expressive cue to an underlying temporal dynamic. The task of the other person present, and certainly the music therapist, is to recognise this temporal dynamic and structure a mutual participatory performance.

A quality of utterances, and many gestures, is that they are spontaneously expressive. With demented patients, the challenge of therapy is to move from the spontaneously expressive to the performatively reflexive utterance that is intentional. It is a mutual shared temporal dynamic that offers a structure for spontaneity, which allows repetition within musical form, and thereby focuses attention and the possibility of regulation. As with all acts there is a constitutional aspect - what this event means-and a regulative aspect – what is to done next as a meaningful response. Thus utterances become articulate.

A fundamental property of mental ability is that is explicated in verbal and musical expressions, gestures and bodily expressions. As we have seen earlier, understanding is achieved through performance. The body is active in the world to open up the world and belongs to the world. Illness becomes a restriction of this bodily presence and thus restricts both presence in the world and understanding (Svenaeus, 2000). The challenge of music therapy is the challenge that we all face, how to establish the pattern of meaning.

At the heart of this understanding is time. Time is the how of events being organized and is the attribution of meaning to change (Tabboni, 2001). How we perceive time is multi-faceted, it is part of our personality and part of our culture and achieved in our relationships. We have various modes of understanding time and in neurodegenerative diseases these are restricted. In Parkinson’s disease we have a disruption of time and its expression in emotion (Kremer and Starkstein, 2000) and movement (Thaut and McIntosh, 1999), in Alzheimer’s disease we have a loss of memory and of fluency (Aldridge and Aldridge, 1992; Aldridge and Brandt, 1991). The phenomenon of “sundowning” in dementia patients is a physiological change where that time structure is lost that coordinates
activity and temperature (Volicer et al., 2001).

The coupling of the neural system, the musculo skeletal system and the environment demands a coordination of temporal dynamics. There are scale relationships of time dependent upon biological events; muscular, cellular planetary, galactic. Behaviour is temporally structured and it is in the organization of time that we synchronize our communication. Anticipation of events and coordinating responses demands a temporal dynamics based upon attention (Keijzer, 1998). Anticipation of events is central to playing rhythm with another person and we see this in the mutual playing of improvised musical playing where even severely disabled patients have the ability to anticipate events and coordinate their behaviour within a context of a flexible temporal dynamic. We are speaking here of musical time that I itself is flexible as performed, not the chronological time of a machine.

**Gesture**

In therapy we have a performed dialogue. The body is central for interaction. We perform most of our action sin daily life without reflecting on how we do it. Everyday skills are the basis of the knowledge that we need to perform our lives. Knowledge is done. It is based on interaction with others and is the background from which we achieve understanding of what others are doing. Therefore, the performance possibilities that we offer others will enhance the abilities that they have. Relationship in this sense is not going to be based upon what we say, but what we do.

Gesture is a central feature of a communicative setting for the ecology that we call understanding. If there is a breakdown in the background, when relationship fails, then the mutuality of time is lost, events lose their context and we become isolated. We literally fall out with each other, fall out of time and thereby, understanding. This is the process of becoming isolated. To repair performance, then we have to offer a structure in time. Structured time is precisely what music is in all its myriad of styles and possibilities for performance. For those losing cognition, or struggling to regain cognition, then the achievement of musical form is the basis of an enhanced cognitive ability. In coma patients, this is the regaining of levels of consciousness (Aldridge, 2000b). Within our varying cultures we have repertoires of performance suitable for promoting understanding, the challenge for us as practitioners is to expand the repertoires of treatment necessary to achieve competent performance for those suffering with neuro-degenerative diseases.

We know that non-verbal behaviours like hand gestures convey important information and are a rich source of unspoken knowledge (Breckinridge Church, 1999; Goldin-Meadow, 1997, 1999, 2000; Mayberry and
Jacques, 2000; Mayberry and Nicoladis, 2000). They are robust across cultures and are used by people of various ages. Not only do they reflect understanding, they also shape understanding. Like utterances, they are an attempt to regain cognition; they are used to inform the listener of the state of the expresser. We judge intentions by gestures. In children gestures signal that a particular notion is available in the repertoire of understanding but not necessarily accessible to speech. However, for the elderly, we can see that a concept is retained in the repertoire but no longer accessible to speech or conscious reflection. Gestures also allow expressions that do not easily fit into a categorical system but still reflect aspects of the performer’s state. This eases the cognitive burden and for the understanding of emotions allows the performer to achieve emotional expression without prematurely labelling that emotion, in giving the emotion a particular valence.

