

Traces and artifacts of physical intelligence

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Traces and artifacts of physical intelligence

In sport and dance, speed and precision combined with fluidity and ease in the execution of certain movement sequences is often said to demonstrate 'physical intelligence'. The problem is that for practices so firmly rooted in the physical, this intelligence tends to be equated with an unconscious intuition, a level of special expertise that "thinking" can only get in the way of.¹ This misconception contributes to the persistent view that mind and body are separate modes of engaging with and making sense of the world. This misconception contributes to the undervaluing of embodied practices in a society that assumes abstract knowledge making to be the highest form of cultural production, and associates language, reasoning and rational thought with this knowledge.

A growing number of scholars and scientists are working to change this misconception, drawing on new interdisciplinary research connections and bringing fundamental assumptions about the constitution of our intelligent thinking selves into question. This involves, for example, the empirical study of how forms of abstract knowledge are the result of direct sensory motor engagement with the world and theorizing how knowledge is constituted from the interaction of the many parts of one's experience.²

What could dance, as a body-based practice and dancers, as experience 'experts' offer as an alternative way of approaching the question of physical intelligence? Could methods of documentation, movement analysis and notation be improved so as to capture and make underlying patterns of choreographic thinking accessible? Could choreographic ideas and processes be rendered tangible, revealing hidden aspects of creativity or visualizing the performed dance's latent structure?

These are the kinds of questions interdisciplinary research groups working in collaboration with a small but increasing number of contemporary choreographers have been addressing.³ The result is a growing collection of choreographic resources, which are helping to build a unique context for the discovery, materialization and subsequent study of traces and artifacts of physical intelligence.

A first step in understanding how these projects connect to questions about physical intelligence is to acknowledge the extent to which choreographers and dancers make use of the page as a site for creative work, specifically focusing on the drawn or written score.⁴ Choreographer Jonathan Burrows in *A Choreographer's Handbook* describes two main approaches to the idea of a score. The first kind of score is like a classical music score "written as a representation of the piece itself. (...) In the other kind of score, what is written or thought is a tool for information, image and inspiration, which acts as a source for what you will see, but whose shape may be very different from the final realization."⁵

¹ Because it was written for such a wide readership, one of my favorite essays on this topic is by the evolutionary biologist Stephen Jay Gould titled "The Brain of Brawn" published in the New York Times 25 June 2000.

² For an overview of this area of research see: P. Robbins & M. Aydede. "A Short Primer on Situated Cognition" in: *The Cambridge Handbook of Situated Cognition*. Eds. Philip Robbins & Murat Aydede. Cambridge University Press: Cambridge. 2008.

³ For examples see: <http://projects.beyondtext.ac.uk/choreographicobjects/index.php>

⁴ See: Blackwell, A., Scott deLahunta and Wayne McGregor. "Transactables". in: *Performance Research, On The Page Issue*. Eds. Ric Allsopp and Kevin Mount. Vol. 9, No. 2. June 2004. pp. 67-72.

⁵ Burrows, Jonathan (2010) *A Choreographer's Handbook*. London, Routledge. p. 141

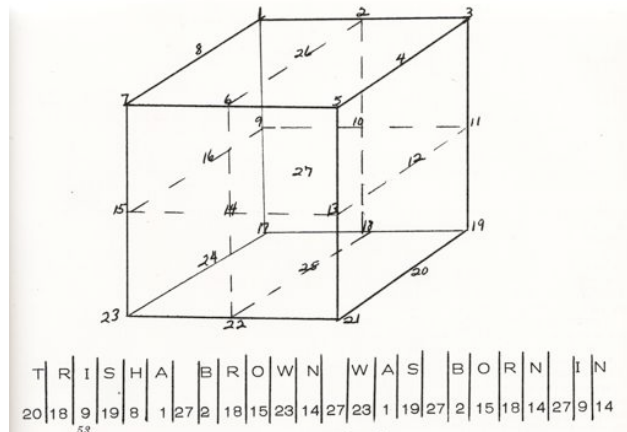


Figure 1: Diagram for *Locus* by Trisha Brown (1975). Source: *Contemporary Dance*. Anne Livet. New York: Abbeville Press. 1978, p. 54

