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Integrating somatics and science

ABSTRACT

After four decades of exploring various avenues of exchange, dance science and somatic education (somatics) face new challenges in integrating theory with practice. In earlier decades of interchange, these challenges largely revolved around finding compatibility between the somatic personal narrative and the positivist models prevalent in science. Today human movement science embraces phenomenology, neurophysiology and cognitive science, providing models for embodied learning. These fields of study have forged new pathways for dialogue and have offered new paradigms through which we can revisit and reimagine long-held beliefs bearing on somatics and science in dance training. One emergent paradigm – embodied cognition – affords possibilities for integrating somatics with dance science. In this article, three academic educators raise questions bearing on the current potential for advancing the integration of somatics within dance science. They consider embodied cognition as one viable model of rigorous yet flexible study of somatics and science in dance.

KEYWORDS

dance science
somatics
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education
integration
ecological affordance

INTRODUCTION AND PURPOSE

When movement and the moving body are central to investigation, both deeply subjective and objective vantage points are needed to analyze movement in its complexity. The distinction between knowing ‘how’ and knowing ‘that’ continues to be a recognized challenge (Pakes 2009: 11; Ryle 1963). Enter dance science and somatics – do they continue to be the binary opposites that characterized their relationship in earlier decades, or have they emerged as more complementary areas of movement research? Throughout four decades of dialogue, the forging of a methodology that combined third-person objectivity with first-person experience posed multiple challenges for both dance science and somatics. Today’s dance scholarship perspective finds its knowledge base situated more in a multiplicity of academic disciplines (Green 2007). Such a confluence of disciplines has brought about the scientific advancement and understanding of embodiment (Root-Bernstein and Root-Bernstein 1999), and of the complexity of dynamic human (movement) systems and their environmental constraints (Kelso 1995; Ting et al. 2009). The burgeoning academic field of embodiment, as well as ongoing somatic exploration and investigation, has been rich, and has brought about new intersections between science and somatics (Jola et al. 2011). Although science and somatics evolved as independent content areas in dance, this recent proliferation of embodied knowledge within academia has spun many threads, both divergent and convergent, that afford opportunities for the integration of theory and practice. In order to further knowledge and understanding of the totality of dance process and performance, the integration of dance science and somatics, the authors advocate a both/and approach.

In order to advance science and somatics within dance training, many questions emerge, a sampling of which might be: what disciplines best contribute to our understanding of dance science and somatics? How will the relationship between somatics and science continue to evolve and become integrated into dance training? How do somatics, dance science and dance training enhance one another at their points of integration? What are the limitations or difficulties faced when integrating these disciplines, and what do we lose by embracing science and somatics in dance practices? In this article, three academic educators select issues and outcomes relating to the interface of somatics and dance science at this point in time. Both alone and in their collaborations, these three educators have worked to formulate a viable model of rigorous yet flexible (Nemecek and Chatfield 2007) study of somatics and science within dance education by weaving together scientific and phenomenological constructs. Through individual and collective research, the three authors have situated their work within a larger framework of scientific constructs of embodied cognition and phenomenological constructs of embodiment, both emergent paradigms that envision and validate connections between somatics and science. The questions posed will be reviewed within the purpose of the article in presenting a model for somatics within dance science. The overall aim is to continue to promote awareness of models of embodiment for the ‘human-being-as-dancer’ by encouraging the next generation of dance science scholars to encompass theories of lived experience alongside objective and quantitative methodologies.

For the purposes of this article, the authors alter the use of the term ‘somatics’ from a specific method (e.g. Body-Mind Centering® or Alexander Technique) to a more focused application of mind–body theories within dance

practice and research. ‘Science’ will refer to the movement or ‘performance’ sciences that are studied within dance science and listed in Eddy (1991: 21), e.g. psychology, nutrition, biomechanics, anatomy, kinesiology, physiology and motor learning. The use of the term ‘embodiment’ will be drawn from its scientific framework within cognitive neuroscience to represent a movement within science away from Cartesian dualism between body and mind, towards a more integrative (albeit cognitive) understanding of human existence (Varela et al. 1991; Gibbs 2006). While critics find the construct of ‘embodied cognition’ insufficient in capturing the scope of human movement (Sheets-Johnstone 2011), it represents a radical shift within science in which dance science and somatics could more readily be situated.

