

Advance praise for *Reclaiming Cognition*

"A notable collection of essays that will give much pleasure to those who have been missing the living body — and its actions and reactions — in contemporary cognitive and neural studies; a must read for those who haven't."

Antonio Damasio

"This collection is a valuable contribution to the elaboration and application of an understanding of mind and brain as situated and embodied. As such, it is timely and important. Although it is unlikely anyone will agree with all the papers, together they pose a challenge every cognitive scientist, neuroscientist and philosopher has to face." **Hubert Dreyfus**

"This book brings together a wide variety of contributions to the search for a science of the mind that is capable of describing and explaining the bewildering diversity of mental phenomena. The dead hand of 'cognitivism' is finally being lifted, allowing us to see the mind as a biological and cultural entity rather than a disembodied symbol processor inspired by the mathematical formalisms that underpin computer science." **Horst Hendricks-Jansen**

"Views of the mind as essentially embodied and embedded in its environment have recently made powerful advances in understanding perception and action and now have taken on cognition. This timely and richly interdisciplinary collection of essays, by innovative thinkers, displays the current exuberance of theoretical alternatives to the computational mainstream." **Susan Hurley**

"The evidence from all over the cognitive sciences is overwhelming: Conceptual systems and language are embodied in the deepest way, shaped by the nature of our brains, our bodies, and our everyday functioning in the world. Reclaiming Cognition helps to wash away the old view of the mind as abstract and disembodied, of thought as symbol manipulation — something a computer could do — and of emotion as separate from reason." **George Lakoff**

"Just as the 1990s were the Decade of the Brain, many have argued that we are now entering the Decade of the Mind. Meeting such a challenge requires that we transcend the crude reductionism and narrow cognitivism that has characterized much of the brain and behavioural sciences of the past century. Reclaiming Cognition teaches us that minds are not architectural modular structures that deal in information, but are constituted by the dynamic interactions of perceiver and percept, knower and that which is to be known — socially, developmentally and evolutionarily formed." **Steven Rose**

"Reclaiming Cognition is a potent antidote to shake up a number of received ideas about mind that have dominated cognitive science since its roots in the 1960s. In retrospect it now seems simply amazing that for so long many believed that mind was dis-embodied, abstract, symbol-based, and a-historical. The diverse contributions in this book provide excellent examples of recent work that extends alternative approaches that had remained in the margin and are now coming to the fore."

Francisco J. Varela

Maxine Sheets-Johnstone

Emotion and Movement

A Beginning Empirical-Phenomenological Analysis of Their Relationship

I: Introduction

In his discussion of time and of 'how many ways we speak of the "now"', Aristotle unwittingly highlights in a striking way the nature of a qualitative dynamics. He says that "'now" is the link of time' referenced in expressions such as 'at some time', 'lately', 'just now', 'long ago', and 'suddenly' (*Physics* 222b27–29). Something radically different is conveyed by the last example: 'suddenly' has a decisively dynamic aspect wholly distinct from the other terms or phrases. Aristotle says simply that "'Suddenly" refers to what has departed from its former condition in a time imperceptible because of its smallness' (*Physics* 222b15–16). He is obviously taking 'suddenly' as a quantitative term parallel to the other quantitative terms. But 'suddenly' is basically something both more and other than an interval of time 'imperceptible because of its smallness'. It is a *qualitatively* experienced temporality, just as rushed, prolonged, and creeping are *qualitatively* experienced temporalities. In brief, the distinctive dynamic that defines 'suddenly' derives from felt experience. It is fundamentally not a quantitative term but an experienced kinetic quale. As such, it has a certain affective aura: 'suddenly' may describe an earthquake, a fall, an ardent kiss, an urge or inspiration, or one of multiple other possible experiences, each of which has a certain affective resonance. What is kinetic is affective, or potentially affective; by the same qualitative measure, what is affective is kinetic, or potentially kinetic.

Recognition of the everyday qualitative character of *suddenly* opens up an intricate and challenging domain of experience emblematic of the intimate bond between emotions and movement. In what follows, I offer a beginning sketch of the relationship, concentrating first on empirical research that preceded the rise of cognitivist science with its prominencing of an information-processing brain (Bruner, 1990) and its correlative dislocation of movement. I summarize three empirical studies of emotion¹ that carry forward the work of Darwin, and that vindicate in

[1] A reviewer of this essay stated that 'the three investigations the author selects ... have not really produced the types of rigorous studies that most scientists would currently deem to be of sufficient quality to *Journal of Consciousness Studies*, 6, No. 11–12, 1999, pp. 259–77

different ways the work of physiological psychologist Roger Sperry on perception and his principle thesis that the brain is an organ of and for movement (Sperry, 1952).² The summaries make evident the theoretic that bind the studies together and reveal the tactile-kinesthetic body that is in each case their foundation. I turn then to a summary phenomenological analysis of movement, showing how the dynamic character of movement gives rise to kinetic qualia. The analysis exemplifies how empirical studies may be epistemologically deepened through phenomenology, in this instance through a phenomenological elucidation of the fundamentally qualitative structure of movement, a structure that grounds the relationship between movement and emotion in a qualitative dynamics and formal dynamic congruency. In virtue of that congruency, motion and emotion — kinetic and affective bodies — are of a dynamic piece.³ Methodological consequences follow from this exposition. So also do implications for cognitivism, which range from the observation that movement is not behaviour and that the term 'embodied' is a lexical band-aid to the observation that animate forms are not machines and that a kinetic, qualitative (meta)physics follows naturally from the study of animation and animate form.

II: Empirical Studies of Emotion

The first research that warrants our attention is the lifelong experimental work, empirical methodology, and related clinical practice of Edmund Jacobson. A close friend of Karl Lashley, Jacobson was a medical doctor and neuropsychiatrist with a doctorate in psychology.⁴ Jacobson developed and honed a form of introspection, a practice he called 'auto-sensory observation', which he taught to his patients, enabling them to monitor and ultimately dissipate excessive, unproductive bodily

constitute essential and unambiguous empirical progress in the area. It is important to point out that the research of the three investigators has not been critically shown to be lacking in rigour, to be of inferior quality, and so on, but has only been ignored, and this most probably because the research is not currently popular. It deals with *experience*, not with behaviour, and it deals with intact living humans, not with bodiless units specifically shown to be indefensible — e.g., the study is invalidated on procedural grounds, it is shown to be unreliable because unreproducible, and so on; and on the other hand, that science progresses as much by discovery in arrears — e.g., Mendel, Wegner — as by advancing discoveries. In evidential support of both hands, we may readily look to Karl Pribram's commanding citations of Nina Bull's research (e.g. in Pribram, 1980, pp. 246, 256) and to Manfred Clynes' positive citation of the same (in Clynes, 1980, p. 281).

[2] Sperry's later groundbreaking experimental research involving brain commissurotomy eclipsed his earlier groundbreaking experimental research on perception and movement. To be noted in this context is that however much present-day textbooks veer off into a pre-eminently information-processing view of brains, in their sections on movement, some of them contradict the view and clearly support Sperry's thesis, e.g., 'The brain is the organ that moves the muscles. It does many other things, but all of them are secondary to making our bodies move.' (Carlson, 1992, p. 214)

[3] The dynamic congruency is elegant in a way analogous to the way in which mathematical formulations and scientific explanations are said to be elegant.

[4] For information on his background, see Jacobson (1970), pp. 11–21. In a paper on the electrophysiology of mental activities, Jacobson mentions '[a] rather amusing comment' made by Lashley: 'Lashley told me with a chuckle that when he and Watson would spend an evening together, working out principles of behaviourism, much of the time would be devoted to introspection' (Jacobson, 1973, p. 14, see also Jacobson, 1967, p. 16). Because of its omission of introspection, Jacobson regarded behaviourism 'only half a science' (ibid., p. 17).

tensions, and in consequence to decrease felt anxieties and other debilitating feelings. In this way, they were able to take personal responsibility for their problems (Jacobson 1929; 1967; 1970). Jacobson's technique of self-observation was learned and taught by other physicians and psychiatrists, and by other persons as well. During World War II, for example, his technique was taught to U.S. Navy Air Cadets — 15,300 men — who suffered 'faintly states accompanied by fatigue, restlessness and insomnia, including what were called *breakdowns*' (Jacobson, 1967, p. 171).