This is a relatively well-known diagram drawn by American choreographer Trisha Brown that is one of several choreographic systems Brown invented. **[Figure 1]** This one, titled *Locus* (1975), is a 27-point cube in which a different number is assigned to each point. The choreography involved generating a score by translating a written autobiographical statement into numbers, which were then transposed to points on the cube by the dancer who could “move through, touch, look at, jump over, or do something about each point in the series, either one point at a time or clustered”.⁶

Trisha Brown is one of a small number of choreographers who have developed a distinctive way of moving. Hers is often referred to as ‘release technique’ an approach to movement that emphasizes an alert, responsive and neutral body prepared to move from specific points of initiation in any direction. What one might contemplate is how a score-making system like *Locus* and its associated instructions and the evolution of a distinctive way of dancing are co-dependent.⁷ Brown’s dancers have to be holding onto a set of ideas in mind (such as where each imaginary point is in space, original statement and translated sequence of numbers and the movement instructions) and problem-solve with them while moving to perform in the context of such a score-generating instrument.⁸

As “a source for what you will see”, to borrow from Burrow’s description of a score, *Locus* can be viewed as capturing physical intelligence in its drawn diagrammatic representations. Another example of capturing physical intelligence is William Forsythe’s CD-ROM *Improvisation Technologies: a tool for the analytical dance eye*. Motivated by a need to transmit quickly principles of improvisation he had developed in the 1980s, Forsythe also turned to drawing. These drawings were made directly on top of a digital video image of Forsythe performing demonstrations of his principles for the camera. The result is a collection of nearly 100 short demonstrations most using dynamic drawings to annotate his movement paths and map out “spatial relationships in and around his body”.⁹ **[Figure 2]**

⁶ Anne Livet. *Contemporary Dance*. New York: Abbeville Press. 1978, p. 54

⁷ See: deLahunta, S. "Moving Ideas: questions for the dancing mind". *ballettanz*, October 2005, pp. 20-23.

⁸ See: deLahunta, S. "Moving Ideas: questions for the dancing mind". *ballettanz*, October 2005, pp. 20-23.

⁹ See: deLahunta, S., Rebecca Groves and Norah Zuniga Shaw. "Talking About Scores: William Forsythe's vision for a new form of dance 'literature'". in: *Knowledge in Motion*. Eds: Sabine Gehm, Pirkko Husemann and Katharina von Wilcke. Bielefeld: transcript. 2007. pp. 91-100.

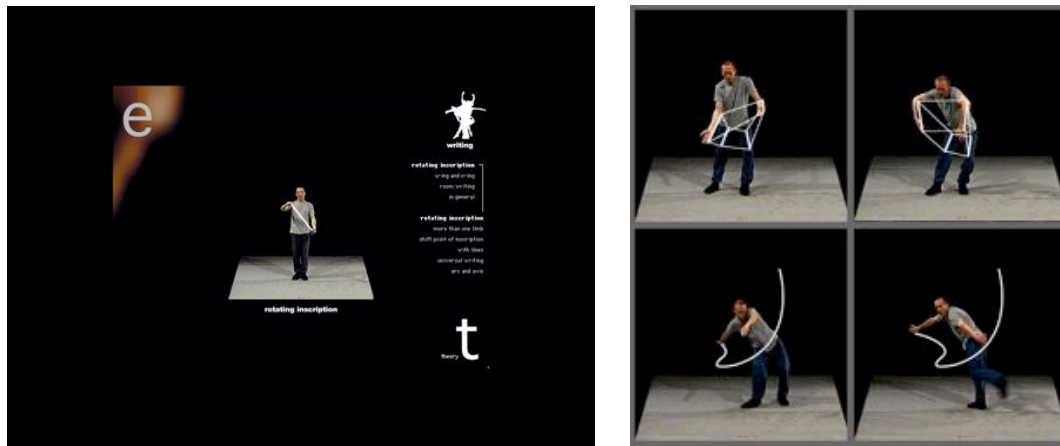


Figure 2: Screenshots from William Forsythe's CD-ROM *Improvisation Technologies: a tool for the analytical dance eye*. Credit: Chris Ziegler (designer)

