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The Psycho-Neurology of Embodiment with Examples from Authentic Movement and Laban Movement Analysis

Abstract

It is proposed herewith that the integration of thought and emotion is felt through the body. It has been agreed that thought is embodied cognition and that our earliest learning is implicit, through the body, and non-verbal. Embodiment and Embodied Simulation (ES) (Gallese, 2011) represent controversial topics in the philosophy of mind (Clark, 1998) and cognitive neuroscience (Gallagher, 2015a, 2015b; Gallese and Sinigaglia, 2011a; Gallese, 2014). As a result of the advances in these areas of research there is a need to re-conceptualize our understanding of the mechanisms/processes involved in DMP. Could ES be applied to the psychology of movement? This article attempts to apply this theory of embodiment to the practice of Authentic Movement (AM) and Laban Movement Analysis (LMA). The theory of ES is proposed as one possible explanation of how the role of the 'witness' in AM comes to know their inner experience whilst in the presence of a mover which may lead to an 'offering' to that mover from the witness' conscious body (Adler, 2002). Furthermore, there is an examination of how ES connects to the task of movement observation and how meaning is arrived at from the various movement patterns observed.

Keywords: Embodiment, Embodied Simulation; Laban Movement Analysis, Authentic Movement, Psycho-Neurobiology

Introduction

The concept of embodiment has received a great deal of attention in recent years. It stresses the role of the dynamic body in the agent rather than proposing forms of cognitive involvement with movement. It holds that the attribution of movement meaning is action-based and enactive incorporating the motor-knowing of the observer and performer.

The term embodiment could be said to refer to the biological and physical presence of our bodies, which are necessary preconditions for subjectivity, emotion, language, thought and social interaction. The phenomenologist Merleau-Ponty (1962) gave an account of embodiment in which he distinguishes between the objective body (the body as a physiological entity) and the phenomenal body, my (or your) body as I (or you) experience it. Thus although there is an experience of our body as a physiological entity the tendency though is to experience our body as a unified potential or capacity for doing things/responding to a need via movement. Motor capacities (expressed as bodily confidence) do not depend on an understanding of the physiological processes involved in performing these actions. Embodiment therefore refers to the phenomenal body and to the role it plays in our object-directed experiences. Csordas (1999) speaks of embodiment as an existential condition in which the body is the subjective source of experience. The ground from which it springs is culture and the experience of being-in-the-world.

Verela, Thompson and Rosch, when speaking on embodiment, refer to an enactive (Thompson, 2007) approach to cognition (a dynamic interaction between an acting organism and its environment) saying that:

‘first, cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities, and second, that these individual sensorimotor capacities are themselves embedded in a more encompassing biological, psychological and cultural context’ (Verela,

Thompson and Rosch, 1991, p.172-3).

Consequently, in cognitive science it is claimed that intelligent behaviour emerges from the interplay between brain, body and the world and this interplay is termed embodied, embedded cognition. Varela, Thompson and Rosch (1991) pioneered the view of embodiment in relation to mind whereby cognition rather than being conceived of as a detached re-construction of the world is seen as a suite of dynamic processes enabling embodied activity (Engel et al., 2013). Action is what enables perception and cognition rather than being in secondary role to them. One could foresee a third wave of cognitive therapy emerging as a consequence, following behavioural and mindfulness, termed embodied, enactive cognitive therapy. The dynamic nature of mind (Kelso, 1995; Thelen and Smith, 1994) and the body (which is as plastic as the brain) in action lead to enactive considerations about perception as embodied activity (Hutto and Myin, 2013). According to Kirchhoff (forthcoming) 'affect, cognition and sensorimotor contingencies are inseparable given that patterns of affectivity are part and parcel of perception, action, and cognition (Colombetti, 2013; Gallagher et al., 2013)'.

There are also the related issues of action understanding and mind-reading. In the area of philosophy of mind folk psychology by the observer (Hutto, 2003) has become one of the most noticeable ways to address the ability to understand others whereby minds are read by ascribing to them intentions, beliefs and other mental states (Davies, 1995). In cognitive neuroscience this is the main aspect of *Theory-Theory* and *Rationality-Teleological Theory*. According to Gallese and Goldman (1998), we understand others because we have developed a common-sense theory of mind consisting of:

a set of causal/explanatory laws that relate external stimuli to certain inner states (e.g. perceptions), certain inner states (e.g. desires and beliefs) to other inner states (e.g. decisions), and certain inner states (e.g. decisions) to behaviour (see also Stich and Nichols, 1992; Scholl and Leslie, 1999) (Gallese and Goldman 1998, p. 496).