The self-observational technique that Jacobson developed centres on a tactile-kinesthetic awareness of the tension level of one's specific and overall bodily muscularature. Jacobson validated the technique by electromyometry, i.e., the measurement of neuromuscular action potentials. He is in fact credited with being 'the first to record the action potentials in the muscles and to show that they vary in a predictable way with mental activity and especially with feelings of tension' (Fishbein in Jacobson, 1967, p. viii). A basic principle of the theory emanating from his experimental findings and clinical practice is quite simple: neuromuscular tension is emotionally laden; 'neuromuscular acts participate in mental activities . . . including emotions' (Jacobson, 1970, p. 34). It is notable that Jacobson pointedly contrasts his theory with the traditional view of the brain, the view 'that all mental activity occurs in the brain alone; that the brain does our thinking, e.g., as the alimentary tract does our digestion,' or, as he later says, with the view of those who regard neuromuscular activity 'as the tail wagged by the dog' (ibid., p. 32). He calls our attention as well to the error of those who, hearing of the practice of 'auto-sensory observation' equate it to 'suggestion' by the instructor (ibid.). A number of Jacobson's findings are of particular interest, such as

[T]he trained observer (not the tyro) identifies and locates signals of neuromuscular activity as integral parts of the mental act [of attention, imagination, recall, fantasy, emotion, or any other mental phenomena]. He does not discern two acts, one so-called 'mental' and the other 'neuromuscular', but one act only (ibid., p. 33); and 'objective and subjective data indicate conclusively that when the trained observer relaxes the neuromuscular elements apparently specific in any mental activity, the mental activity as such disappears accordingly' (ibid.).⁵

In sum, Jacobson's fundamental experimental finding — and hence the significance of auto-sensory observation — is that what happens in a brain does not happen apart from muscular innervations. 'Those who would do homage to the brain with its ten billion cell-amplifiers can well continue to do so', Jacobson says, but they must also not overlook empirical evidence: that 'muscles and brain proceed together in one effort-circuit, active or relaxed' (ibid., pp. 36, 34).⁶

[5] To assure clarity, I add the following annotation: Jacobson does not say *all* mental activity disappears; he says that the mental activity as such disappears. The *as* such qualifies the particular mental activity that disappears, i.e., the mental activity ongoing before the onset of relaxation. With all due attention to Jacobson's emphasis upon the necessity of developing capacities in auto-sensory observation and differential relaxation — of being a trained observer, not a tyro — readers might nevertheless try consulting their own experience to corroborate the disappearance of a specific mental activity upon neuromuscular relaxation.

[6] That muscle-brain constitute a unitary circuit is a key insight supported and emphasized by notable contemporary investigators as well as by Roger Sperry in his initial and highly influential work on perception, which led him to identify the brain as an organ of and for movement (Sperry, 1952). Dynamic systems theorist J. A. Scott Kelso, for example, writes, 'It is important to keep in mind . . . that the brain

Empirical evidence of a singular muscle-brain 'effort-circuit' confirms the basic premise implicit in Darwin's *The Expression of the Emotions in Man and Animals*: movement and emotion proceed hand in hand. The fundamental concordance between the two phenomena lies in the fact that bodily movement is expressive. What Darwin sought to explain in his book was the origin of the concordance on the basis of serviceable habits, the principle of antithesis, and the phenomenon of 'nerve-force'; that is, certain movements arise because they are of benefit to the animal, or because they are called forth in opposition to innate kinetic practices, or because of a spontaneity or excess of 'nerve-force'. Throughout the book, what Darwin basically describes is *movement*. For example, with respect to joy and vivid pleasure, he writes that 'there is a strong tendency to various purposeless movements' (Darwin, 1965 [1872], p. 76), and several sentences later remarks,

Now with animals of all kinds, the acquirement of almost all their pleasures, with the exception of those of warmth and rest, are associated with active movements, as in the hunting or search for food, and in their courtship. Moreover, the mere exertion of the muscles after long rest or confinement is in itself a pleasure, as we ourselves feel, and as we see in the play of young animals. Therefore on this latter principle alone [the principle of the action of the nervous system] we might perhaps expect that vivid pleasure would be apt to show itself conversely [that is, in contrast with long rest and confinement] in muscular movements (p. 77).

The implicit premise is furthermore explicitly and succinctly attested to in his remark concerning the variable relationship of movement and emotion: 'I need hardly premise that movements or changes in any part of the body . . . may all equally well serve for expression' (ibid., p. 28). In short, the *expression* of emotion in man and animals is a kinetic phenomenon, a neuromuscular dynamic that, as we will presently see, has a certain spatiality, temporality, intensity, and manner of execution. This complex kinetic structure is essentially demonstrated in movement notation analyses by ethologists who thereby capture the dynamics of animal behaviour. The ethological studies of mammalian pre-copulatory interactions (Golani, 1976) and of the dynamics of wolves fighting (Moran *et al.*, 1981) are classics in this respect.

The import of Jacobson's work to Darwin's evolutionary studies of emotion, and to movement-oriented ethological studies as well, lies in the strong empirical data it presents showing that emotions are grounded in a neuromuscular dynamic. The dynamic is delineated along further empirical lines in the experimental research of psychiatrist Nina Bull. Bull's work shows that emotions are shaped by motor attitudes, that 'a basic neuromuscular sequence is essential to the production of affect' (Bull, 1951, p. 79).⁷ It demonstrates, and in a striking way, that there is a *generative* as

did not evolve merely to register representations of the world; rather, it evolved for adaptive action and behavior. Musculoskeletal structures co-evolved with appropriate brain structures so that the entire unit functions together . . . (Keiso, 1995, p. 268). He goes on to say that 'Edelman arrived at a similar conclusion', i.e., 'For him, like me, it is the entire system of muscles, joints, and proprioceptive and kinesthetic functions plus appropriate parts of the brain that evolves and functions together in a unitary way' (ibid.).

Ginsburg and Harrington (1996), in their review of research on bodily states and emotions, thoroughly misrepresent Bull's monograph and the experimental work that it details when they characterize her view of feeling as a 'pause' between 'motor attitude' and 'instrumental action' (p. 249). Bull is at pains to describe emotions as a *process*, and a process that includes thinking. Toward the end of her first chapter, with respect to one aspect of that process, 'attitude-affect', the aspect with which she is

well as *expressive* relationship between movement and emotion. Her work is in this respect a significant amplification of Darwin's. A summary account follows.

In a first group of experimental studies showing how a preparatory postural attitude is vital to the feeling of emotion, subjects were hypnotized, then told '[that] a word denoting a certain emotion would be uttered, that they would then experience this emotion, that they would show this in outward behavior in a natural manner', and that they would afterward be asked to describe what happened (ibid., p. 78). Six emotions were investigated in this manner: fear, anger, disgust, depression, joy, triumph. The subjects' reports validate Bull's thesis that a certain neuromuscular attitude is necessary to, and coincident with, each particular emotion. With respect to fear, for example, one subject reported 'First my jaws tightened, and then my legs and feet . . . my toes bunched up until it hurt . . . and . . . well, I was just afraid of something' (ibid., p. 59). With respect to anger, 'subjects mentioned wanting to throw, pound, tear, smash and hit' — and what restrained them was 'always the same, *clenching the hands*' or making some similar restraining movement (ibid., p. 65).⁸ It is important to emphasize that the preparatory postural attitude is in all instances a spontaneously arrived at attitude; what subjects are reporting in each case is *how they were moved*. In the succeeding set of experimental studies, hypnotized subjects were read a particular description from one of their own experiential reports, the description beginning with phrases such as 'Your jaws are tightening' (fear), or 'You feel heavy all over' (depression), or 'There is a feeling of relaxation and lightness in your whole body' (joy), or 'You can feel your chest expanding' (triumph), and so on. Following this initial descriptive reading, the subject was told 'You are now locked in this physical position. There will be no changes in your body — no new bodily sensations — until I position. There will be no changes in your body — no new bodily sensations — until I feel this emotion — feel it naturally — and will be able to tell us about it afterward' (ibid., pp. 79–80). The emotion the experimenter named was antithetical to the one coincident with the position in which the subject was locked. What the experiment showed is that subjects were unable to have any other feeling than the one into which they were locked. In other words, they were unable to feel the designated contrasting emotion, and this because any change in affect required a change in postural set or

particularly concerned, she states that while it may seem to be a *state* or a 'static quality', attitude-affect is actually 'a moving series of neuromuscular events, a process which, for want of any better name, we must continue to call *emotion*' (Bull, 1951, p. 13).