It is important to note that these procedures, these choreographic ideas, existed before the annotated videos which help to materialize them for viewers. And, like Brown, Forsythe's ideas played a role in the evolution of a distinctive way of moving. In his case, against the background of ballet, "It was easy to represent things this way – thinking in circles and lines and planes and points. That's not so unusual for ballet dancers, this system is basically a manipulation of their existing knowledge".¹⁰ Forsythe refers to the *Improvisation Technologies* as a way of "taking mental note" while moving. This scaffolding for thinking while moving was first put in place by Forsythe with the dancers through practice, in the studio and on the stage. Only later have these ideas been made visually accessible on the CD-ROM. These annotations draw the viewer's attention to something that is normally unseen in the studio and in performance. This type of drawing captures what the dancer might be thinking. A question to return to later: does this help the audience see other types of structure in the dancing?

This emphasis on 'what the dancer is thinking' is picked up by the work of choreographer Wayne McGregor who has for nearly a decade been engaged in a study of choreographic cognition in collaborative research with scientists.¹¹ They have shared in setting up empirical research, developing theoretical models and applying results of the collaborative work in the studio when McGregor is giving the dancers complex tasks or instructions (sometimes similar to Brown's *Locus*) for generating movement material.¹² While the research work is still ongoing, McGregor and his dancers are now regularly augmenting this generation part of the creative process using a sort of 'cognitive toolkit' that draws explicitly on insight from the collaborative research. Given the title *Choreographic Thinking Tools*, this method currently focus on the use and manipulation of internal imagery in the context of 'tasking'.

¹⁰ Forsythe, W (1999) *Improvisation Technologies: A Tool for the Analytical Dance Eye*. Of the series: ZKM digital arts edition. Zentrum für Kunst und Medientechnologie: Karlsruhe. p. 18.

¹¹ See: <http://choreocog.net>; see: http://www.randomdance.org/r_research

¹² See: deLahunta, Scott, Phil Barnard, Wayne McGregor. "Augmenting Choreography: Insights and inspiration from science". in: *Contemporary Choreography: A Critical Reader*. eds. Jo Butterworth and Liesbeth Wildschut. London: Routledge. 2009. pp. 431-448.

One way of understanding imagery is to look again at the figure from Forsythe's *Improvisation Technologies* CD-ROM, where the annotation shows you what the dancer may be creating as a visual reference with their imagination. Most of the procedures in *Improvisation Technologies* involve our ability to manipulate visual imagery in space. The CD-ROM annotations draw the viewer's attention to the spatial-praxic focus of the dancers. Brown's *Locus* cube does something similar; it shows us the attention focusing system, a primarily visual one, without the annotation. In both cases, they demonstrate the generative potential of structuring a mental space through thinking systems involving points, lines and planes. *Choreographic Thinking Tools* extends the scaffolding for thinking while moving to include two other forms of imagery: auditory-verbal (sounds or voice in the head) and semantic. In all three forms, points in mental space need to be constantly updated as the focus of attention shifts.¹³

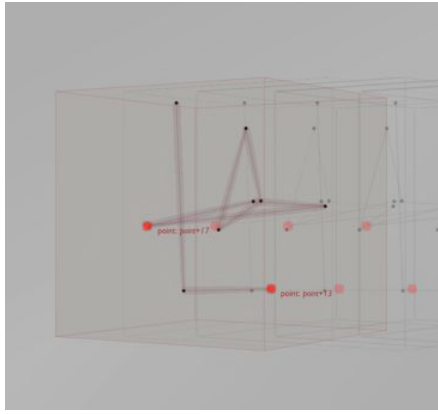


Figure 3: Wayne McGregor | Random Dance in the studio during collaborative research residency at the University of California, San Diego (2009). Credit: Adriene Hughes