Dennett (1987) claims that mentalizing has a set of rational principles underlying it which the mind-reader uses to decide which mental state would be embraced by the others, seen as rational agents. However, more recent research has taken us beyond the cognitive and mind-reading propositions. The era of the dominant cognitive paradigm, and the associated cognitive behavioural therapy aiming to change the patient's maladaptive conscious cognitions, has passed. The new acknowledgement of the bodily-based emotions and psychobiological states has been welcomed to centre stage in both research and clinical practice. Gallagher (2005) has underlined the important role of the body in shaping the mind beyond the brain, including the sensor-motor system, the perceptual system and situatedness (the body's interaction with the environment) challenging Cartesian dualism.

In dance movement psychotherapy (DMP) as far back as Berrol (1992; 2006) an overview of the neurophysiological and neuroscientific connections has been made and Homann (2010) presented concepts from embodiment and related them to neurobiology. Affective neuroscience (Gallese and Lakoff, 2005) emphasize the importance of body-originated information for the formation of neural structures. Schore (2012) alerts us to the paradigm shift taking place in psychotherapy where there is an integration of nature and nurture, specifically biology/neurology and psychology. It is the duality of thought and emotion that interpersonal neurobiology does not support (Schore, 2012; Siegel, 2012, van der Kolk, 2014). Instead, all thought is now understood as embodied cognition. Our earliest learning is implicit, through the body, and non-verbal.

The afore-mentioned cognitive model posits a clear-cut separation between sensory perception and motor processes. However, contemporary studies in the neurosciences provide a new perspective of the mind. The proposal that movement is uninvolved in the coding of sensory information but confined only to execution is no longer valid (Gallese et al., 1996). Cortical motor areas traditionally believed to possess functions purely related to

movement are now known to be actively involved in processing sensory information too (Rizzolatti and Craighero, 2004). Several investigations demonstrated that cortical areas involved in the motor control of, for example, a hand grasp, are also activated during the observation of graspable objects, or, in the case of research on mirror neurons, during the observation of an action performed by another individual (Gallese et al., 1996; Ferrari et al., 2003; Fogassi et al., 2005). This demonstrates that the behaviours, emotions, and sensations of others are mapped into our internal motor representation, thus creating a direct connection between self and others.

Through a mirror mechanism we can simulate in ourselves the same emotional and somatosensory experiences that we observe in others. This direct, interpersonal route of knowledge allows us to resonate in synchrony with others and makes it possible to share dimensions of experience at a nonconscious level i.e. that of implicit inter-corporeality. The term nonconscious found in neuroscience and psychology refers to processes experienced and observed in physical actions and feelings without the involvement of language and symbolic thinking (Rustin, 2013). Established in infancy pre-verbally, Stern (2004) called it 'implicit knowing' (ibid p. 116), however, it may become conscious through bringing attention to the movement and/ or feeling (Stern, 2004; Beebe and Lachman, 2014). The nonconscious is differentiated from Freud's references to the unconscious and unconscious repressed material. Furthermore, Shore (2003) argues that the nonconscious survival functions of the right brain, rather than the language functions of the left, are dominant in development and psychotherapy as are the most complex, highest human functions such as empathy, stress regulation, intersubjectivity, compassion, creativity and intuition. Implicit relational knowledge lies in the nonverbal communication right to right brain, underneath words (Schorre, 2011). This connects to Travarthen's research on inter-subjectivity in mother-infant communication (Travarthen, 1977; Travarthen and Aitkin, 2001). Furthermore, it is accepted that change can happen through transforming implicit memories at nonconscious levels (Lyons-Ruth, 1998; Schorre, 2011).

