Dance 'Becoming' Knowledge.

James Leach
Social Anthropologist

Centre de Recherche et de Documentation sur l'Océanie
Maison Asie Pacifique, Université d'Aix-Marseille
3 Place Victor Hugo
13003 Marseille
james.leach@pacific-credo-fr

Scott deLahunta
Dance Researcher

Schererstrasse 11
D-13347 Berlin
scott@motionbank.org

© ISAST

Abstract

In this article we discuss the possibility of presenting the unique qualities of 'the body' in contemporary dance practice through tailored digital choreographic objects. We reflect on some implications of abstraction in cognitive science, and on 'the body' as a site of exploration and knowledge in the realm of social, moral, and relational being.

Keywords: the body, social, moral, choreographic objects, abstraction, cognitive science
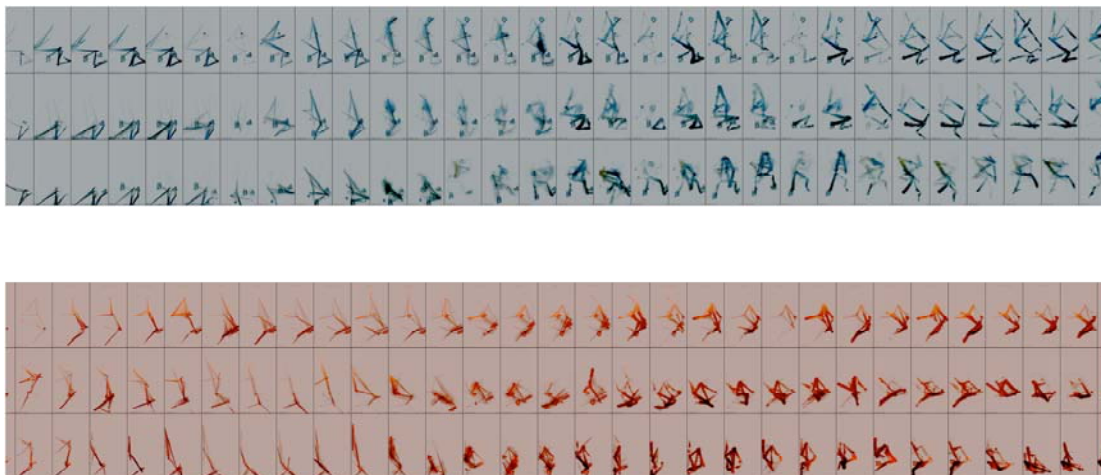
Fig. 1. *Becoming* screen shots. (© Scott deLahunta. Photo: Marc Downie [OpenEndedGroup] and Nick Rothwell [Cassiel])

Introduction

Choreographers of contemporary dance have for several decades sought to develop new tools or processes for stimulating creativity in the studio. The choreographer whose work we focus upon here (Wayne McGregor) conforms to this tradition by evolving methods of innovation. He often does so through collaboration with scientists. McGregor began investigating the possibilities of digital media as tools for dance making in the 1990s with an interest in building an artificially intelligent computer-based 'entity' to be present in the studio alongside the dancers. In the culmination of the development of this 'entity' in the context of McGregor's decade-long collaboration with cognitive science, we focussed on what he and the dancers understand as 'the body'. Drawing on theory and methods from social anthropology, we explored and articulated the use of the body's relational and elicitory capacities in the development of movement material. Offering this perspective on what is 'known' in dance making during collaboration with McGregor and digital artists, we were able to inform the development of a distinct 'entity', used successfully by McGregor and his dancers in the rehearsal studio.[i]

Thinking with the Body

In September 2013, a major exhibition was staged at Wellcome Collection in London called 'Thinking with the Body: Mind and Movement in the work of Wayne McGregor'. The title, although not a new phrase (1) or idea in contemporary dance, or indeed, cognitive (2) or social science (3), nevertheless intentionally poses us an intriguing question. Much of the exhibition drew on collaborative studies with cognitive scientists that McGregor and his company had initiated in 2003. A core part of these studies focused on the processes that underlie, generate, or make possible the complex movement forms in a piece of McGregor's choreography. The emphasis was on the mental aspects of the process, and how these are intertwined with the physical so that the body in motion becomes a problem solving, knowledge generating entity in this genre.