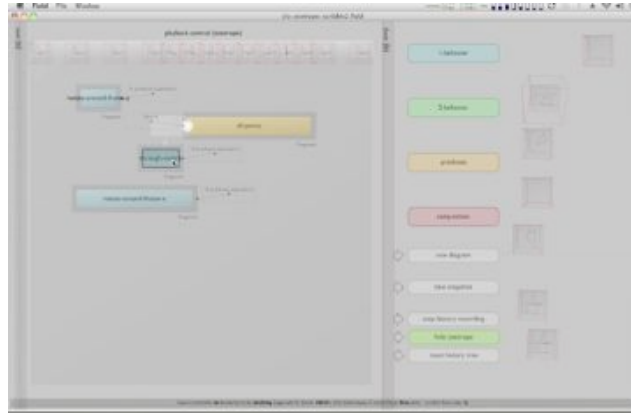
In the context of McGregor's work unique properties of choreographic thinking are being exposed through collaborative work with scientists. **[Figure 3]** The work does not seek to scientifically evaluate aesthetic judgment or validate artistic choices. It aims to uncover more about the kinds of intelligences involved in contemporary dance making and makes this information available to choreographers in a format that is useful. It draws from and contributes to evolving theories of embodied cognition, supporting various studies such as how gesture is recruited for creative problem solving in dance.¹⁴

¹³ For more information about the imaging systems referred to see the upcoming publication of: "Points in mental space: an interdisciplinary study of imagery and tasks in movement innovation" (in submission). Co-authors J. May, B. Calvo-Merino, S. deLahunta, W. McGregor, R. Cusack, A. Owen, M. Veldsman, C. Ramponi, P. Barnard. *Dance Research Journal* (electronic edition). In revision. Expected publication Summer 2011.

¹⁴ See: Kirsh, D. *Thinking With The Body*. The Annual Meeting of the Cognitive Science Society. (upcoming 2011)



LEFT SCREEN



RIGHT SCREEN

Figure 4: The left and right screens of the *Choreographic Language Agent*. Credit: OpenEndedGroup & Wayne McGregor|Random Dance

The work has also resulted in another type of drawing tool or sketching environment called the *Choreographic Language Agent (CLA)*.¹⁵ Formative to the development of the CLA has been a focused research into how computation and embodied practice can creatively intersect and includes a close collaboration with the artists of the OpenEnded Group who have worked extensively with other choreographers including Trisha Brown. **[Figure 4: CLA image]** The CLA is still in development, but the concept is as follows. With this tool dancers first construct a 3-D drawing comprised of points, lines and planes on the left screen in the visual space. They then use drop-down menus on the right screen to select some aspect of their drawing, for example all points on the left side. They then select an instruction to apply to them, for example rotate these points around their own axis. These two parts are assembled one after the other on the right screen and dragging the playback bar across them animates the drawing in the visual space. This sounds simple, but these assembled phrases can be layered one on top of the other and produce surprising and complex animated drawings. Like the second type of score described by Burrows, the dancers take these as inspiration for movement generation into the studio space, returning to the CLA sketching environment to try out new combinations.

While both Forsythe's and Brown's dancers had to be holding sets of ideas in mind and problem-solve with them while moving; the CLA moves parts of this process to its computer canvas as a page for working out choreographic ideas more interactively. Here dancers can manipulate structural relationships that are both syntactic or language-like and visual-spatial; and they build further understanding of these manipulations by assimilating them into their movement generation in the studio. With its digital memory, the CLA uniquely documents aspects of their decision-making – making a part of their choreographic thinking process available for revisiting and examination.¹⁶

¹⁵ Developed as a Wayne McGregor | Random Dance / OpenEnded Group collaboration with Marc Downie, Nick Rothwell, CASSIEL; Luke Church & Alan Blackwell, Crucible/ Computer Laboratory, Cambridge University. Initial Project Funding from: Portland Green Cultural Projects.