The early philosopher Merleau-Ponty (1968, p141-143) first coined the term 'intercorporeity' which is associated with Travarthen's (1977) term inter-subjectivity, the space between two people. Atkins defines it as 'the capacity to understand another person's action through the body prior to, and as a condition for, cognition' (Atkins, 2008, p.48). Gallagher and Payne (2014) argue that the contribution of embodiment to cognition, and therefore clinical reasoning, is inescapable.

This discourse revolves around research on the role of emotions in development, psychopathology and psychotherapeutic processes and the importance of body-felt affective processes in human experience (Gainotti, 2012; Shore, 2012). Damasio (2003) offered a helpful division between emotions as observable body states, and feelings as mental events noticed only by the one experiencing them. He argued that 'emoting' begins with an emotionally competent stimulus (e.g. an attractive or scary person). The organism automatically appraises the stimulant as conducive or not to survival/ wellbeing. As a result a complex range of physiological reactions are mapped onto the brain such as a faster heartbeat, tension of facial muscles etc. from which a feeling arises. Feelings, he claimed, corroborate the state of life deep within and are a guide to decision-making.

In contrast, Stern (2010) proposed that vitality, first conceptualised in his work with mother-infant non-verbal communication (Stern, 1985), and grounded in the body, is the life force exhibited by all living organisms. His research demonstrates that it is possible to trace vitality to real physical and mental operations including movement, time, perception of force and the spatial aspects of the movement and its underlying intention. He shows us that the multimodality of sensorimotor experience is a cornerstone for the emergence of a vitality form. He explains that forms of vitality characterize personal feelings as well as dynamics of movement. Thus these forms are related to feelings of agency and self-efficacy, and may be shaped and influenced by the early interactions between caregivers and infants.

The origin of these vital feelings takes place within the infant's psychobiological rhythms of the body, which arise from relationships with others, particularly with the mother. The early mother–infant interaction can be considered a bio-behavioural system that is regulated in the brain through complex neurochemical systems and circuits involved in reward and motivation.

Maternal attunement is “a partial and ‘purposely’ selective kind of imitation” (Stern, 2010, p. 113) supporting a correspondence of the infant's vitality form. The difference between attunement (Kestenberg, 1995; Keysers, 2011) and imitation is that in the former mothers match and focus the dynamic features of their infant's inner state. Markova and Legerstee (2006) found that maternal attunement leads to more infant gazing, smiles, and positive vocalizations towards the mother when compared with maternal imitation. In DMP it is the psychotherapist's capacity for intentional attunement communicated to clients through her bodymind which supports the therapeutic alliance. By this emphasis on the primary role of movement in creating forms of vitality, it is clear that the physical aspects and mechanics of movement in time are the building blocks for the creation of a mind that is shaped to capture the dynamics of forces and sensations linked to movement, whether self-generated or produced by others.

The experience of vitality is expressed in movement by considering time, space, force, and intention. Interpreting the intentionality of movement, rather than simply the individual movements themselves, is advantageous because it allows the observer to filter out all the irrelevant observed movements. While interacting with someone, the observer attends to a very limited set of stimuli and only those expressing intentionality are relevant (Stern, 2010).

Embodied Simulation

The concept of Embodied Simulation (ES) goes beyond the reading of bodies and minds, it involves the psychology of movement. Proposed by Gallese (2011) this is explored below as inherent to the practice of DMP, and in particular to the related disciplines of Authentic Movement (AM) and Laban Movement Analysis (LMA) because of the inter-relationship between the mover / observed movement behaviour and the witness / Laban movement observer respectively which results in the actions and emotions of the witness/observer being engaged during their respective tasks. The processes underlying interpretations of movement actions in others in both disciplines can be explained by Embodied Simulation.