[8] Of particular significance is Bull's attention to kinetic detail in the form of identifying conflicting motor attitudes. In anger, there is 'a primary compulsion toward aggression or attack, and a secondary powerful restraint, or holding back, which was always muscular and attitudinal' (1951, pp. 62–3). Equally divergent but different attitudes are found in fear and in disgust. Bull speaks of '[t]he jointed character of disgust' (p. 48), the one distinct reaction being a felt nausea and a preparation for vomiting and the other a turning away or averted attitude of the body. Thus, one reaction was 'predominantly visceral and the other predominantly skeletal' (p. 48). Proportions were different in each case so that the overall experience varied, but '[t]he two reactions [were] so closely interwoven as to be apparently inseparable' (pp. 48–9). Again, in fear, 'two separate incompatible reactions [were] going on at once, but in this case the conflict was between posture and movement within the same muscular system', both reactions being skeletal rather than skeletal and visceral in nature. The '*desire to get away* [was] opposed by the *inability to move*' (p. 58).

bodily attitude. As one subject said, 'I reached for joy — but couldn't get it — so tense'; and as another said, 'I feel light — can't feel depression' (ibid., pp. 84, 85).

From a methodological viewpoint, what makes Bull's study of particular interest is that it utilizes hypnosis to access the experience of emotions. Introspective reports so obtained do not require time-intensive observational training as, for example, Jacobson's introspective auto-sensory observational studies do. Most important, however, are two facts: first, experiences of emotion reported by hypnotized subjects are near indisputable, i.e., there is no reasonable basis for challenging their authenticity; second, experiences so obtained are readily and incontrovertibly detailed as pre-eminently experiences of the tactile-kinesthetic body. The averted pattern of disgust, for example, is described by one subject as 'I tried to back away — pushed back on the chair — straight back. All the muscles seemed to push straight back. I could feel that rather strong'; the dual character of fear is described by another subject as 'I wanted to turn away in the beginning . . . I couldn't . . . I was too afraid to move . . . [my legs were] made of lead . . . I couldn't move my hands either. It was as if they were nailed to the chair'; the expansive and powerful character of triumph is described by another subject as 'I had an urge to stand on my toes in order to look down on people at a more acute angle' (ibid., pp. 53, 58, 73). With respect to the evidential pre-eminence of the tactile-kinesthetic body, and to the origin of emotion in a qualitatively felt neuromuscular dynamics, Bull's comment about the subjects' general lack of distinction between bodily feelings and the feeling of an emotion is significant. Although she also remarks that subjects 'seemed always aware of a difference', she concludes by saying that '[t]his important matter requires further investigation, and no exact definition of emotional feeling or affect, as distinct from organic sensation, will be attempted at the present time' (ibid., p. 47). In effect, she leaves the question of the relationship between bodily feelings and emotional feelings in mid-air. Yet if having a feeling in an emotional sense depends on a certain postural set, a certain tactile-kinesthetic attitude and thus a certain tactile-kinesthetic feel, and if one must get out of this tactile-kinesthetic attitude and feel in order to have a different emotion, then clearly, definitions and distinctions are less important than the recognition and descriptive analysis of a basic corporeal matter of fact: *affective feelings and tactile-kinesthetic feelings are experientially intertwined*. That subjects generally do not distinguish between the two feelings is testimony to the fact that they are regularly experienced holistically, not as piecemeal parts that become progressively apparent, and not as causally sequenced phenomena, but integrally. It thus suggests that bodily feelings and feelings of emotion are divisible only reflectively, after

the experience. Further, as the experimental evidence shows, affective feelings are consistently true to tactile-kinesthetic dynamics; the two sets of feelings are mutually congruent. Their congruency defines the character or nature of their intertwining. The summary phenomenological analysis of movement that will presently follow lays the groundwork for elucidating the foundational dynamics undergirding the congruency.

Now a postural attitude is defined by Bull as a readiness to do something, a corporeal readiness to act in some way or other, and it is this postural attitude that is the generative source of emotion (cf. Varela, 1999, pp. 132–3 on 'ontological readiness' and 'readiness potential'; Sheets-Johnstone, 1999, Chapter 9, on 'readiness toward meaning').¹⁰ The postural attitude is thus coincident with what might be designated the onset of emotion: *with a felt urge to do something* — approach something, strike something, touch something, run from something, and so on. Emotion, then, is not *identical* to kicking, embracing, running away, and so on, but is, from the beginning by way of the postural attitude, the motivational-affective source of such actions.¹¹ As such, it might be conceived within Bull's analysis as the necessary substrate or foundation of action. An observation by Darwin succinctly illustrates this point. Darwin writes that '[W]hen we start at any sudden sound or sight, almost all the muscles of the body are involuntarily and momentarily thrown into strong action, for the sake of guarding ourselves against or jumping away from the danger, which we habitually associate with anything unexpected' (Darwin, 1965, p. 284). The action itself, that is, the 'guarding ourselves against' or 'jumping away from' is not the feeling nor does it generate the feeling; the guarding or the jumping is its expression. By the same token, the 'strong action' of the postural attitude — 'all the muscles of the body are involuntarily and momentarily thrown into strong action' — is what makes the guarding or jumping possible. Without the readiness to act in a certain way, without certain *corporeal tonicities*, a certain feeling would not, and indeed, could not be felt, and a certain action would not, and indeed, could not be taken, since the postural dynamics of the body are what make the feeling and the action possible.

Psychologist Joseph de Rivera's 'geometry of emotions' (Dahl in de Rivera, 1977, p. 4) provides further documentation of the essential relationship between emotion and movement, and in ways that both corroborate and extend Bull's experimental studies. His 'geometry' or structural theory of emotions rests on two fundamental observations: when we experience emotion, 'we experience ourselves . . . as being

[9] Usual counterexamples offered to this line of reasoning concern paraplegics and paralyzed persons.

What is not customarily recognized, however, is that persons so afflicted were once not so afflicted. As experimental subjects, there is no doubt but that their testimony is conditioned by previous experience: they know what it is like to feel anger, fear, and so on, in a full bodily felt sense. (It is telling that most people do not realize — or they commonly forget — that Helen Keller was not blind and deaf from birth, but became blind and deaf when she was nineteen months old. Fundamental experiences and learnings in the first months and years of life can be neither ignored nor discounted.) It is furthermore apparent from the empirical studies cited in the present text that some kind of preparation is necessary to obtaining veridical reports on the tactile-kinesthetic body, and this because adults, especially Western ones, are notoriously afflicted with Cartesian disease. In other words, adults need to be trained to attend to their bodies and to be meticulous observers. This applies to all persons involved in introspecting tactile-kinesthetic experience.

[10] Specific attention should be called to the fact that the postural readiness to act is a *spontaneous* bodily happening, not a voluntary cultivated one. Attention too should be called to the fact that *readiness* is a phenomenon in dire need of recognition and study by cognitivists and researchers generally in the area of cognition and semantics. Readiness is obviously related to attention — one of the 'mental powers' identified by Darwin (Darwin, 1981 [1871]), and to receptivity, a fundamental dimension of experience analyzed by Husserl (1973b) in terms of *turning toward*. Implicit in both Darwin's and Husserl's accounts is a recognition of living bodies, i.e., readiness is a phenomenon that is anchored in living bodies and, being so anchored, is a phenomenon that necessarily requires the study and understanding of animate form.