While McGregor's long collaboration with cognitive science may be unique, the concept that dancers might be problem solving or thinking with their body to generate novel movement material is common to many contemporary dance makers. Recent effort on the part of choreographers to share these processes with audiences and other disciplines has been well documented.[ii] However, 'Thinking with the Body' was an ambitious and unprecedented example. In this paper, we refer to this exhibition to frame our reflection on some outcomes of McGregor's engagement in the fields of cognitive science and technology. The invitation from this important institution and the large public interest generated by the exhibition points toward the wider fascination with bodies and their capacity to 'know'.[iii] The exhibition explicitly invited visitors to question and explore what in fact 'thinking with the body' might be, and we explore this same question here drawing on social anthropological research with the company and their science/technology collaborators.

Thinking through tasks

McGregor, in keeping with many in the genre of contemporary dance, engages his performers as creative collaborators in the creation of movement material for a new dance piece. Some terms

may be helpful for a reader unfamiliar with the genre here. A choreographer aims to give each dance piece a unique signature. This comes through developing a distinctive 'vocabulary' of movement in each case. In discussing this process, McGregor refers to giving dancers 'tasks' from which to develop movement material (8), and cognitive scientists collaborating with the company have adopted this terminology (9).[iv] The pieces that McGregor makes with Wayne McGregor | Random Dance [Random] are always made from scratch. McGregor will have an idea, a shape, theme, or area of reading and investigation in mind. From these, he will derive tasks for the dancers usually in the form of clear brief verbal instructions that invite them to use their imagination to make links between the instructions and movement. On day one in the rehearsal studio, the group of 10 dancers begin to develop movement 'phrases' based upon responding to these particular tasks.

In past work with Random, McGregor has used the image of Leonardo's Vitruvian man. This image alerts the dancer to the body situated in a space composed of points, lines, and planes.[v] In order to make material, the choreographer will set a task based on moving in this imagined space. The simplest idea: describe a space around the body with the body at its centre. Move along axes, or in relation to points.
Describe lines and shapes with your body. Transpose those into other regions, or use different parts of the body to describe the same movement. For McGregor, instructions stimulate a certain interior landscape of thinking that should bring 'intentionality' (artist's use of the term) to the dancers' performance, rendering visible what the dancer is paying attention to during the execution of the instruction or task. Tasks also support the dancers in their exploration of novel non-habitual movement patterns and are often described from a conceptual or thematic starting point.

These tasks are inspired by or conditioned by certain stimuli such as pictures, readings, or music. The consequence of undertaking them is a gradual build up of sequences of movement; repeatable, transfer-able movement 'phrases' that can be put together to develop a 'vocabulary' for the work. Dancers, then, create (some of) the movement that is organised into the dance piece through image-based task solving, using their bodies as the medium and tool of thought. To make this process interesting and productive, McGregor constantly seeks ways to perturb and disrupt the habitual processes of developing vocabulary.

One way to achieve this is through the introduction of novel or innovative elements in the making process. Scientists undertaking experiments around the studio are one example, or, pertinently here, technology. Of course, these are different forms of perturbations, and the way the intervention shapes the emergent movement material is not always obvious or direct. However, a constant in McGregor's practice is the introduction of elements designed to disrupt the habitual movement and process of himself and his dancers. (We come back to this insistence on novel exploration later in the paper.)

It was this desire for novelty in making material combined with curiosity about artificial intelligence that inspired McGregor to explore the idea of an independent dance entity, a 'choreographic agent'. That is, an entity that could respond to and solve the kinds of choreographic tasks that he set for his dancers. It was never intended to replace the dancers but rather to be used for generating a different vocabulary of movement material in the studio.

An artificial choreographic entity

What though, would an artificially intelligent, choreographic agent do? Early investigations of the field of artificial intelligence brought McGregor and Random into contact with a community of practice largely motivated by non-art engineering goals and computer science research questions that proved difficult ground for the collaborative building of choreographic tools. Importantly, this enquiry pointed toward the lack of a commonly comprehensible description of what choreographic problem solving or thinking was. And that was where McGregor's nascent collaborations (11) with cognitive scientists found one of their long-term goals.