HISTORICAL CONTEXT

Dance and somatics share a common bond: the moving body as a viable source of embodied knowledge through movement practice. Through intentional, directed kinaesthetic awareness of the moving body in these expressive movement practices, the merging of physical and the metaphysical leads to self-actualization (Batson 2010). Historically, somatics infiltrated dance, contemporary dance in particular, decades ago. According to Mangione (1993 cited in Eddy 2009), somatics and the modern dance movement are linked in historical time through practice of the freedom of the moving body. By contrast, dance science is a relatively new discipline. The International Association of Dance Medicine and Science (IAMDS), which was officially formed in the 1990s, emerged around the time of the first symposium entitled *The Science and Somatics of Dance* (Dunn and Chmelar 1991/1992). Since then dance scientists have regularly advocated for integrating principles of dance science (which includes somatic principles) into the dance studio (Krasnow and Chatfield 1996; Geber and Wilson 2010). While both dance science and somatics share similar aims of exploring and promoting efficiency and optimal functioning of the body–mind in dance (Krasnow et al. 2011; Wilson and Kwon 2008; Brodie and Lobel 2004), the means and outcomes are seemingly different.

The earliest phases of the dialogue between dance science and somatics were characterized by a need to reconcile scientific dualism: the individual first-person narrative of somatics appeared irreducibly evanescent and changeable, while third-person science demanded reductionism – quantifiable and constant. Even though educator Thomas Hanna advocated for somatics as science as early as 1973 (Hanna 1973), it has taken decades for dance science and somatics to find common ground on which to converse. As somatic philosopher Elizabeth Behnke notes, we are ‘still living in a culture whose inherited categories leave little room for something that is neither sheerly physical nor sheerly psychological’ (2008). This statement highlights the challenges that persist in integrating the pragmatics of somatics, representative of the lived experience, with the more objective and at times reductionist paradigms of dance science.

Despite successful attempts at convergence between dance science and somatics, problems remain in integrating the pragmatic field of somatics with the more theoretical paradigms of dance science. For example, somatic experiences are not often explicitly grounded in scientific constructs, and dance science experiments often exclude somatic principles and experiences. This has left applications of an integrated approach fragmented and underdeveloped.

Dance science and somatics have therefore remained separate domains of study, resistant to integration, with their compatibility questioned (Green 2008), and with resources from both fields underutilized. In educating the new generation of dance science and somatic scholars it is important to consider the many questions yet to be explored. However, both dance science and somatics bear the responsibility of acknowledging how ongoing developments in research can enhance and progress approaches to pedagogy and practice. Advances have been made to this end. Action research and other qualitative paradigms, for example, have opened the door to somatics within dance scholarship through reflexive (applied reflective) practice (Green 2007).

AN EMERGENT PARADIGM – EMBODIMENT

In the last few decades, a confluence of academic thought has engendered the field of ‘embodiment’, including (but not limited to) discourse from the fields of biology, neuroscience, psychology, phenomenology, social studies, performing arts and artificial intelligence (Root-Bernstein and Root-Bernstein 1999). The general construct of embodiment challenges western traditional thought by advocating a paradigm shift that dismantles centuries of Cartesian dualism. The explicit term ‘embodied cognition’ evolved largely out of cognitive neuroscience, suggesting a holistic perspective within science, the ability to interact with a thought or an experience through the integrated expression of the total person (Varela and Shear 1999). No longer is the brain disembodied, nor is the mind considered a separate functional entity from the body; rather our brains are embodied (Clark 1998). Embodied consciousness means that all aspects of cognition (ideas, thoughts, concepts) are shaped by bodily experience (Varela et al. 1991). Often referred to as third-generation cognitive science, embodied cognition moves beyond the ‘mind as a computer’ metaphor and asks how our bodily being in the world develops into consciousness and thought (Hirose 2002). Key tenets of embodied cognition postulate that cognition is formed by action, perception, nature, culture and environmental interactions. Rather than a top-down strategy where the mind is directing the body, the importance of our physical experience in the world establishes continuity between body, brain and world (Garbarini and Adenzato 2004; Hirose 2002; Richardson et al. 2008; Wilson 2002). As Bruzina writes, researchers in embodied cognition study the ‘motor functions of the neurological system’ (2004), which are stimulated when we perceive and attend to objects or actions.