[11] The movements of grief and of joy are not actions but precisely movements. In effect, there is no less a distinctive postural readiness to the having of these and other such emotions. The body folds heavily inward in grief, for example, in contrast to its expansive lightness in joy. Hence, 'preparation for action' may in some instances be a certain postural readiness and corporeal tonicity tied not to action but to a purely qualitative kinetics or kinetic form — a way of being a body.

moved (ibid., p. 11, italics in original; see also, among others, ¹² Sartre, 1948, p. 15: '[T]he phenomenologist will interrogate emotion. . . . He will ask if not only what it is but what it has to teach us about a being, one of whose characteristics is exactly that he is capable of *being moved*' [italics added]); and when we examine our experience, we discover 'different movements of the emotions' and in turn can specify 'the nature of the movement that each [emotion] manifests' (de Rivera 1977, pp. 35, 38). De Rivera elaborates the first observation when he writes that 'the paradox of emotional experience' is that 'we are passively being moved rather than acting and yet this movement seems to be coming from *within us*' (ibid., p. 12). He does not inquire specifically into the provenience of this *coming from within*; he does not trace its roots to Jacobson's felt bodily tensions, to Bull's felt neuromuscular dynamics, or to what I have identified phenomenologically as the tactile-kinesthetic body, but it is clear that he recognizes this *generative* source of emotions even as he focuses on what he defines as the transformative nature of emotion (they transform our relation to the world [ibid., p. 35]), and even as he fuses, or perhaps better, prenatally fuses and thus confuses 'the movement of emotions' and emotional transformations. His recognition of a tactile-kinesthetic dynamics — of the coming from within as a postural attitude that engenders an urge to move in certain ways — is evident in the corporeal illustration he gives of the four basic differential movements of emotion. The illustration implicitly specifies, and in concrete kinetic terms, the coming from within. Presented in the chapter 'The Movements of the Emotions', the illustration names four fundamental kinetic relations — what we might designate four basic *kinetic forms* — that can obtain between subject and object and that are instantiated in the feelings of anger, fear, affection, and desire. De Rivera's illustration of the differences between and among these forms is firmly anchored in common, everyday bodily movement experiences and warrants full quotation:

It is intriguing that the distinction between these four basic relations [of anger, fear, affection, and desire, which he delineates in terms of moving against or away from an object in the first two instances and in terms of moving toward an object in the second two instances] may be captured by different bodily movements of extension and contraction. If the arms are held out in a circle so that the fingertips almost touch, they may either be brought toward the body (a movement of contraction) or moved out in an extension. The entire trunk may follow these movements. [So also, we might add, may one's legs, and thus one's whole body.] Now if the palms are facing in, the extension movement corresponds to a moving toward the other — a giving — as in tenderness, while the contraction movement suggests a movement toward the self — a getting — as in longing. If the palms are rotated out, the extension movement corresponds to the thrusting against of anger, while the contraction intimates the withdrawal away of fear. . . . If one allows oneself to become involved in the movement and imagines an object, one may experience the corresponding emotion (ibid., p. 40).

On the basis of these 'four basic emotional movements' (ibid., p. 41), de Rivera elaborates a complex structure of emotions that includes consideration of a subject's emotions toward him/herself (emotions such as shame and pride), of emotions as fluid or fixed, of movement from one emotion to another, and so on. The point of moment here is not the complex interrelated structure that de Rivera progressively builds, but the basic kinetic structure underlying the whole: *all emotions resolve*

themselves into extensional or contractive movement, movement that goes either toward or against or away from an object, including the object that is oneself. The simple self-demonstration that de Rivera describes aptly captures this basic kinetic structure and with it, the quintessential kinetic dynamics of emotion. It does so through a recognition of the spatiality inherent in the generative kinetic form of emotions: we are moved to move toward or against or away; we are moved basically to extend or to contract ourselves. The correspondence between the spatiality of these basic movements and the spatiality expressed in statements of Bull's subjects is transparent: they say not only that 'I reached for joy — but couldn't get it — so tense', but 'My chest was expanded and held out'; 'I wanted to pound the table or throw something, but I clasped my hand instead'; 'I tried to back away — pushed back on the chair — straight back. All the muscles seemed to push straight back' (Bull, 1951, pp. 143, 146, 153); and so on. The spatial dimension of movement is thematic and palpably evident in these statements. But spatiality is only one dimension of movement; temporality, intensity, and the projectional character of movement are basic dimensions as well. The global phenomenon of movement is compounded of dynamically interrelated elements that together constitute the fundamental dynamic congruency of emotion and motion. Indeed, emotions are from this perspective *possible kinetic forms of the tactile-kinesthetic body*. This is the direction in which all of the empirical research points. A phenomenological analysis of movement will elucidate the dynamic structure underlying these possible kinetic forms.

III: The Phenomenology of Movement: A Summary Account

When we bracket our natural attitude toward movement,¹³ which includes suspending the object-tethered, dynamically empty, and in turn epistemologically and metaphysically skewed definition of movement as 'a change of position',¹⁴ and turn our attention to a phenomenological analysis of the *experience* of movement, we find a complex of four basic qualities: tensional, linear, amplitudinal, and projectional (Sheets-Johnstone, 1966/1980; 1999). These qualities, separable only analytically, inhere in the global experience of any movement, including most prominently our experience of self-movement. Any time we care to notice them, there they are. We shall take an everyday experience of moving ourselves — walking — as a 'transcendental clue' (Husserl, 1973a; see also Sheets-Johnstone, 1999), that is, as a point of departure for a summary phenomenological analysis of movement.

Walking is a dynamic phenomenon whose varying qualities are easily and plainly observable by us: we walk in a determined manner, with firm, unswerving, measured steps; we walk in a jaunty manner with light, cantering, exaggerated steps; we walk in a disturbed manner with tense, erratic steps that go off now in this direction, now in that, and that are now tightly-concentrated, now dispersed; we walk in a regular walking-to-get-some-place manner with easy, flowing, striding steps. Tensional, linear, amplitudinal, and projectional qualities of movement are present in each instance

[12] See below in this text: emotions 'happen' to us (Ekman *et al.*, 1990).

[13] For a detailed account of bracketing (the phenomenological *epoché*), see Sheets-Johnstone (1999), Chapter 4; Husserl and Von Heimboltz — and the Possibility of a Trans-Disciplinary Communal Task. [14] What changes position are objects in motion, not movement. Movement is thus not equivalent to objects in motion (see Sheets-Johnstone, 1979; 1999).

and in each instance define a particular dynamic.¹⁵ With the recognition of these qualities comes a beginning appreciation of their complexity and of their seemingly limitless interrelationships — and an appreciation as well of the fiction and vacuity of defining movement as 'a change of position' much less of conceiving it as output. As the examples of walking indicate, movement is a variable phenomenon because it is an inherently complex dynamic phenomenon. Motor physiologists have long recognized this fact in what they term 'the degrees of freedom problem' (Bernstein, 1984). The problem is aptly designated phenomenologically 'the kinaesthetic motivation problem' (Sheets-Johnstone, 1999): we can raise our arm from the wrist, from the elbow, from the shoulder, for example, with different possible tensions and amplitudes, different possible speeds, in different possible directions, and so on. Regarded in the phenomenological attitude, movement is both a variable-because-complex and complex-because-variable dynamic happening, an experience which, as indicated, is there any time we care to notice it.¹⁶

By the very nature of its spatio-temporal-energetic dynamic, bodily movement is a *formal* happening. Even a sneeze has a certain formal dynamic in which certain suddennesses and suspensions of movement are felt aspects of the experience. Form is the result of the qualities of movement and of the way in which they modulate and play out dynamically. In a very general sense, tensional quality has to do with our felt effort in moving; linear quality with both the felt linear contour of our moving body and the linear paths we describe in the process of moving, thus, with the directional aspect of our movement; amplitudinal quality with both the felt expansiveness or contractiveness of our moving body and the spatial extensiveness or constrictedness of our movement, thus, with the magnitude of our movement; projectional quality with the manner in which we release force or energy — in a sustained manner, for example, in an explosive manner, in a ballistic manner, in a punctuated manner, and so on. Linear and amplitudinal qualities obviously constitute spatial aspects of movement; temporal aspects of movement are a complex of projectional and tensional qualities. It is of singular moment to note that movement *creates* the qualities it embodies and that we experience. In effect, movement does not simply take place in space and in time. We qualitatively create a certain spatial character by the very nature of our movement — a large open space or a tight resistant space, for example, a spatial difference readily suggestive of the distinctive spatialities of joy and fear.