Initially another mode for enriching his studio practice, and for gaining information from science about dysfunction and perturbation in movement (13), the first contact with particular cognitive scientists in 2003 became an opportunity to develop nuanced and detailed descriptions of the choreographic thinking process.[vi] Of how dancers went about solving the tasks they were given by the choreographer. Their focus was on how images are generated in the mind, how spatial and other forms of imagery operate, and how various forms of movement are followed by, given shape by, these imaging operations. Notebooks were another particular interest of some of the scientists looking at how physical knowing is distributed in objects and inscriptions (14). These two areas of enquiry and the individual researchers involved would principally inform the work on the 'entity' during the years to follow.

Knowledge and Abstraction

McGregor's aim was always to help him explore his process, to understand that better and thus have more sense of how to innovate upon it. Working with cognitive scientists brought their ambitions, vocabularies, and assumptions into this project. The scientists who continued to work with Random were interested in choreography as a mode of image manipulation for one thing. And the emerging team working on the idea of the 'entity', now involving the digital artists Marc Downie and Nick Rothwell, were also concerned to produce something that would 'travel'.[vii] The 'entity' (choreographic agent) was envisaged as a tool that McGregor would use to make work, but that, based on an accurate description of his process, would also be interesting to other dance makers because of commonalities across the contemporary genre already mentioned.

Armed with the conceptual apparatus of 'points, lines, and planes' drawn from analysis of McGregor's tasking process, scientific descriptions of image-forming and manipulation in the brain of the dancer, and the sense that the tool was to have agency, that is, make decisions and produce forms that were different to those of the dancers, a piece of software was developed called 'the Choreographic Language Agent (CLA)' (16). 'Choreographic' referred to the user's ability to shift points, lines, and planes around in a 3D virtual space. 'Language' referred to the fact that it could be instructed to make transformations on spatial structures. (In this it mirrored the choreographer's process of tasking dancers to respond to constraint and stimuli.) And 'agency' was in the programme's unique capacity to generate movement sequences and images based upon an application of rules and preferences built into its functioning (Fig. 2).
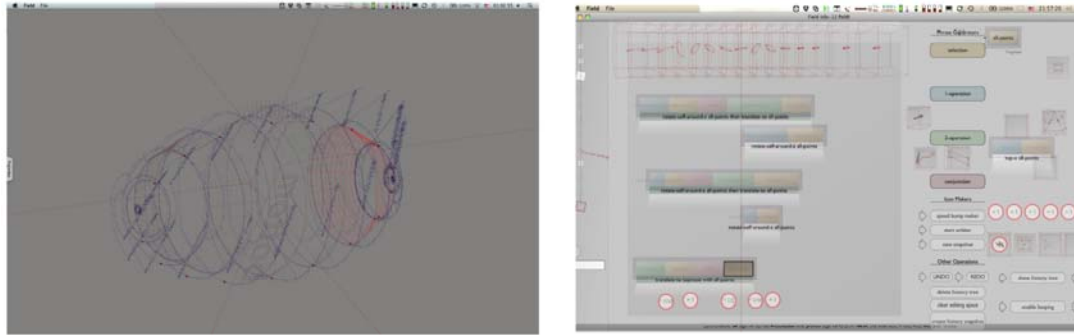
Left and right screens of the Choreographic Language Agent.
Credit: OpenEndedGroup, Cassiel & Wayne McGregor | Random Dance
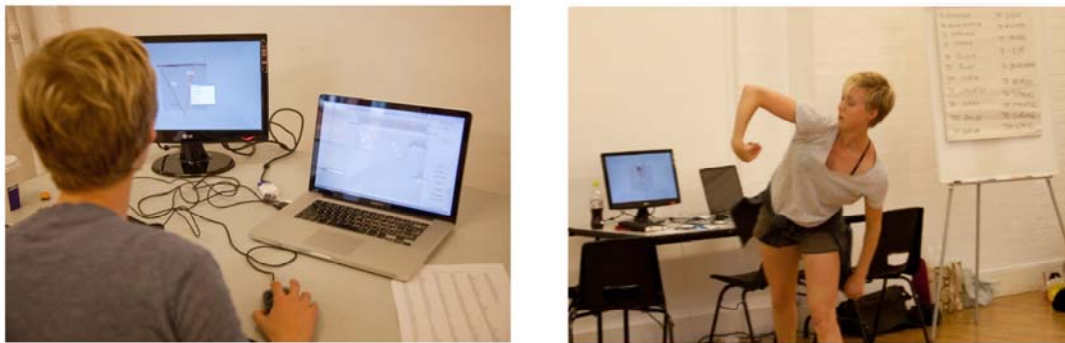
Company Dancer Jessica Wright working with the CLA in training session June 2011. Credit: Luke Church