From the perspective of human movement science, embodiment implies not just the body itself, but a systems view – the many systems of the moving body situated within its context, where the interrelationships between environment and task help shape the movement outcome (Richardson et al. 2008). In this vein, control lies not merely in the body itself, but in the confluence of the body situated in the environment and embedded in the task. In the examples that follow, this notion of embodiment helps validate first-person narrative and frames it within scientific parlance, and provides context for thinking about the integration of dance science and somatics in theory and in practice. Variants on embodied cognition include looking at how (1) different bodies have differing ways of understanding the world based on our sensorimotor experience, (2) interactions in the world are the core of cognition and (3) the body in the world plays a constitutive role in cognitive processing (Shapiro 2011). Embodied cognition establishes the role of the body and movement in

thinking, learning and meaning-making. Recently, researchers in neurophysiology and embodied cognition have been looking at Yoga and other meditative practices to understand the connection between body and mind in a somatics-based practice ([Depraz 2009](#); [Raffone and Srinivasan 2010](#)).

A correlate of embodied cognition is ecological affordance, which focuses on an organism's interaction in the world, noting how the environments in which we live and work, including cultural and social milieus, shapes perception and action and organize our thought ([Gibson 1977](#)). [Declerck and Gapenne](#) describe affordance as a 'possibility for an inquiry into bodily constitution of experience' (2009). Ecological affordance could provide a unifying framework for dance science and somatics by asking us to ground our research in the context of the many environments in which we work.

Both embodied cognition and ecological affordance find links with dance somatics and science through phenomenology. Phenomenology, a philosophical tradition in its own right, looks at how intersubjectivity – an intimate connection between subjectivity and the subject – implies embedding in the environment. In addition, as a methodology, phenomenology looks at how a 'thick' description of lived experience helps us explicate meanings as we live them ([Van Manen 1990](#)). Accessing and describing the lived experience in science, somatics and dance training create a more holistic view of the dancer's subjective and objective experience.

Recently, researchers in psychology, cognitive science, neuroscience and motor learning have turned to phenomenology for grounding their theories on how we make meaning in the world. Indeed, [Sheets-Johnstone \(2011\)](#) argues that cognitive science needs experience and kinaesthesia as movement underpins and develops action and thought to ground their findings. At the same time, phenomenologists are returning to science to provide a 'naturalizing' or grounding to the phenomenon studied, and advocate for integrating phenomenological analysis into an explanatory framework ([Bruzina 2004](#)). This pairing is not without difficulty, as explained by [Jola et al. \(2011\)](#). In their conclusion, they argue that both methodologies are necessary to provide us with a more holistic understanding of a participant's experience.

On a practical level, phenomenology and cognitive science look at how we develop a physical consciousness connecting mind, body and environment. Both somatic and dance practices link body, mind and environment, although there may be very different perspectives on how this is achieved. Both somatics and dance practices create an embodied consciousness and turn us towards cognition and self-knowledge. Somatics opens us up to the world of actuality (an opening to the possible) and dance training opens us to the possibility of expanding our notion of being in the world. Dance science tends towards a different lens – looking at the mechanics of movement, physiology and psychology as a means of optimizing our dance training and performative goals. Combining somatics and dance science provides a more comprehensive understanding for dance training that could feed and progress our dance practices.

Returning to the questions posed earlier, the authors consider what the integration of somatics and dance science might be like in practice. At Trinity Laban Conservatoire of Music and Dance (London, UK), the Masters (M.Sc.) in Dance Science curriculum is structured and delivered to provide a flexible working practice, which expands the mindset of students who perceive science as wholly objective, as well as to challenge those familiar with a solely embodied and subjective experience of somatics. We have worked together

to develop a module on this programme, entitled Performance Psychology, Embodiment and Perceptual Learning, which draws upon the emergent paradigms presented within this article and supports the integration of somatics and science, for the benefit of dance practices. The module is praxis based, where theory informs practice and practice informs theory. The embodied knowledge informs the student of both 'self' and 'other' experiences, which is important in preparing future dance science researchers and practitioners. Integrating somatics and scientific methodologies within the study of dance science is one example of the potential for somatics and science to converge within dance education, striving for a range of disciplines from which students can draw and integrate into a rigorous methodological framework and at the same time, a flexible working practice. But questions remain.