[15] Linguaging the dynamics of movement is a challenging task, perhaps more so than languaging any other phenomenon one investigates phenomenologically. Pinpointing the exact character of a kinetic experience is not a truth-in-packaging matter; the process of moving is not reducible to a set of ingredients. The challenge derives in part from an object-tethered English language that easily misses or falls short of the temporal, spatial, and energetic qualitative dynamics of movement.

[16] A reviewer called my attention to a paper by Georgieff and Jeannerod in connection with his concern that 'it is not obvious that kinaesthesia ALONE could be responsible for awareness of movement as self-initiated.' The paper by Georgieff and Jeannerod (<http://www.isc.cnrs.fr/wp/wpjea9805.htm>) in part concludes that 'normal subjects appear to be unable to consciously monitor the signals generated by their own movement' (p. 4). The experiment on which the conclusion is based, however, assumes a key element that needs to be investigated and taken into account, namely, attention (cf. Darwin, 1981 [1871]). What one attends to is what one is conscious of: if one's attention is visually tethered to a visual desired result (and given 'the well-known dominance of visual information over information from other modalities,' a point that Georgieff and Jeannerod themselves make (*ibid.*)), kinaesthetic awareness will be proportionately lessened. The conclusion, in effect, is vitiated by oversight of a key 'mental power' (Darwin, 1981 [1871], pp. 44–45).

Analogous relationships hold with respect to the created temporal character of movement — a hurried and staccato flow of movement, for example, or a leisurely and relatively unpunctuated flow, temporal differences readily suggestive of the distinctive temporalities of agitation and calmness. In sum, particular energies, spatialities, and temporalities come into play with self-movement and together articulate a particular qualitative dynamic.

IV: The Dynamic Congruency

As the examples of walking show, the formal dynamics of movement are articulated in and through the qualities of movement as they are created in the act of moving. The challenge now is to demonstrate concretely how dynamic kinetic forms are congruent with dynamic forms of feeling — how motion and emotion, each formally distinctive experiences, are of a dynamic piece. Because it is a common and well-researched experience, I will use *fear* to illustrate the dynamic congruency.

Phenomenologically, it is sufficient to imagine oneself fearing (Husserl, 1983, Section 4) — as in being pursued by an unknown assailant at night in a deserted area of a city¹⁷ — in order to begin studying the kinetic dynamics of fear. A beginning phenomenological account of the kinetic experience might run as follows:

An intense and unceasing whole-body tension drives the body forward. It is quite unlike the tension one feels in a jogging run, for instance, or in a run to greet someone. There is a hardness to the whole body that congeals it into a singularly tight mass; the driving speed of the movement condenses airborne and impact moments into a singular continuum of motion. The head-on movement is at times erratic; there are sudden changes of direction. With these changes, the legs move suddenly apart, momentarily widening the base of support and bending at the knee, so that the whole body is lowered. The movement is each time abrupt. It breaks the otherwise unrelenting and propulsive speed of movement. The body may suddenly swerve, dodge, twist, duck, or crouch, and the head may swivel about before the forward plunging run with its acutely concentrated and unbroken energies continues.

Compare this brief phenomenological description to the description of Martina's fear on experiencing a change in accustomed habit. Ethologist Konrad Lorenz writes:

One evening I forgot to let Martina [a greylag goose] in . . . and when I finally remembered . . . I ran to the front door, and as I opened it she thrust herself hurriedly and anxiously through, ran between my legs into the hall and . . . to the stairs. . . . [A]rriving at the fifth step, she suddenly stopped . . . and spread her wings as for flight. Then she uttered a warning cry and very nearly took off. Now she hesitated a moment, turned around, ran hurriedly down the five steps and set forth resolutely . . . (Lorenz, 1967, pp. 65, 66–67)

Compare it to the fear of Temple in novelist William Faulkner's *Sanctuary*:

She surged and plunged, grinding the woman's hand against the door jamb until she was free. She sprang from the porch and ran towards the barn and into the hallway and climbed the ladder and scrambled through the trap and to her feet again, running towards the pile of rotting hay. Then suddenly she ran upside-down in a rushing interval; she

[17] Obviously, this is only one possible example. A complete phenomenological analysis requires 'free variations' (Husserl, 1973a; 1977), or in other words, consideration of multiple experiences of fear in order to identify invariants. A complete analysis would thus entail, for example, consideration of instances in which one is paralyzed with fear as well as mobilized by it.

could see her legs running in space, and she struck lightly and solidly on her back and lay still . . . ' (1953, pp. 75–76).

Descriptions of the dynamics of fear illustrate in each instance how the four basic qualities of movement inhere in an ongoing kinetic dynamic and how that dynamic is through and through congruent with the dynamics of fear: its felt urgency, clutchedness, stops and starts, desire for escape, sense of sudden impending disaster coming from everywhere and nowhere, and so on. In short, movement qualities can be described (and both more finely and more extensively than in the brief sketches above); and *fear* movement can in turn be distinctively detailed, and in different species as well as different instances. This is essentially because movement is movement — it is analytically the same in all instances — and because fear moves us — living creatures, animate forms — as all emotions move us: to move in ways coincident with its felt dynamics. Dynamics vary because fear itself varies: the clutchedness of fear may predominate over the desire for escape; urgency may be extreme at one moment or in one situation and far less pressing in another; and so on. Moreover, each particular experience unfolds in a particular way, articulating a particular overall formal dynamic that begins in a certain way from a certain here-now other emotion,¹⁸ that waxes and wanes, or is attenuated, heightened, reinforced, compounded, intensified, or unexpectedly calmed. Whatever the particular instance, when fear 'happens' to us (Ekman *et al.*, 1990), i.e., when it moves us, we move in ways qualitatively congruent with the way(s) in which we are moved to move; spatial, temporal, and energetic qualities of our movement carry us forward in an ongoing kinetic form that is dynamically congruent with the form of our ongoing feelings. Unified by a single dynamics, the two modes of experience happen at once; simultaneity of affect and movement is made possible by a shared dynamics.

It is evident, then, that a particular kinetic form of an emotion is not identical with the emotion but is dynamically congruent with it. Because there is a *formal* congruency, one can separate out the emotion — the felt affective aspect and the postural attitude that generates it, or allows it to generate — from the kinetic form that expresses it. An emotion may thus be corporeally experienced, on the one hand, even though it is not carried forth into movement, and it may be mimed, on the other hand, but not actually experienced.¹⁹ In other words, one can inhibit the movement dynamics toward which one feels inclined — opening one's arms, moving quickly forward, and hugging; or throwing one's arms upward, wheeling about, and pacing; and equally, one can go through the motions of emotion — opening one's arms, moving quickly forward, and hugging; or throwing one's arms upward, wheeling about, and pacing — without experiencing the emotion itself.²⁰ The dual possibilities testify unmistakably to the dynamic congruency of emotion and motion. Corporeal tonicities are congruent with specific emotions from the beginning, as Bull's research shows. Whether and how one gives kinetic form to these tonicities is a matter of

[18] Limited space precludes showing how emotion is continuous rather than a set of neatly packaged states that descend on us individually every so often.

[19] One can precipitate autonomic nervous system activity, however, merely by 'putting on a face'. See Levenson *et al.* (1990); Ekman *et al.* (1983).