The way the CLA prototype worked was relatively simple. The choreographer or dancer sits in front of two screens, on the one side is an empty 3-D screen where one can draw any shape consisting of lines and points with the mouse, linking three points with a line creates a plane. This shape can be rotated, moved sideways and zoomed in and out. On the other screen are a number of menus allowing one to select aspects of the shape, apply transformations to these aspects, and assemble these into sequences that can be played back on the 3D screen. This invites the choreographer or dancer to explore and discover interesting spatial transformations they can then use for inspiration for movement development in the studio.

Fig. 2. Left and right screens of the Choreographic Language Agent. (© Scott deLahunta. Photo: OpenEndedGroup, Cassiel & Wayne McGregor | Random Dance.) Company Dancer Jessica Wright working with the CLA in training session June 2011. (Photo: Luke Church)

What in effect was built was a kind of prosthetic dancer's brain. This was partly a function of keeping close to the different elements of the specification outlined above. The CLA fulfilled the aim of generating and manipulating images and of notating, and recalling, past iterations and movement. Its agency was a function of having some degree of autonomy, tightly coupled with choices the user would make. The CLA presented a version of a technique (tasking) for making material. However, it was not the choreographic entity that had been envisaged.

The CLA had in fact been transformed through its iterative design and creation process into something more like an extended digital notebook. Despite achieving a number of its original research goals, during its inauguration in the studio for the creation of UNDANCE (2011), the CLA was found to be a disruption to the rapid flow of moving and making, a perturbation too far in the context of Random's creation process. In addition, its outputs did not hold McGregor's

attention. A quality of the choreographic process was not present in the CLA prototype. This stimulated our investigation of other ways to comprehend 'choreographic thinking'.

The Body

Dancers and choreographers talk all the time about 'the body'. About the body being their tool. About bodily intelligence, about signature movements and bodily habits, about challenging and pushing the body, about investigating the body and its possibilities. This seems obvious of course, but some very particular outcomes of ethnographic engagement with McGregor and his company focussed us on an investigation of the body in this practice in a specific manner.

When asked why the CLA had not been used much in the studio, and why it had not been fully realised from its prototype form, McGregor was careful to acknowledge the work behind the CLA. But, he said, 'it really needs a body'. Elaborating, in essence, he suggested that the CLA was not interesting to him, or to his dancers in the way that a body is interesting. It emerged that what an 'artificially intelligent choreographic agent' needed (for him) was not just the ability to make decisions and generate movement forms, it needed to carry something else as well. That was a quality that bodies have. Sitting at a computer terminal striking keys (17), watching shapes transform, and then using that as stimulus for movement, did not have this quality. It became important at this stage then to understand what is meant by 'the body' for this particular choreographer, and perhaps more generally in the choreographic process of 'thinking with the body'.

Investigating 'the body', McGregor, and several dancers (independently) asserted that bodies are things one has a response to. They insisted that one cannot help, in fact, feeling a response to another body in the same space. There is a quality to bodies that we feel, and in that feeling, a kinaesthetic, as much as an emotional response is central. Bodies attract, repel, move other bodies. In fact, part of what we came to understand was that it is *the relation* between bodies that is interesting, that is compelling and generative. The CLA prototype was all about movement, but movement highly abstracted and removed from the body. It is as if the brain that processes imagery and solves spatial or emotional problems is outside, directing and feeling though the body, not being it.

Introducing comparative ethnographic material (18) to the conversation allowed an elaboration of what McGregor and the dancers at his company were conveying about 'the body'. Making movement material with others, or with others in mind is about the relational aspects of movement. When articulating the qualities of working with others in a studio, or in tasking situations, dancers[viii] said that they are aware of a constant negotiation of feeling and presence, of desire, shame, imposition, power, politeness, domination, or facilitation. These are qualities *felt and worked with* in making movement material. They are moral, if we may deliberately introduce a startling term in this context; aspects or qualities of what is being termed 'the body' here, which begins to appear far less of an individual entity restricted to the skin, and much more as an extension of feeling, knowing, and sensing into the world *with, and of,* other bodies. An anthropologist would identify this as the world and space of *other persons*. And that means, persons in bodies, bodied forth. The moral, aesthetic, social, and political aspects of persons are tangible in their relation to others.