1. What disciplines best contribute to our understanding of dance science and somatics? Both phenomenology and embodied cognition provide an alternative framework for pairing dance science and somatics. Phenomenology can provide a connection between a dancer's capacity (as measured by dance science) and experience (as explored through somatics). Behnke (2008) uses somatic practice as an example of kinaesthetic consciousness – the original 'I do'. She is not looking at the 'what' of movement, but the 'how'. Regarding the link between somatics and dance science, and their impact on dance performance, how does the 'I' or 'I feel' inform and progress the 'I can'? Phenomenological methods of description, reflection and recollection can be useful tools in making the dancers' experiences explicit. Despite the utility of often contrasting methodologies, the underlying objective of both dance science and somatics, as applied to dance, is complementary and includes similar fundamental steps of observing, questioning and analysing. Therefore, weaving these steps together within scientific and phenomenological frameworks broadens the sphere of the experiential within dance science scholarship and dance science scholarship within the experiential.

Research in psychology and motor control also provide additional linkages between dance science and somatics. Montero (2010) challenges the notion that 'body awareness' (a focus on how your body is feeling or how it is moving at the same time you are moving) is detrimental for skilled movers such as expert athletes and performing artists. She looks at the relationship between attention and bodily movement noting that attention is beneficial at the highest level of performance. This stance represents a radical departure from conventional somatics and dance training, one that essentially asks us not to think or engage in conscious reflection on our practice. Dance science can offer additional methodologies for us to understand the perception/action cycle and how it informs, and is informed by, codified movement. Reframing the enquiry as to what we are looking at in our training may open us up to new discoveries in dance training, somatics and dance science.

2. How will the relationship between somatics and science continue to evolve and become integrated into dance training? Sheets-Johnstone (2009) writes of a corporeal experience – kinetic action providing fundamental knowledge of the world. From felt dynamics and proprioception, we develop complex action, and from complex action we develop thought. Somatic practices ask us to reconsider our relationship with our body in the world, but do they take us to Sheets-Johnstone's 'felt dynamics' from

- which meaning can develop? Or is this a new component that somatic practices could incorporate? On the other hand, how can research in dance science benefit from a somatic perspective? Understanding a participant's experience performing a movement for analysis or specific training protocol will greatly illuminate the understanding of *how* the dancer is working, and somatics practices, with a focus on the individual's experience, provide another way to understand *how* someone takes research outcomes into technical training and on into performance.
3. How will the relationship between somatics and science evolve? Recently, researchers in neurophysiology have taken an interest in somatics and dance performance. How can we use the information generated in clinical trials to better understand embodied practice? And how does somatic practice augment the science of dance training? Batson's (2010) article using proprioceptive training to augment the performance of a battement *tendu* takes this perspective and is an excellent example of a practical paradigm that incorporates somatics, dance training and dance science in a simple exercise dancers execute daily.
 4. What are the limitations or difficulties that emerge when combining dance practice, somatics and dance science? Jola et al. (2011) identified the challenges of correlating subjective experience with objective data when responding to dance performance both in terms of methodology and interpretation of results. While the authors acknowledge that there are different and immeasurable areas of knowledge that can be described through qualitative and quantitative measures, neither methodology can give us a complete picture of experience. And while an interdisciplinary approach can provide greater insight, it requires that the collaborators are willing to learn the language and become familiar with the tools of both disciplines in order to 'achieve knowledge and understanding of each other's work' (Jola et al. 2011). In this light, the only limitation comes from the willingness of the researchers to work together.
 5. What do we lose by embracing science and somatics in dance practices? Will the aesthetics of dance be compromised by nurturing the individual experience or trying to come up with reliable measures of dancer capacities? Dance training opens us up to possibility and artistry, expanding our notion of being in the world, and this can be augmented by somatic practice and scientific enquiry. Somatics creates an opportunity for experience, for giving primacy to the experience and the potential for transformation. Dance science provides an understanding of the potential and physical properties of movement. In the end, research in dance should always reflect the most basic tenet of movement and dance – to understand what makes us humanly unique and uniquely human.

CONCLUSION

As theories of embodiment within the complexity of human movement continue to evolve and proliferate, emergent frameworks within dance science and somatics better reinforce one another. Within a paradigm of embodied knowledge, one can draw on fields outside of dance science and somatics for grounding. These emerging paradigms help to provide a rigorous framework of investigation, which supports an integration of lived experience with objective methodologies, each telling its own 'narrative' to provide a more coherent

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