Simulation theory states that one way to make sense of another's behaviours and beliefs is when an agent ascribes to them mental states by simulating them internally in his/her cognitive system (Gordon, 1986; Gallese and Goldman, 1998; Currie and Ravenscroft, 2002) in a form of re-cognition. ES, according to Gallese and Sinigaglia (2011a), is a unitary description of the fundamental features of inter-subjectivity. They demonstrate that people recycle mental states/processes represented in a bodily format, expressed as functionality, which they then attribute to others. We experience others as having experiences similar to ours. Making sense of others' alive and dynamic bodies is rooted in the power of re-using our own motor, somatosensory and visceromotor resources (Gallese and Ebisch, 2013) facilitated by mirror neurones (Berrol, 2006; Gallese and Sinigaglia, 2011b). This is similar in the field of social cognition to mentalisation - the process by which we are attentive to, and make sense of (implicitly or explicitly) others and ourselves in terms of subjective states and mental processes (for example interpreting needs, goals, reasons, desires, feelings, beliefs, intentions). The related area of Theory of Mind, in which it is assumed that others have minds by analogy with one's own mind, also refers to the ability to attribute/ infer these mental states to oneself and others and to understand perspectives that are different from our own. This 'tuning into' others (attunement), which develops in the first five years of life, is intuitive, allows us to predict and interpret another's actions by evaluating their

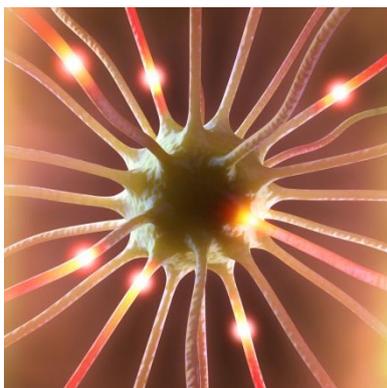
intention/motive, thoughts, feelings, desires etc. and is linked to our capacity to empathise with others.

ES has been debated in the study of inter-subjectivity, whereby social cognition can be defined as understanding another's sensations and emotions without any kind of folk psychology (Gallese, 2001; 2005) being required. This position has been interpreted as a low-level form of mental simulation (Goldman, 2006) based on the 'unmediated - below the threshold of consciousness - processes underlying mirror-neuronal activity' (Gallese and Lakoff, 2005 p. 5). This is in contrast to a high level one, associated with the attribution of complex mental states (e.g. propositional attitudes), 'accessible to consciousness' (Goldman, 2006, p. 147).

Mirror neurones discovered in the premotor cortex of rhesus monkeys were shown to be involved in action understanding. Single-electrode recording revealed that these neurons fired when a monkey performed an action and when the monkey viewed another agent carrying out the same task. Studies with human participants have shown the brain regions containing mirror neurons are active when one person sees another person's goal-directed action suggesting that mirror neurons may provide the basis for theory of mind, and to support simulation theory of mind-reading (Haroush and Williams, 2015). Essentially the point is that mirror neurons and the associated neuroscience studies show that witnessing the actions of others rather than being simply a visual exercise, is one that co-involves our own actions and emotions. Consequently, our motor and affective system, which are inevitably shaped by our history of personal actions and emotions will always infiltrate our perception of the emotions and actions of others, and thus be intrinsically subjective.

Similar processes take place in DMP when employing a group model using a mirroring method termed Chacian circles (Chace, 1970) (often with music). Participants in the circle are invited to copy the group therapist's movements and to synchronise with others'

movement so they are all moving to the same rhythm at the same time with similar movements (termed entrainment in music). In this approach the therapist leads the group by attuning to the group, picking up on, and mirroring back to the group individual participant's divergent movements which reflect emotional aspects being expressed in the group movement. This method enhances and amplifies the communication in different non-verbal ways. Mirroring by the Chacian group therapist is a body-felt response to the group's non-verbal expression, a way of incorporating movements spontaneously performed by participants. The therapist is bodily engaged in the active, expressive movement dialogue and expression, she is relating non-verbally to participants including their movements (whether they are conscious of this or not) to form a cohesive group process nurturing a sense of belonging. Research has demonstrated that this synchronous group process of dancing together to music can reduce pain and increase social bonding (Stone et al., 2015). The reflection-in-action of physically mirroring movements by the therapist in Chacian circles makes it different from the authentic movement and movement observation examples. In these the witness and observer respectively are not engaged physically (reflecting-on-action), being receptive to the movement yet outside the action. However, the same processes of ES may also be at work in Chacian circles.