It is not that the CLA's focus on image manipulation was necessarily inaccurate as a rendering of certain mental processes that dancers use in making dance material. But these mental processes are not abstracted from the body in that making. They cannot be, as to be of use to the choreographer they are within the body as an extended and relational entity.

In McGregor's making process it is in the contact between unfamiliar and challenging movement, and the relational space of expectations and convention, of others and their feelings, responses, and movements, that what is *interesting* about movement comes into being. The choreographer is articulate about the fact that novelty for its own sake is not the goal. It is clear from observing the making practice that they are not focussed on innovating purely to distinguish themselves against peers or ancestors. Movement is a form of thinking, we suggest, because it is an exploration of and emergent understanding within a particular kind of space. Movement, 'thinking with the body', is a way of exploring the world, and what it is to be human within it. That exploration thrives on unfamiliar yet highly conscious movement.

To make work in this genre then is to commit to exploration and experiment *with the body as the tool and vehicle*. But for that to make sense, it is important that we retain a sense of *what* the body is. Doing so assists in understanding what the body's potential for knowing refers to. From there we might consider what possible exploration, experiment, engagement, and knowing can be made through 'thinking with the body'. Our research around the CLA offer a description of the exploration of bodies in this dance making practice as an exploration of the space of human relationality.

The sense of oneself as part of others in movement, of the necessary unfolding of consciousness in a world of relations to space and social other, relations that also constitute and unfold these things, is clearly highlighted, made available, through the medium of dance and dance making. Philosophical articulations of understanding dance in this way can be discovered in the work of, Manning & Massumi (19), Gil (20), and Noë (21). For these authors, exploration of thinking in movement is an exploration of the emergence of subjectivity, and its reliance on relations to and with the worlds and others it participates in generating. We have already introduced (proactively) the term moral. Manning mentions the political, and argues that movement, thought, and subjectivity are not *given* as social, they are not social *before* they are made present in movement, but that the social and the political come into being as part of movement (22). We concur, the social and the political cannot pre-exist movement and relation because they are always made into being in movement and relation. Dance is a modality in which this coming into being is explored in experimental, innovative patterns and events. It is 'thinking' precisely because thinking in movement is an exploration of the unfolding human relation.

The exploration of subjectivity, of consciousness of self and other, and of the political, moral, social dimensions of these experiences, is undertaken by making them present through moving with others, or for others, or in relation to an idea of others. The political here is a micro-politics of realising and experimenting around coexistence, domination, facilitation (and so forth) as *events of specific interaction*. The experiment in making movement material is also the experience, and thus something is 'known' we might say, in dance making, and in the choreographer's attention to these elements. That attention is focussed on finding what is

interesting in movement, and as such is focussed on what we know and can know by our movement.

This argument develops our conceptualisation of the outcome of our investigations into the qualities of movement made with others in the context of a critique of the CLA. It offers another way into some of what is 'interesting' about a body for McGregor and his dancers. With their emphasis on disrupting habits, on exploring novel and non-intuitive modes of provoking and developing movement, in making new forms, these movers are utilising the body as a tool for thinking. Developing a description of it offers us a chance to consider an appropriate mode for the presentation, representation, and transmission of such knowledge processes.

Becoming

Discussions with McGregor about the body resulted in a new understanding of what the entity, the 'choreographic agent' might be. Recall that 'the body' is something that is compelling to be with. It has presence, and that presence has an effect. McGregor said, 'you cannot be in the same space as another body and not feel a response'. That we may or may not actually move is not the point at all, bodies elicit responses in other bodies. Those responses are both emergent in the particularity of the relationship, and conditioned by familiarity, morality, personal history, convention, innovation, daring etc. The qualities of the body that are 'interesting' then are 'to do with' its capacity for elicitation, and the elicitation of a specifically social-kinaesthetic response.