**Setting and performance**

How we perceive sounds as music or noise is dependent upon culture. Art productions are a ritualised form of performance, as are some clinical encounters. Yet, the everyday stuff of life is improvised. How we participate in these performances, and understand what is happening, is a matter of culture. Culture too is performed.

One of those influential cultural aspects will be the setting within which the performance takes place. Thus the setting of the home, the clinic, the day-centre, the hospice, will be important for the understanding of the performance.

The nature of this performance too will be dependent upon the engagement between the performers, and this is inevitably emotional and sensual (Smith, 2000). Emotional relationship is a way of understanding the world and this is absolutely central for the sufferers of neuro-degenerative disease. We have the massive problem of agitation in demented patients, and the confounding problem of depression throughout the broad spectrum of disorders. Music therapy, with the cultural aspects of emotion and sensuality related to music, has an important role to play in relieving the suffering of these patients.

Musical performance does not cause feelings but is the embodiment of feelings given form. That is why music therapy is important for demented patients in that it offers a form for interaction. Feelings regain their shape such that they can be initiated, formed and resolved. The ideas of emotions achieving closure is important that it emphasises performances that are bodily satisfying, if not intellectually satisfying. What cannot be articulated in speech can be expressed through music, primarily because the medium of musical
performance is that of organised perceptions and related actions. The basis of human intimacy is the coordination of understanding between self and other. For infant and mother, it begins as a mutual dialogue. Such dialogues also occur for adults and we simply have to extend our repertoires of caring such these can be achieved. Music therapy is one form of acceptable intimate dialogue.

If our bodies are the source of musical performance, then disruptions in kinesis, rhythm and hearing will disturb that performance. The goal of therapy will be to restore the organisational property that binds these sources of performance together, such that coherence of the whole person can be achieved once more. This binding, organizational property is time experienced as musical form.

Gestures also boost activation levels and are involved in the temporal structure of thinking (Alibali et al., 2001; Alibali et al., 2000). We see this in the simple beat movements when people listen to music. Even when people are talking on the telephone they gesture. The use of gesture also modulates responses to sensory input. Where agitation is a problem then gesture is an attempt to regulate arousal, either as an over sensitivity or as mentioned earlier to boost activity. Sensory integration, including proprioception, demands an adaptive response if communication is to take place. Integration requires arousal (maintaining alertness), attention (ability to remain focussed on a desired stimulus or task), affect (emotional regulation) and action (goal-directed behaviour as praxis in planning behaviour).

For patients in neurological rehabilitation, it is imperative that sensory integration is promoted as soon as possible and that this integration can be practiced, maintained and achieved through active musical play. For the active synchrony of neural events then a pattern of strong signals has to be established and this demands orientation with focussed attention with a conscious discrimination of auditory events Carrollphelan, 1996 #296] (Engel and Singer, 2001).

Robertson et al. (Robertson et al., 1997) write that insufficient attention to tasks can result in slips of action as automatic, unintended action sequences are triggered inappropriately. Such slips arise in part from deficits in sustained attention, which are particularly likely to happen following frontal lobe and white matter damage in traumatic brain injury.

Mood regulation

“It is not the affect that regulates people rather than people regulating their affect” (p210) (Erber and Erber, 2000).

A central feature of our emotional lives is the ability to regulate our emotions (Larsen, 2000). Indeed, when such regulation fails, then we
take it as a sign that something is going wrong and in the extreme, we suspect a psychological disturbance. Affective states also influence attention, alter the way in which we perceive the world and influence our social relationships. Emotions are expressive, and we achieve this expression through gesture, postural changes, facial expression and the use of voice. It is not what we say, but the way that we say it that indicates our emotional state and intentions. The musical parameters of communication indicate emotional valence.