Authentic Movement

The discipline of Authentic Movement is another approach in DMP. It employs two fundamental roles those of the witness and the mover (Whitehouse, 1979; Chodorow, 1992;

Adler, 2002; 2006). A period of time is agreed for the process and eye contact between the witness and mover is made. The witness does not move (usually sitting) and remains with eyes open. Her role is to attend carefully and benignly to her mover, regarding her non-judgementally whether she moves or remains still. The mover, with eyes closed, waits for a stimulus for action. She may move in response to her imagination, a sensation, an environmental source, or express a feeling, a thought/ story or symbol etc. she is free to express for the duration of the agreed period of time in the presence of her witness. A transition time may then ensue whereby drawing, writing or contemplation take place before the mover speaks of her experience and naming any movement she can recall. Then she can invite witnessing of the movements at which point the witness speaks of her experience in the present tense and only where it connects to the movements named by the mover. They meet in languaging their experience of the moment of the movement named by the mover. There may be a unity of experience, such as in one significant moment they both speak of the same creature and understand its intentions (for example, a panther prowling across the land marking its territory). In this case the mover will be clearly seen by her witness. Another time there might be a diverging of perception i.e. what was experienced by the mover was not seen in a similar way by the witness.

When applying the ES conceptual framework to the reception of movement as in witnessing experiences it is suggested that there could be a representational equivalence between the perception of a given movement behaviour and its neural simulation. ES can shape the degree of the agent's practical knowledge of movement, and offers an explanation of the way a witness meaningfully understands the movement she sees. It refers to a basic form of (action) understanding, which regulates the pre-conceptual responses to the movement stimulus according to the witness' motor expertise, providing her with a different, intrinsically motor, modality of movement understanding. This would suggest that the AM witness, in the presence of a mover, accesses her own imagination, sensations, interpretations, intentions

and emotional feedback in an 'as if' (Damasio, 2003) scenario, i.e. as if she was actually performing the movements herself.

At the beginning of the causal process the brain's emotion is triggered by detecting a simulation mechanism, which is done by the agency's belief or imagination creating the movement (in the example of AM, this would be the 'mover'). Then the intermodal connection between emotion and bodily movements is utilized in the 'witness', leading to the mirroring of these movements from a first-person perspective, which elicits a simulation of emotions in the witness. It is action-empathy and is inter-personal in resemblance since the witness has no access to the mover's mind.

Consequently, when taking the practice of AM as illustrative, it is proposed that the notion of ES may be conceptualised as the method by which a witness might make sense of the movement as expressed by their mover (i.e. the one who spontaneously moves with eyes closed in response to an impulse whilst in the presence of a witness who remains still yet attentive to their mover, and to their own experience in the presence of their mover, whether imaginatively, through body sensations, emotionally, kinaesthetically, cognitively etc.). Such meaning-making ability allows the witness to infer for example, the intentions behind the movement material being witnessed in the dynamic movement interaction. In the case of the witness being in the role of the psychotherapist, with an in-depth knowledge of the psychopathology and history of the client/mover, it would be treating the movement as a form of interpersonal (involving the transference relationship) interpretation. Connections made by the therapist with the client's personal history, life events and current conflicts would also contribute to the interpretation offered by the therapist.

Neuro-scientific research indicates that neural mechanisms mediate between personal, experiential knowledge held about our lived body and the implicit knowing held about others. Our body-held experiential knowledge, or body memory (Fuchs, 2003), facilitates an

intentional attunement with others, co-creating a collective inter-subjectivity. Through this 'we-centric' environment we characterize and bring experiential understanding to the actions, emotions and sensations of others. This body-felt, experiential understanding is achieved by modelling another's behaviour as intentional experience on the basis that there is a correspondence between what they do, sense, imagine and feel and what we do, sense, imagine and feel. Consequently, it can be said that the psychotherapist (or the one in the role of witness) is connecting with their client/mover through ES with the mirror neuron system the likely neural correlate of this process.

[The mirror mechanism] given the present state of knowledge, maps the sensory representation of the action, emotion or sensation of another onto the perceiver's own motor, visceromotor or somatosensory representation of that action, emotion or sensation. This mapping enables one to perceive the action, emotion or sensation of another as if she were performing that action or experiencing that emotion or sensation herself (Gallese and Sinigaglia, 2011b: 2)

In AM group work when a witness sees a mover creating movement, making/receiving physical contact with/from another or to herself (tactile empathy activated through her somatosensory cortex), or hears the sounds of the mover(s) (auditory empathy) she resonates with these, whilst in stillness herself, interpreting the movement/touch/sound through ES. Later, if requested by her mover on her return from the moving experience, she can speak about her experience of these moments of resonance to her mover, if her mover has mentioned these movements in her reflections previously. The witness speaks about her experience in the present tense, so enlivening those same pathways, to give clear, empathic and profound witnessing. Hopefully the mover will feel clearly seen by the witness who verbalises her experience of their meeting in the mover's movement, touch or sound-making.