What emerged about the process of creative work in these ethnographic investigations is that choreographers use specific techniques (tasking, image-based manipulations, improvisations) to generate new or unfamiliar, exploratory movement. These techniques *generate* movement. What is *interesting* in that movement, the *substance* or material that emerges in the generation*,* is something to do with the quality of the body's relationality, its presence eliciting feeling response and movement in others. When McGregor, with his expertise in working with bodies said that the CLA, 'needs a body', this highlights qualities that bodies have in relation.

So we specified (as part of our research brief) some new parameters for a 'remade' CLA. To remake the entity, and make it true to an aspect of the knowledge form we had to revisit 'physical thinking', not as a version of intellectualisation, but as an exploration of the awareness and intelligence of kinaesthetic elicitation. The parameters were simple. Whatever the 'entity' was to become, it needed to be compelling to be with, and to elicit a kinaesthetic response. We suggested it should be human scale. That it should have its own presence without the need for complex set up or manipulation. That it would work towards or try to solve movement tasks in its own way, a way that was elicitory of human movement. In this context, a *representation* of a body is not 'the body'. We were instead looking for something in the space that those in its presence would want to respond to.

During the months leading up to the making of a new piece (Atomos) by Random the digital artists who had realised the CLA prototype built a new entity they called 'Becoming' in response to these parameters. Becoming was built around the manipulation of points, lines, and planes on the platform of the CLA software. But it was made to be an aesthetically and kinaesthetically compelling presence. It takes stimulus from (in this case) the form outlines and colour palate of

film clips, and, following rules in a constrained environment that include gravity and friction, it attempts to build towards taking the form of the stimulus. That is, it is constantly striving, against certain constraints, to achieve a form. 'The abstract agent enacts a heuristic search through the space of all the configurations and muscle activations of its own peculiar body to match the movement of each shot. It works out its approximations through a series of iterations, stopping only when satisfied that it has come as close as it can' (23). It is shown on a large 3D screen, requiring the use of glasses (Fig. 3).

Becoming screen shots. Credit: Marc Downie (OpenEndedGroup) & Nick Rothwell (cassiel)

Company dancers working with Becoming in the studio during the creation of Atomos. Credit: David Bickerstaff

Fig. 3. *Becoming* screen shots. (© Scott deLahunta. Photo: Marc Downie [OpenEndedGroup] and Nick Rothwell [Cassiel]). Company dancers working with *Becoming* in the studio during the creation of *Atomos*. (© Scott deLahunta. Photo: David Bickerstaff.)

The human scale in the studio, the script guiding it to seek solutions, and its expressive aesthetic qualities summed up to something much closer to the originally envisaged 'entity'. McGregor found it compelling enough to use it in the studio as the company made their latest piece -

referring to it as an 11th dancer. Becoming was subsequently installed as a part of the aforementioned Wellcome Collection exhibition, 'Thinking with the Body'.

One aim of that exhibition was to take something of the knowledge form that is McGregor's contemporary dance practice and make it available, present it outside the context of the studio. Becoming was featured as an experiment in capturing something of the elicitory capacity of bodily movement that choreographers work with, and presenting that in another medium and form. To be with this strange entity is to feel something of the capacity of bodies to elicit response.

Of course Becoming does not capture, represent, or give access to the body in its moral and social situated-ness. In that it is also interesting.

Reflecting on the use of 'tasking' in the studio in the light of our analysis of the CLA, we can agree that tasking is solving problems using the capacity for the body to think. But the emphasis on thought may be misleading. It is easy to see why it is prominent in reaction to the common misperception of dance as physical, intuitive, primitive, etc. (24), but it is a potential misdirection made visible in the CLA. The CLA prototype was developed alongside emerging ideas from within collaborative research with cognitive science as an extended form of 'thinking with the body'. It was, however, an abstracted and intellectualised version of this 'thinking'. So to remake the entity, and make it true to the knowledge form, we had to revisit 'physical thinking', not as a version of intellectualisation, but as an exploration of the awareness and intelligence of kinaesthetic elicitation (25). The body is physical if we understand *physical* as an extended presence in relation to others and spaces.

How would one gather some qualities of this process of knowing? Becoming is a strange form in space that elicits a response in movement, in the body of those in its presence. When it appeared in McGregor's studio the dancers 'got it' immediately, one responding as he walked into the room with it for the first time, 'Ooooh, it's a body', simultaneously moving in response to its movements.