[20] The striking power of movement in dance to present us with the semblance of emotion (Langer, 1953) through the choreographic formalization of a kinetic dynamics is testimonial to the latter possibility (see also Sheets-Johnstone, 1966/1980). Martha Graham's *Lamentation* is a classic example.

choice.²¹ The two options appear to have different origins. With respect to inhibition, one ordinarily learns in childhood that to avoid certain unwanted consequences, self-restraint is desirable. However, precisely in these circumstances, one may learn to simulate — to go through the motions of — what parents or other adults deem proper. While inhibition is actively learned, that is, a child is taught to restrain him/herself from, for example, hitting, no one teaches a child to dissemble or simulate, e.g., to move compliantly when she/he feels like hitting. A child learns this from her/his own experience and intuitively practices the art of movement deception.²² The dual possibilities not only testify to dynamic congruence; they underscore the fact that what is affective is kinetic or potentially kinetic, and that what is kinetic is affective or potentially affective. Restraining movement and simulating emotion attest to each fact respectively.

V: Methodological Significance of a Whole-Body Dynamics

The kinetic dynamics of emotion may be studied objectively through the use of a movement notation system. The possibility is not entirely new (see review of non-verbal behaviour studies in Rosenfeld, 1982), but its methodological significance for empirical studies of emotion has not been recognized, in large measure because the fundamental congruity of emotion and motion has been neither acknowledged nor examined. To appreciate the significance, consider first some well-known empirical data.

Fear 'is the dominant component of anxiety'; it measures the highest tensional mean of all emotional situations; it 'brings about a tensing and tightening of muscles and other motor mechanisms, and in terror the individual may 'freeze' and become immobile' (Izard, 1977, pp. 378, 366, 365). Psychologist Carroll Izard amplifies these basic empirical findings, stating that 'Intense fear is the most dangerous of all emotion conditions' and that 'The innate releasers or natural clues for fear include being alone, strangeness, height, sudden approach, sudden change of stimuli, and pain' (p. 382).²³ The data bear out and broaden Jacobson's studies of anxiety. With respect to felt bodily experiences of fear, however, they fall far short of what Bull's subjects offer. While facial expression is described, and extensively so, the body is not, except to say that 'The person feels a high degree of tension and a moderate degree of impulsiveness' (p. 383).

[21] Whether and how one moves (or, in highly simplified third-person behavioural terms, whether and how a person acts, e.g., aggressively, friendly, or disgustedly, for example, and what actions a person performs, e.g., pounding, patting, or turning away) is something over and above the corporeal tonicities themselves in that whether and how one moves are both volitional. However much one is moved to move, and however much one is a creature of habit, one can elect to move — angrily or compassionately, for example — or not to move, e.g., to be indifferent, or uninvolved, which kinetically means turning away in some manner, averting one's eyes, and so on. One is, in short, always responsible for one's movement (behaviour).

[22] See von Helmholtz (1971 [1870]) and Husserl (1980) on intuition and its distinction from reasoned processes of thought.

[23] Todd (1937, p. 267): 'The terrified cat at the top of the elm, his muscular strength greatly enhanced by his adrenalin secretion, stops digesting because of his more pressing needs. Rescue him, and he curls up in his corner and is soon fast asleep, recovering his equilibrium. Man, however, being the only animal that can be afraid all the time, prolongs his conflicts even after the danger is past. Proust died of introspection long before he died of pneumonia, burned out by the chemistry of seven volumes of *Remembrance of Things Past* (p. 274). See also Averill (1996, p. 218): '[F]ear: no animal has as many as man, not only of concrete, earthly dangers, but also of a whole pantheon of spirits and imaginary evils as well.'

Bodily movements coincident with emotion are different from both facial expression and autonomic nervous system activity, these phenomena being the prime focus of empirical studies of emotion. Studies of the former present emotion in the form of visual stills and deduced facial muscle involvement; studies of the latter measure physiological responses.²⁴ Neither focus on the *whole-body experience* of emotion, which means neither focus on the felt experience of being moved and moving. This is *not* to minimize the far-reaching epistemological value and significance of studies of facial expression or of autonomic nervous system activity *vis à vis* emotions. It is rather to call attention to the near complete lack of attendance to the felt bodily experience of emotion as in Bull's studies, to the felt kinetic unfolding or bodily process of emotion as adumbrated in de Rivera's 'movement of emotion,' and to the twin formal dynamics of being moved and moving as evident both in the above descriptive accounts and in diverse literatures generally.²⁵ In fact, by itself, our immediate and untroubled comprehension of descriptions of emotion — descriptions regularly given in primatological studies, ethological studies, and in all manner of literature on humans — calls attention to the foundational grounding of emotion in motion, which is to say in the experience of our own kinetic/tactile-kinaesthetic bodies. How else explain our untutored understanding of a tightly tensed running body that suddenly stops; turns, swivels, then pitches on, or of a goose's 'hurried' and 'anxious' stop-and-start movements, or of a character's 'surging', 'plunging', 'grinding', 'springing', 'scrambling' movements? We know immediately — in our muscles and bones — what it is to be pursued, to experience sudden and disruptive change, to be trapped; we know in a bodily felt sense what it is to be — in a word — fearful. Indeed, we recognize fear in these purely kinetic descriptions in the same way that experimental subjects recognize fear on being shown composite photographs of faces with widely opened eyes, raised and pulled together brows, and drawn-back lips, and who furthermore recognize their own facial expression of fear on being asked to make these composite gestures themselves (Ekman *et al.*, 1983; Levenson *et al.*, 1990). *We recognize the kinetics of fear on the basis of our own kinetic/tactile-kinaesthetic bodily experiences of fear.* Primatologist Jane Goodall documents this fact straightaway and more broadly when, in describing a variety of intraspecific whole-body emotional comportments in a chimpanzee society, she states, 'We make these judgements [about how a chimpanzee is feeling] because the similarity of so much of a chimpanzee's behaviour to our own permits us to empathize' (Goodall, 1990, p. 17).

[24] With respect to physiological studies, it is worthwhile pointing out that various researchers localize emotions in the (primitive) brain, especially the limbic system, and that the practice of localization is not without criticism. After considering various localization scenarios, Averill (1996, p. 221) comments that 'As Von Holst and Saint-Paul (1960) have emphasized, questions of "how" and "why" are too frequently turned into the seemingly more simple problem of "where".' He goes on to remark, 'The recent past has been a period of great neuroanatomical progress, made possible by advances in electronic recording and stimulating devices; unfortunately there is little sign of corresponding progress in the conceptualization of psychophysiological relationships. The macroscopic phrenology of Gall and Spurzheim may be dead, but a kind of microscopic phrenology is alive and well in many a neurophysiological laboratory.'

[25] The lack is occasionally recognized: e.g., Ginsburg and Harrington (1996, p. 245): 'There is a relative dearth of systematic research on the relationships between (sic) emotions and movements and postures.'

To omit attention to a *whole-body* dynamics is to reduce the dynamics of emotion — and more particularly, the dynamic form of an emotion as it unfolds — to a single expressive moment or to isolated internal bodily happenings. It is to de-temporalize what is by nature temporal or processual. Correlatively, it is to skew the evolutionary significance of emotion, which is basically not to communicate, but *to motivate action*. Sperry's principal finding — that the brain is an organ of and for movement — is central to this evolutionary understanding. Not only is the social significance of emotion, i.e., the value of letting others know how one feels and of knowing how others feel, contingent on being social animals, a comparatively late evolutionary development, but knowledge of the feelings of others is itself tied to movement. 'Fearful behaviour' — a 'display' of emotion or what primatologist Stuart Altmann more generally and rightfully terms a 'comsign' (Altmann, 1967; see also Sheets-Johnstone, 1990) — is articulated in bodily movement. Being articulated in bodily movement, it has a distinctive kinetic form recognizable by others. Indeed, like all communicative emotional behaviours, 'fear behaviour' *originates in movement*, movement that is communal in the sense of being performed or performable by conspecifics, movement that thus falls within the 'I cans' or movement possibilities of the species and on that basis is immediately meaningful to all — a *comsign*. In short, emotional behaviours are fundamentally kinetic bodily happenings that originate in experiences of being moved to move and that evolve kinetically. Their communicative value is an evolutionary outgrowth of what is already there: motivations (from Latin *movere*, to move) are felt dispositions or urges to move in certain ways — to strike or to back away, or to peer, stalk, touch, snatch, or squeeze. To say that the social derives from what is evolutionarily given is to say that it derives from species-specific kinetic/tactile-kinaesthetic bodies (Sheets-Johnstone, 1994; see also Ekman, 1994; Ekman and Davidson, 1994).