The importance of the witness being relatively immobile has been demonstrated to be crucial to this process. Gallese (2016) indicates that it is this relative inactivity (which he terms the

'neotenic look' as found in infancy) which facilitates the emotional responses to the action to be felt in more depth (for example, when watching a film which touches us emotionally).

Our being still simultaneously enables us to fully deploy our simulative resources at the service of the immersive relationship with the fictional world, thus generating an even greater feeling of body. Being forced to inaction, we are more open to feelings and emotions. The specific and particularly moving experience generated when immersed in fictional worlds is thus likely also driven by this sense of safe intimacy with a world we not only imagine, but also literally embody (Gallese 2016: 23).

If the witness is craning to 'see' a mover, fidgeting or turning to other distractions she is disturbing the requirement for her to absorb fully the impact of the mover's action on her bodymind. Stillness in this context can be understood as a form of meditation in which the whole bodymind is open and receptive to whatever comes its way from the mover and the environment in which she moves. The witness intends to attend to (or regard) the mover, though, at the same time, noticing the inner experiences in her lived body whilst in the presence of the mover.

We share various states with others including emotions, actions and sensations and these bind us in shared identity providing a sense of belonging and community. Inter-subjectivity enables us to conceptualise that we re-cog-nise others as similar to ourselves making communication and ascribing possible intentionality. Through the practice of disciplines like AM, deep empathy and compassion can be experienced. Through ES our most fundamental 'beingness' can be experienced again and again as we are 'seen' and we 'see' others clearly.

An example from Authentic Movement:

I am a witness to a mover. I see this mover begin by walking from

one pillar to another as though checking the boundaries around the space. I see her enter the middle of the space and spread into it, using all there is available. She expands her body on the floor and now raises up and travels around and around in circles. I feel dizzy, she stops. I do not feel dizzy anymore. I get a sense of restlessness in my mover, no place feels quite right to settle in. I see her flick away, with her fingers, bits she finds on the floor, the unwanted debris from life. I see her open her arms as she runs around the space, I see play, laughter, and smiles across her face and I hear her voice. I feel joy, expansion, release of baggage, I feel light and airy. I have space all around me to be who I am without judgement. Am I seen? I am a plane turning its wings skyward, side to side, held by the air, she dies down and breathes, there is more to come but time is up.



Laban Movement Analysis

Laban Movement Analysis (LMA) (Laban, 1990) is a tool sometimes employed by dance movement psychotherapists to assess clients' movement profiles. The attribution of meaning to movement has been claimed by many including Laban and Lawrence (1974) and others employing the theory, for example, Dell (1977); Ramsden (2004); Lamb and Watson (1979); Moore (1982); Moore and Kaoru (1988); Newlove and Dalby (2005); Bloom (2005); Davies

(2008) as well as numerous body language authors and researchers in the field of non-verbal communication and psychology.

LMA in particular has led the field in DMP with reference to the assessment and diagnosis of, for example, personality as in North (1972), and various mental disorders such as schizophrenia (Higgins, 2004) and to those with irritable bowel disease and eating disorders (Lausberg, von Wietersheim and Feiereis, 1996). Such authors illustrate how the system can be utilised as an assessment methodology for the planning of sessional work with a range of populations. The proposal herewith challenges the so-called objectivity of this observation, description and meaning-making of movement behaviour.

When observing movement using the categories of LMA it can be speculated that the meaning ascribed by the analyst to the movement is not only arrived at by a cognitive understanding of the movement categories - fitting the movement into these (Kestenberg-Amighi et al., 1999) - but is also reached through the observer/analyst's ES which does not involve any kind of mental/cognitive states. The acts mirrored in ES are goal-directed acts within the motor repertoire of the perceiving subject, or the movement observer in this example. The resemblance on which ES relies here is intra-personal, as the perceiving subject does not have direct access to the other's mental states. They are only able to observe the outer behaviour and from that assign their own meaning and subsequently categorise the movement.