Public visitors at the Wellcome Exhibition were more bemused. It was not clear to them what Becoming was, as we deliberately placed text and explanation after their initial encounter with it. But audience responses indicated both that it was capable of eliciting kinaesthetic response, and that their bemusement was because of the ambiguous form that was achieved (26). Becoming is neither tool nor art work. It corrupts and distorts conventional categories, utilising aesthetic elicitation as a form of knowledge transfer. That knowledge is not utile, it is not about something other than the experience of the body as a responsive entity. 'Becoming' was an experiment in presenting a form of knowledge that did not collapse what that kind of knowing is into a conventional representation.

In this refusal to be something other than the moving form, 'Becoming' does not 'think with the body', it does not represent the body, or the techniques of dance making, but it does give an experiential sense of kinaesthetic responsiveness. There is no sense in which Becoming mirrors or captures the moral, social, emotional reach of the body. But it does provide a compelling

presence in the space, it does elicit movement in the viewer, and as such, actually reveals both some of what is and is not 'bodily' about it.

Conclusion

We return in conclusion to the question, 'what is thinking with the body'? We have written that contemporary choreographers understand the body as intelligent. For others not part of this community of practice, such phrases may have little meaning other than as a metaphor. It is quite clear how skilled the dancers are in movement. But why call it intelligence? Why call it thinking? Well, one interpretation that resonates particularly with what we have observed in the genre of contemporary dance is that at a level of incredible sophistication, we all operate within the same space as other bodies that are *other people*, all the time. Continual calculations and judgments are being made by bodies in the same space about obligation, co-operation, domination, discomfort, shame, desire, … these are some of what bodies 'are'. We are constantly negotiating and manipulating the spaces we occupy with others – in fact, whether they are there or not.[ix] Bodies are things that are always eliciting and provoking a response. We feel them, we think through and around them, we respond to them. 'Response' is all about the experience of a relation to others. The experiment with Becoming and the specific history of its development as an iteratively created choreographic object within the context of the work of a particular dance company provided the opportunity to probe this theme of body, relations, dance, and knowledge.

Acknowledgements

References

1. D. Kirsh, "Thinking with the Body," *Proceedings of the 32nd Annual Conference of the Cognitive Science Society*, Eds S. Ohlsson R. Catrambone, (Austin, TX: Cognitive Science Society, 2010) pp 2864-2869.

2. C. Stevens & S. McKechnie,"Thinking in action: thought made visible in contemporary dance**"**, *Cognitive Processing*, vol. 6, no. 4, (2005) pp. 243–252.

3. T.H.J. Marchand, Ed. "Making Knowledge: explorations of the indissoluble relation between mind, body and environment". Special Issue of the *Journal of the Royal Anthropological Institute*. (Oxford: Wiley-Blackwell 2010).

4. M. Bleeker, Ed. *Transmission in Motion*, (Cambridge MA: The MIT Press, upcoming)

5. B. Cvejić, "Introduction". *A Choreographer's Score: Fase, Rosas danst Rosas, Elena's Aria, Bartók*. De Keersmaeker, A.T., Cvejić, B. (Brussels: Rosas and Mercatorfonds, 2012) pp. 7-19.

6. S. deLahunta, "Publishing Choreographic Ideas" in: *SHARE: Handbook for Artistic Research Education*, Eds. Mick Wilson & Schelte van Ruiten. (ELIA: Amsterdam, 2013) pp. 170-177.

7. J. Leach, "Choreographic Objects, Contemporary dance, digital creations and prototyping social visibility", *Journal of Cultural Economy*, (2013) DOI: 10.1080/17530350.2013.858058

8. E. Brannigan & W. McGregor, 'Positioning Passions' realtime: Australia's critical guide to international contemporary arts. Issue #34, (1999) p. 30.
http://www.realtimearts.net/article.php?id=5359 (accessed 14.09.14)

9. D. Kirsh, et al. "Choreographic Methods for Creating Novel, High Quality Dance." *5th International workshop on Design and Semantics of Form and Movement*. (2009)
http://adrenaline.ucsd.edu/kirsh/publications.html (accessed 14.09.14)

10. S. Banes, "Robert Dunn's Workshop". *Democracy's Body: Judson Dance Theatre 1962-1964*. (Ann Arbor, MI: UMI Research Press, 1983) pp. 1-33.