Emotions are bodily events that have shape and duration. How these events are regulated on a daily basis is also a matter of ecology balancing our personal environment and the social world. Although we consider our emotional life to be personal, it takes little persuasion to convince us that it is our lives with others that has and influence on those emotional reactions. When we fail to interact satisfactorily with others, then a source of emotional regulation may also fail. If we lose attention with both external and internal events then there is loss of feedback and the potential for emotional disregulation. We need to know, for example, the difference between a current state and a desired state. This is a cognitive activity. The linking of emotional events to understand the profile of an emotion is a matter of time. The ability to express emotions is important but also the facility to inhibit emotions forms the profile of our everyday lives. Choosing the form of an emotion, in terms of expression and inhibition, is necessary for appropriate emotional articulation.

In dementia of the Alzheimer’s type, agitation is a problem of emotional expression. Agitation being a state of emotional arousal, that fails to achieve a satisfactory emotional form, that appears to have no potential for inhibition and thus no closure as an emotional form.

Motor mimicry is an essential feature of empathy and understanding the other person (Neumann and Strack, 2000). Facial and postural expression influence emotional expression. Thus the perceptions of another person’s behaviour may activate the same action codes within the observer that generate that behaviour. Thus, how we approach the demented is important in the way in which they will respond. Imitation is a feature of musical play and used in improvisation.

We also judge the expressive behaviour of others to know something about ourselves. The vocal expression of emotion embedded in the speaking voice is a powerful indicator of relationship and promotes a response. Expressed emotions promote congruent mood states in the listener; therefore we have to be as careful about how we say what we do as what we say. In music therapy, the use of timbre is central to emotion expression, as it is in the performance of operatic arias.
Cohen-Mansfield (Cohen-Mansfield, 2000) writes of the need to recognise the unmet needs of dementia patients where symptoms may be an attempt to alleviate need (pacing provides stimulation), agitation may be an over-expression of emotional arousal), that symptoms may be an attempt to communicate needs, and that behaviour may represent the outcome of an unmet need (crying from pain).

Children and adolescents who sustain brain injuries may also experience episodic agitation during the course of their recovery where agitation may be the direct effect of the neurological insult itself, as well as the child's response to physical pain and to his or her confusing surroundings. Later during the recovery process, agitation may occur in response to increasing demands made of the child and in response to feelings of loss. Agitation in children is a communication and attempts to provide the child with comfort, support, and alternative ways to communicate help. If health care staff and family members understand the underlying factors driving agitation, and recognize it as a transient phase of recovery, then the broader treatment strategy is enhanced (Deaton et al., 1995).

Nurses and music therapists have emphasized the benefits of music (Ragneskog and Kihlgren, 1997; Thomas et al., 1997) or music therapy (Brotons et al., 1997; Brotons and Pickett-Cooper, 1996; Vink, 2000) for the relief of agitation. Such interventions encouraging forms of expression will encourage unmet needs to be resolved.

**Time achieves form**

My hypothesis is that music offers the patient an alternative form for structuring time that fails in the working memory of the demented and is not yet made manifest in the coma patient. To achieve mentation, cognition, and consciousness then we must be brought into movement.

Initially this movement is achieved through the rhythm of breathing and then through gesture and bodily movements in a context of musical improvisation. The coordinated time structure for these movements is musical performance where the rhythmical intentions of the therapist combine with the basic rhythms of the patient. When tomes are connected together intentionally, then we have the phenomenon of melody. The extension of melody on the basis of rhythm in time is “memory”. Once memory is extended further in time, then we have the achievement of consciousness.