This action-simulation mechanism, embodied in mirror neurons, is consistent with the idea that a subject can re-enact her own motor experience through an automatic, involuntary, process in order to give sense with her own body to a movement seen. Dance movement psychotherapists and certified Laban movement analysts train their bodies in the various effort combinations and shape elements in order to recognise these patterns of postures / gestures in mover behaviour (Bartenieff and Lewis, 1989/2000). It could be inferred that the

development of the capacity to dance in the performer's motor system leads to a vocabulary of motor actions that can be employed to simulate the actions, emotions and the intentions evoked by movement patterns expressed by another. It is this which enables an intentional meaning to be ascribed to a movement expression observed. Most dance movement psychotherapists are bodily intelligent having trained for many years in one or more forms of dance and/or movement practice, in Laban movement, including all the elements of Body, Effort, Shape and Space, and in movement observation and analysis. As a psychotherapist employing LMA it follows that they would be able to see and interpret a wide range of movement repertoire as a result.

However, aspects of movement can also be interpreted by people without such a training, or who do not have that particular sequence of acts in their motor repertoire (i.e. they become 'thought-dancers' in that they do not know, in their bones as it were, how to dance/move that particular movement). This is because, despite not having had a specific training, they will have experienced a range of feeling-states and their associated movement patterns throughout life. Hence, anyone can become a witness or interpret another's movement patterns at a particular level, for example, feel empathic towards a mover or 'read'/ascribe meaning to their body movement.

Empathy is based on the recognition of another's emotions by noticing their expressive behaviour (Prinz, 2004). The movement firstly triggers the emotion, detecting simulation mechanisms by the belief or imagination of the agency generating the movement. Then the intermodal connection between feeling and bodily movements is employed, resulting in the mirroring of these movements from a first person perspective which elicits a simulation of emotions in the observer. This can unify their sense-making abilities, where memory, imagination and sensation can be integrated in a motor-grounded framework. However, this view relies on an autonomous domain to simulate emotions, which, according to Gallese

(2005; 2011), is not necessary and prone to circularity in the context of embodied approaches to sense-making where imagination is conceived of as an example of ES.

The vehicle for emotional expression is the body and the feedback from the body when interacting with the environment affords bodily resonance (Husserl, 1952; Merleau-Ponty, 1962) (sensations, posture, gesture or a 'readiness' for movement) leading to emotional perception. Thus inter-affectivity, or embodied inter-affectivity (Fuchs and Koch, 2014), and inter-corporality are intertwined in and through our bodies. That is, I am affected by your emotional expression since I experience my response to it through my body's sensation and kinaesthesia. Furthermore, at the same time I am also affecting your bodily resonance creating a mutuality of intersubjective affectivity. Emotions are brought about by this inter-bodily conversation within the embodied appraisal (Prinz, 2004) and cognitive appreciation of the situation, which may subsequently be modified by any relevant body memory as examined by Fuchs (2012). Consequently, any interpretation will be a subjective, embodied response rather than an objective stance towards the one observed. Movement observation and analysis, similar to any observation and subsequent interpretation of behaviour/actions, is a subjective process.

Conclusion

In this proposition then an observer of another's movement, such as a certified Laban movement analyst, will bring to their observation all these factors which, in turn, affects their observation (depending on the resonance through ES), and subsequently their interpretation of the movement patterns expressed. It can therefore be established that when we consider the concept of ES in a movement observation context or in authentic movement practice, it appears to present as a fitting model for identifying the multifaceted affinity between an agent, (whether observer or witness), and the mover. In the examples of authentic movement and Laban movement observation/analysis it can be concluded therefore that the witness and the movement observer respectively bring to that experience (and

interpretation) their own neuronal pathways imbued with personal history including emotional and motoric experiences. Thus these are entirely subjective processes rather than visual exercises in the objective sense. The processes underpinning DMP approaches such as Chacian circles, authentic movement and movement observation can benefit from the research in interpersonal neurobiology such as Embodied Simulation, building on for example, attunement, embodied inter-affectivity, and inter-subjectivity.

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