11. S. deLahunta, P. Barnard, W. McGregor, "Augmenting choreography: insights and inspiration from science", *Contemporary Choreography : a Critical Reader*. Eds. J. Butterworth, L. Wildschut, (London: Routledge, 2009) pp. 431-448.

12. R. Laban, *Choreutics*. ed. Lisa Ullmann. (London: MacDonald and Evans, 1966)

13. R. McCarthy, A. Blackwell, S. deLahunta, A. Wing, K. Hollands, P. Barnard, I. Nimmo-Smith, A. Marcel, "Bodies Meet Minds: Choreography and Cognition", *Leonardo* October 2006, Vol. 39, No. 5 (2006) pp. 475–478.

14. L. Church, N. Rothwell, M. Downie, S. deLahunta, & A. Blackwell, "Sketching by programming in the Choreographic Language Agent". *Proceedings of the Psychology of Programming Interest Group Annual Conference (PPIG 2012)*, (2012) pp. 163-174.

15. M. Strathern, *Commons and Borderlands*, (Wantage (Oxon): Sean Kingston Publishing, 2004)

16. S. deLahunta, "The Choreographic Language Agent", *Transmission in Motion*, ed. M. Bleeker, (Cambridge MA: The MIT Press, upcoming).

17. T. Ingold, *Lines. A Brief History*. London: Routledge, 2007) p27-8.

18. J. Leach, *Creative Land. (*New York: Berghahn Books, 2003) p155-177.

19. E. Manning, B. Massumi, "Just Like That: William Forsythe, Between Movement and Language" in *Touching and to Be Touched. Kinesthesia and Empathy in Dance and Movement.* Eds. Brandstetter, G., Egert, G., Zubarik, S., (Berlin: DeGruyter, 2013) pp. 35-62

20. J. Gil, "Paradoxical Body" *Planes of Composition: Dance, Theory and the Global*. Eds. A. Lepecki, & J. Joy. (New York: Seagull, 2009) pp. 84-106.

21. A. Noë, "Making Worlds Available", *Knowledge in Motion: perspectives of artistic and scientific research in dance*. Eds. S. Gehm, P. Husemann, K. von Wilke, (Bielefeld: transcript verlag, 2007) pp. 121-127.

22. E. Manning, *Relationscapes. Movement, Art, Philosophy*. (Cambridge MA: MIT Press, 2009) p 22.

23. M. Downie, "Becoming", OpenEnded Group Website (2013) http://openendedgroup.com/artworks/becoming.html (accessed 14.09.14)

24. S. deLahunta, "Traces of Physical Intelligence", *Gestalt der Bewegung*. Ed. Annett Zinsmeister. (JOVIS verlag, 2011) pp. 94-113.

25. M. Sheets-Johnson, *The Primacy of Movement*. (Expanded Second Edition), (Amsterdam: John Benjamins Publishing Co. 2011).

26. H. Blades, "Becoming a Body" (2014) http://r-research.org/wp-content/uploads/2014/06/Becoming-paper_Hetty-Blades.pdf (accessed 14.09.14)

James Leach is Directeur de Recherche, CREDO (CNRS, EHESS, Aix-Marseille University) and Professor of Anthropology at the University of Western Australia. www.jamesleach.net

Scott deLahunta is the Director of Motion Bank (DE) and Senior Research Fellow, C-DaRE. Coventry University (UK) and at Motion.Lab, Deakin University (AU). www.motionbank.org

---

[i] This paper is based on an AHRC (UK) funded project 'Enhancing Choreographic Objects' Ref: AH/K003046/1.
[ii] (4), (5), (6), (7).
[iii] 19,229 visitors were recorded over a six-week period.
[iv] The use of instructions, procedures or tasks to create movement material or even entire dances has a history in contemporary dance dating in particular to the 1960s to workshops of the composer Robert Dunn (10).
[v] Reference to invisible points, lines and planes in space is widely used by choreographers, e.g. William Forsythe & Trisha Brown well-recognised proponents from the genre, and is also found in the movement analysis concepts of Rudolf Laban (12).
[vi] Project Documentation: http://www.choreocog.net/ (accessed 14.09.14)
[vii] 'Travel' is borrowed from Strathern (15).
[viii] (Including those interviewed during another project with Catherine Stevens).
[ix] 'Even one body alone is dancing relationally' (Manning & Massumi 2013: 44).