In sum, emotions are prime motivators: animate creatures 'behave' because they feel themselves moved to move. Short of this motivation, the social significance of emotion would be nil. What would be the value of knowing another's feelings or of another knowing one's own if in each instance the knowledge was kinetically and affectively sterile, generating nothing in the way of interest, curiosity, flight, excitement, amicability, fear, agitation, and so on?²⁶

Movement notation systems allow empirical study of a whole-body kinetic process in ways that would provide insight into the *differential dynamics of emotions*. In Labananalysis and Labanotation especially, both the *what* and the *how* of movement is notated, thus not merely a flexing of the knee or a twisting of the torso (Labananalysis), for example, but the manner in which the knee is flexed or the torso is twisted (Labanotation or Effort/Shape). In effect, one could specify both the qualitative dynamics of movement and the formal dynamics of emotion as they are simultaneously played out. One could thereby demonstrate empirically the dynamic congruency of movement and emotion in real life. It bears noting that, through the use of movement notation systems, dynamic congruency can be elucidated in species-specific ways that draw our attention to kinetic domains (Sheets-Johnstone, 1983; 1999), thus to similarities and differences among and between species. Moreover,

[26] Limited space precludes showing that interest, curiosity, excitement, and other such feelings are no less emotions than fear and anger.

dynamic congruency can be elucidated in culture-specific ways, allowing one to distinguish what is evolutionarily given from what is culturally transformed — exaggerated, suppressed, neglected, or distorted (Sheets-Johnstone, 1994). Insofar as one can find only what one's methodology allows one to find and to know only what one's methodology allows one to know, the value of movement notation systems to the empirical study of emotion is self-evident: the systems offer a methodology proper to *dynamical* studies of emotion, emotion as it is actually experienced in the throes, trials, and pleasures of everyday life. In this respect, they offer the possibility of a complete empirical science of emotion, a science that, not incidentally, is capable of addressing evolutionary and cultural questions on the basis of detailed pan-species and pan-human empirical evidence.

VI: Implications for Cognitivism

Emotions move us, and in moving us are quintessentially linked to kinetic/tactile-kinaesthetic bodies. Preceding sections have shown that they are clearly tied to animation and to kinetic possibilities of animate life. Broad but conceptually fundamental implications follow from this beginning analysis. The characterization of living organisms as information processors or algorithmic machines and in turn as things whose various mechanisms can be thoroughly explained by studies of brains and behaviour — i.e., *in exclusion of experience, which means in exclusion of phenomenological and empirically-focused investigations and analyses of experience* — skews an understanding of animate life. Calling attention to this experientially deficient understanding, the foregoing analysis has the following implications for cognitivism:

(1) Movement is not behaviour; experience is not physiological activity, and a brain is not a body. What emerges and evolves — ontogenetically and phylogenetically — is not behaviour but movement, movement that is neatly partitioned and classified as behaviour by observers, but that is in its own right the basic phenomenon to be profitably studied; what is of moment to living creatures is not physiology *per se* but real-life bodily happenings that resonate tactilely and kinaesthetically, which is to say experientially; what feels and is moved to move is not a brain but a living organism.

(2) A movement-deficient understanding of emotion is an impoverished understanding of emotion. Being whole-body phenomena, emotions require a methodology capable of capturing kinetic form. When serious attention is turned to kinetic form and to the qualitative complexities of movement, emotions are properly recognized as dynamic forms of feeling, kinaesthesia is properly recognized as a dimension of cognition, cognition is properly recognized as a dimension of animation, and animation is no longer regarded mere output but the proper point of departure for the study of life.

(3) Movement notation systems provide real-life as opposed to computational or engineering conceptions and mappings of animal movement. Modelled movement is no match for a real-life kinetics, which alone can provide detailed understandings of the spatio-temporal-energetic dimensions of movement itself and of the dynamics of kinetic relationships and contexts.

(4) The penchant to talk about and to explain ourselves and/or aspects of ourselves as embodied — as in 'embodied connectionism' (Bechtel, 1997), and even as in 'embodied mind' (Varela *et al.*, 1991; Lakoff and Johnson, 1999), 'embodied schema' (Johnson, 1987), 'embodied agents', 'embodied actions' (Varela, 1999), and 'phenomenological embodiment' (Lakoff and Johnson, 1999) — evokes not simply the possibility of a disembodied relationship and of near or outright tautologies as in 'embodied agents', 'embodied actions' and 'the embodied mind is part of the living body' (Lakoff and Johnson, 1999, p. 565), but the spectre of Cartesianism. In this sense, the term 'embodied' is a lexical band-aid covering a 350-year-old wound generated and kept suppurating by a schizoid metaphysics. It evades the arduous and (by human lifetime standards) infinite task of clarifying and elucidating the nature of living nature from the ground up. Animate forms are the starting point of biological evolution. They are where life begins. They are where animation begins. They are where concepts begin. They are where emotions are rooted, not in something that might be termed 'mental life' (e.g., Cabanac, 1999, p. 184: 'emotion is a mental feeling'), a 'mental' that is or might be embodied in some form or other, but in animate form to begin with. *Embodiment* deflects our attention from the task of understanding animate form by conceptual default, by conveniently packaging beforehand something already labelled 'the mental' or 'mind' and something already labelled 'the physical' or 'body' without explaining — to paraphrase Edelman (1992, p. 15) — 'how "the package" got there in the first place' (cf. Sheets-Johnstone, 1998; 1999).

(5) Machines are sessile systems/devices anchored in one place as animate creatures are precisely *not* anchored. Robots are not forms of life to whom emotions happen but remote-control puppets to which signals are sent; they are not *moved* to move, but are *programmed* to move. Zombies are even more remote, being mere intellectual figments plumped with sound and fury but signifying nothing pertinent to understandings of animate life. In this respect, the hard problem is to forego thought experiments and to listen assiduously to our bodies, and to observe phenomenologically and empirically what is going on. The hard problem is to give animate form and the qualitative character of life their due. More broadly, the hard problem is to see ourselves and all forms of life as intact organisms, living bodies, rather than as brains or machines. We come into the world moving; moving and feeling moved to move are what are gone when we die. Surely when we lament or fear our own death, we do not lament or fear that we will have no more information to process. We lament or fear that we will no longer be *animate* beings but merely material stuff — *lifeless, unmoved, and unmoving*. Nature is 'a principle of motion', as Aristotle recognized, and kinetic form is its natural expression.

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References

- Altmann, Stuart (1967), 'The structure of primate social communication,' in *Social Communication Among Primates*, ed. Stuart A. Altmann (Chicago: University of Chicago Press).
- Aristotle (1984), *Physics*, trans. R.P. Hardie and R.K. Gaye, in *The Complete Works of Aristotle*, ed. Jonathan Barnes (Princeton: Princeton University Press).
- Averill, James R. (1996), 'An analysis of psychophysiological symbolism and its influence on theories of emotion,' in *The Emotions*, ed. R. Harré and W. G. Parrott (London: Sage Publications).