¹⁶ The part of this project still in development is that the dancers have to master this tool so that the time they spend figuring something out creatively is not spent learning how to use the tool. A CLA workshop is planned for early June 2011 with the dancers of WMRD

These tools for information that have been discussed so far support choreographers and dancers in working creatively with choreographic ideas. As score generating systems, they offer themselves as objects of self-reflexive study, helping to increase the domain level expertise of the choreographer and dancer. But they are also available as study objects for other specialists interested in researching embodiment. The more of these objects of choreographic thinking that can be made available from different artists the richer this research environment will become.¹⁷

How might these developments impact an audience that does not come to dance with such a specific research interest? If choreographic ideas and processes could be rendered productively tangible as has been discussed, could some of the same approaches be used to enhance an audience's experience of watching dance, specifically their ability to read and make sense of non-narrative choreographic forms?

This question motivated Forsythe to develop another project, originally conceived as an "instructional DVD" that would again use digital video annotations to draw the viewer's attention to the forms of choreographic organization in a finished dance titled *One Flat Thing, reproduced* (2000). The following brief description by Norah Zuniga Shaw gives an impression of the piece:

Seventeen dancers fly, slide, reach and twist their bodies within a grid of twenty steel tables. Seemingly on the edge of chaos their actions are controlled by a complex array of interdependencies that challenge and excite your sense of order as you watch. Time slips and slides between constant acceleration and sudden moments of active stillness, elements align and dissolve, dancers come and go, your eyes flicker in search of pattern, seeing and not-seeing the changes that occur.¹⁸

The project was developed over a period of four years in collaboration with researchers in both arts and science across the campus at The Ohio State University, eventually launching on-line in April 2009 with the title *Synchronous Objects for One Flat Thing, reproduced*.¹⁹ This extensive site makes a large amount of material available for exploration. My aim here is to briefly connect this project to the others already mentioned and speculate further on the possibility of revealing and exploring aspects of physical intelligence in the context of expert dance practice.

On the site, *One Flat Thing, reproduced* is described as an "ensemble dance that examines and reconfigures classical choreographic principles of counterpoint. (...) Three structural systems interact to create the counterpoint of the dance: movement material, cueing and alignments."²⁰ Each of these structural systems is explained in more detail on the site. These two figures show how the video annotations appear that show the cueing and alignments. **[Figure 5 & 6]**

¹⁷ See Motion Bank (<http://theforsythecompany.com/> > motion bank)

¹⁸ See: deLahunta, S., Rebecca Groves and Norah Zuniga Shaw (ibid)

¹⁹ The co-creators with William Forsythe of *Synchronous Objects for One Flat Thing reproduced*, (<http://synchronousobjects.osu.edu>) were Norah Zuniga Shaw, Assistant Professor and director of Dance and Technology, Department of Dance, The Ohio State University and Maria Palazzi, Director, Advanced Computing Center for the Arts and Design, The Ohio State University.

²⁰ "In OFTr counterpoint is defined as a field of action in which the intermittent and irregular coincidence of attributes between organisational elements produces an ordered interplay." (From a description on: <http://synchronousobjects.osu.edu>)

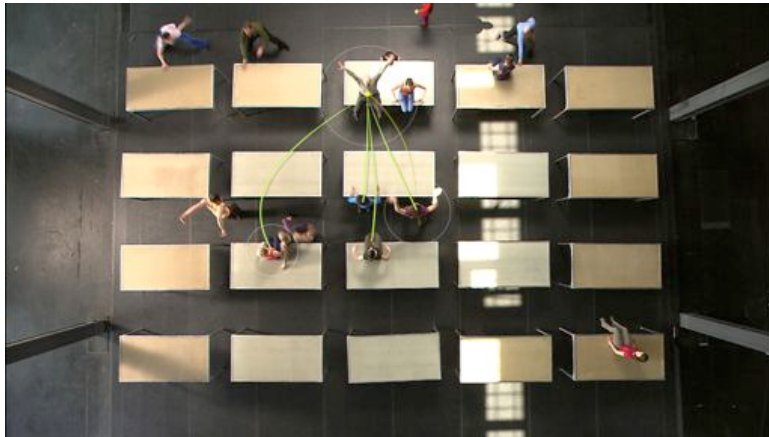


Figure 5: Cueing System. Still from annotated video illustrating the complex system of cueing in *One Flat Thing, reproduced*. Credit: Synchronous Objects Project, The Ohio State University and The Forsythe Company