**Temporal coherence and memory**

Music therapy is indicated in neurological rehabilitation because it offers an external sense of temporal coherence that is latent in the patient through the dialogue of relationship.
We know that the nature of communication breakdown, how it is signalled, how it is repaired, and the outcome of the repair process appears to be disease stage-dependent. Couples in the early and middle stage of neurological disease achieve success in resolving communication breakdowns despite declining cognitive, linguistic, and conversation abilities of the individuals with the disease (Orange et al., 1998). This has important implications for understanding the influence of the progression of neuro-degenerative diseases on conversational performance and for advancing the development of communication enhancement education and training programmes for spousal caregivers of individuals with such diseases. Similarly, in coma, post-coma recovery and rehabilitation, we will expect to see, and hear, stages of recovery. Rehabilitation then will entail a recovery of that ecological niche which we call “communication”, this is achieved in the mutuality of performance as dialogue. For sufferers, we are that recovery, we are the context offering them an ecological niche. That is, we are communication and our responsibility lies in developing our own communicative abilities beyond the use of words. As living beings we perform in relationship with our milieu, a milieu that includes others. This ecological milieu is established through a dynamic mutual interaction. We establish communicative forms, these are inherently of time and musical. In this sense, memory is not the recovery of facts but the performance of reality linking events. What we experience as development is a creative act of improvising forms for being in time, this we experience physically as the body but psychologically as consciousness.

Benefits of music therapy

As Cohen-Mansfield (Cohen-Mansfield, 2000) suggests, therapeutic interventions need to be tailored to meet the needs of individual patients and their characteristics. In various social and treatment settings, music therapy can promote dialogue. The implication of such dialogues is that the sufferer can maintain, or even recover, an identity that has a broad repertoire of possibilities. When we enter into such dialogues, then the caregivers are also offered a broader potential of identities. The sufferer is reintegrated within a communicative ecology and this prevents isolation.

Music therapy offers a flexible temporal structure for processing temporal information. If timing is an ability that is failing, then musical form offers an alternative form within which timing can be temporarily recovered and practiced. The expression of timing in communication will utilise gestural abilities, including utterance, that spontaneous bind events together and are indicative of performed ability. Gestures are seen within this context as attempts to regain
cognition, not solely as failed abilities.

As emotional regulation is a common core problem within these diseases, attempts to positively regulate emotion will have benefits for both sufferers and carers. Emotional arousal is located within a context of attention and action whereas needs may be unmet, are unable to be expressed or are fail to be recognised. The expression of emotion, and similarly the ability to inhibit arousal, will contribute to communicating needs effectively.

Communicative abilities are essential. This mutual need is usually achieved through speech. When speech fails, then it is important to utilise those properties of human communication that are not speech dependent. Attention, arousal, affect and action all occur in musical performance. Music therapy has the potential to promote communication, stimulate cognitive abilities and alert us to residual communicative abilities.

Gesture and dialogue then are important activities for communication. Indeed this embodied activity is communication. To enter into dialogue with the other, then we must ourselves embody those rhythms of common rhythms of consciousness, and this is achieved through music therapy. By playing together, we achieve that understanding necessary for dialogue and thus an embodied hermeneutic.

Table 1 Benefits of music therapy for the neuro-degenerative diseases

<table>
<thead>
<tr>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meets the needs of individual patients and their characteristics</td>
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<tr>
<td>Promotes dialogue and the maintenance of an identity that has a broad</td>
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<tr>
<td>repertoire of possibilities</td>
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<tr>
<td>Reintegrates the person within a communicative ecology and prevents</td>
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<tr>
<td>isolation</td>
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<tr>
<td>Offers a flexible temporal structure for processing temporal information</td>
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<tr>
<td>where timing can be temporarily recovered and practiced</td>
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<tr>
<td>Utilises gestural abilities, including utterance, binding events</td>
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<tr>
<td>together that are indicative of ability</td>
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<tr>
<td>Gestures are seen as attempts to regain cognition, not seen as failed</td>
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<tr>
<td>abilities</td>
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<tr>
<td>Regulates emotional arousal in terms of expression and inhibition with</td>
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<tr>
<td>implications for sufferers and caregivers</td>
</tr>
<tr>
<td>Need can be expressed</td>
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<tr>
<td>Motivates communication and participation without being speech</td>
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<tr>
<td>dependent</td>
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<tr>
<td>Attention, arousal, affect and action embodied in musical form</td>
</tr>
</tbody>
</table>


Personality and Social Psychology 79, 2, 211-223.