- Bechtel, William (1997), 'Embodied connectionism,' in *The Future of the Cognitive Revolution*, ed. David Martel Johnson and Christina E. Erneling (New York: Oxford University Press).
- Bernstein, Nicolas (1984), *Human Motor Actions: Bernstein Reassessed*, ed. H.T.A. Whiting (New York: Elsevier Science Publishing Co).
- Bruner, Jerome (1990), *Acts of Meaning* (Cambridge, MA: Harvard University Press).
- Bull, Nina (1951), *The Attitude Theory of Emotion* (New York: Nervous and Mental Disease Monographs [Coolidge Foundation]).
- Cabanac, Michel (1999), 'Emotion and phylogeny', *Journal of Consciousness Studies*, 6 (6-7), pp. 176-190.
- Carlson, Neil R. (1992), *Foundations of Physiological Psychology* (Boston, MA: Allyn and Bacon).
- Clynes, Manfred (1980), 'The communication of emotion: Theory of sentics', in *Emotion: Theory, Research, and Experience*, vol. I, *Theories of Emotion*, ed. R. Plutchik and H. Kellerman (New York: Academic Press).
- Crick, Francis and Koch, Christof (1992), 'The problem of consciousness', *Scientific American* 267/3: pp. 153-159.
- Dahl, Hartvig (1977), 'Considerations for a theory of emotions', in de Rivera (1977).
- Darwin, Charles (1965 [1872]), *The Expression of the Emotions in Man and Animals* (Chicago: University of Chicago Press).
- Darwin, Charles (1981 [1871]), *The Descent of Man and Selection in Relation to Sex* (Princeton: Princeton University Press).
- de Rivera, Joseph (1977), *A Structural Theory of the Emotions* (New York: International Universities Press).
- Edelman, Gerald (1992), *Bright Air, Brilliant Fire* (New York: Basic Books).
- Ekman, Paul (1994), 'Strong evidence for universals in facial expressions: A reply to Russell's mistaken critique', *Psychological Bulletin*, 115 (2), pp. 268-87.
- Ekman, Paul and Davidson, Richard J. (Ed. 1994), *The Nature of Emotion: Fundamental Questions*, (New York: Oxford University Press).
- Ekman, Paul, Davidson, R.J. and Friesen, W.V. (1990), 'The Duchenne Smile: Emotional expression and brain physiology II', *Journal of Personality and Social Psychology*, 58 (2), pp. 342-53.
- Ekman, Paul, Levenson, R.W. and Friesen, W.V. (1983), 'Autonomic nervous system activity distinguishes among emotions', *Science*, 221, pp. 1208-10.
- Faulkner, William (1953), *Sanctuary* (Harmondsworth: Penguin Books).
- Georgieff, Nicolas and Jeannerod, Marc (1998), 'Beyond consciousness of external reality. A "Who" system for consciousness of action and self consciousness', <http://www.isc.cnrs.fr/wp/wpjea9805.htm>: 1-10.
- Ginsburg, G.P. and Harrington, Melanie E. (1996), 'Bodily states and context in situated lines of action', in *The Emotions*, ed. R. Harré and W. G. Parrott (London: Sage Publications).
- Golani, Ilan (1976), 'Homeostatic motor processes in mammalian interactions: A choreography of display', in *Perspectives in Ethology*, vol. 2, ed. P.P.G. Bateson and Peter H. Klopfer (New York: Plenum Publishing).
- Goodall, Jane (1990), *Through a Window: My Thirty Years with the Chimpanzees of Gombe* (Boston, MA: Houghton Mifflin).
- Husserl, Edmund (1973a), *Cartesian Meditations*, tr. Dorion Cairns (The Hague: Martinus Nijhoff).
- Husserl, Edmund (1973b), *Experience and Judgment*, ed. Ludwig Landgrebe, tr. James S. Churchill and Karl Ameriks (Evanston, IL: Northwestern University Press).
- Husserl, Edmund (1977), *Phenomenological Psychology*, tr. John Scanlon (The Hague: Martinus Nijhoff).
- Husserl, Edmund (1980), *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy*, Third Book (*Ideas III*): *Phenomenology and the Foundations of the Sciences*, tr. Ted E. Klein and William E. Pohl (The Hague: Martinus Nijhoff).
- Husserl, Edmund (1983), *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy*, First Book (*Ideas I*), tr. F. Kersten (The Hague: Martinus Nijhoff).
- Izard, Carroll E. (1977), *Human Emotions* (New York: Plenum Press).
- Jacobson, Edmund (1929), *Progressive Relaxation* (Chicago: University of Chicago Press).
- Jacobson, Edmund (1967), *Biology of Emotions* (Springfield, IL: Charles C.
- Jacobson, Edmund (1970), *Modern Treatment of Tense Patients* (Springfield, IL: Charles C. Thomas).

- Jacobson, Edmund (1973), 'Electrophysiology of mental activities and introduction to the psychological process of thinking', in *Psychophysiology of Thinking*, ed. F.J. McGuigan and R.A. Schoonover (New York: Academic Press).
- Johnson, Mark (1987), *The Body in the Mind* (Chicago: University of Chicago Press).
- Kelso, J.A. Scott (1995), *Dynamic Patterns: The Self-Organization of Brain and Behavior* (Cambridge, MA: Bradford Books/MIT Press).
- Langer, Susanne K. (1953), *Feeling and Form* (New York: Charles Scribner's Sons).
- Lakoff, George and Johnson, Mark (1999) *Philosophy in the Flesh* (New York: Basic Books).
- Levenson, Robert W., Ekman, Paul and Friesen, W.V. (1990), 'Voluntary facial action generates emotion-specific autonomic nervous system activity', *Psychophysiology*, 27 (4), pp. 363-84.
- Lorenz, Konrad (1967), *On Aggression*, tr. Marjorie Kerr Wilson (New York: Bantam Books).
- Moran, Greg, Fentress, John C. and Golani, Ilan (1981), 'A description of relational patterns of movement during "ritualized fighting" in wolves', *Animal Behavior*, 29, pp. 1146-65.
- O'Connell, Alice L. and Gardner, Elizabeth B. (1972), *Understanding the Scientific Bases of Human Movement* (Philadelphia, PA: Lea & Febiger).
- Pribram, Karl H. (1980), 'The biology of emotions and other feelings', in *Emotion: Theory, Research, and Experience*, vol. I, *Theories of Emotion*, ed. R. Plutchik and H. Kellerman (New York: Academic Press).
- Rosenfeld, Howard M. (1982), 'Measurement of body motion and orientation', in *Handbook of Methods in Nonverbal Behavior Research*, ed. K.R. Scherer and P. Ekman (Cambridge: Cambridge University Press).
- Sartre, Jean-Paul (1948), *The Emotions: Outline of a Theory*, tr. B. Frechtman (New York: Philosophical Library).
- Sheets-Johnstone, Maxine (1966/1980), *The Phenomenology of Dance* (New York: Arno Press; London: Dance Books Ltd.).
- Sheets-Johnstone, Maxine (1979), 'On movement and objects in motion: The phenomenology of the visible in dance', *Journal of Aesthetic Education*, 13 (2), pp. 33-46.
- Sheets-Johnstone, Maxine (1983), 'Evolutionary residues and uniquenesses in human movement', *Evolutionary Theory*, 6, pp. 205-9.
- Sheets-Johnstone, Maxine (1990), *The Roots of Thinking* (Philadelphia, PA: Temple University Press).
- Sheets-Johnstone, Maxine (1994), *The Roots of Power: Animate Form and Gendered Bodies* (Chicago, IL: Open Court Publishing).
- Sheets-Johnstone, Maxine (1998), 'Consciousness: A natural history', *Journal of Consciousness Studies*, 5 (3), pp. 260-94.
- Sheets-Johnstone, Maxine (1999), *The Primacy of Movement* (Amsterdam: John Benjamins Publishing).
- Sperry, Roger W. (1952), 'Neurology and the mind/brain problem', *American Scientist*, 40, pp. 291-312.
- Todd, Mabel Elsworth (1937), *The Thinking Body* (New York: Dance Horizons).
- Varela, Francisco J. (1999), 'Present-time consciousness', *Journal of Consciousness Studies*, 6 (2-3), pp. 111-40.
- Varela, Francisco J., Thompson, Evan and Rosch, Eleanor (1991), *The Embodied Mind* (Cambridge, MA: MIT Press).
- von Helmholtz, Hermann (1971 [1870]), 'The origin and meaning of geometric axioms (I)', in *Selected Writings of Hermann von Helmholtz*, ed. and tr. R. Kahl (Middletown, CT: Wesleyan University Press).