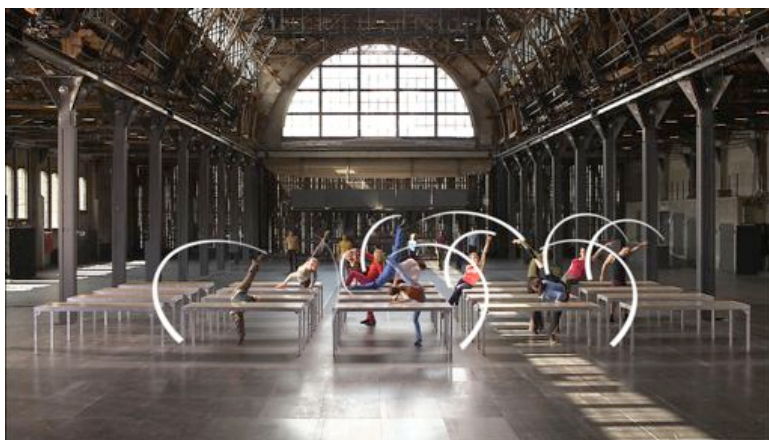


Figure 6: Form Flow. Still from annotated video illustrating alignments, the way in which Forsythe designs relationships in space and time. Credit: Synchronous Objects Project, The Ohio State University and The Forsythe Company

These lines drawn on top of the video make explicit selected inter-dancer relationships corresponding to that particular choreographic system. As such they are an indication of the focus of attention in the space at that particular moment. Whereas the *Improvisation Technologies* CD-ROM draws the viewer's attention to what the dancer might be thinking with the body, *Synchronous Objects* foregrounds the overall distribution of attention that is facilitating coordinated decision-making.²¹ As has already been observed, scientists and philosophers are developing new theories of how the body shapes the mind that counter the prevailing view that physical intelligence is purely instinctive. We have already discussed how physical intelligence can be embedded in score generated tools. Now, observing the annotated videos of *One Flat Thing, reproduced*, we could contemplate how physical intelligence can be extended beyond the boundaries of a single individual.

However, this does not answer the question if audience experience can be enriched by such exposure to the workings of physical intelligence. For some non-researchers it

²¹ See: Kirsh, D. (2009). Choreographic methods for creating novel, high quality dance. In, Proceedings of the 29th Annual Conference of the Design and Semantics of Form and Movement (pp. 188-195). Lucerne, Switzerland: Design and Semantics of Form and Movement.

might prove to be useful information, but is it enough to render visible what the dancer might be thinking while moving either alone or with the group?

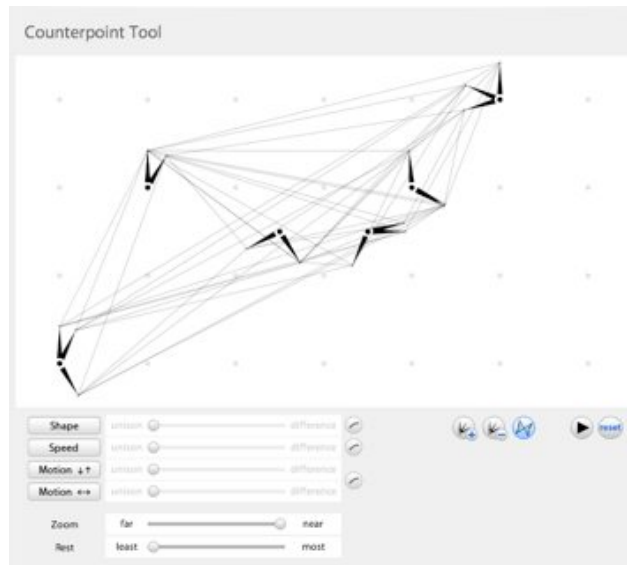


Figure 7: Counterpoint Tool. Interactive creative tool in which users can create their own visual counterpoint, reveal alignments in form and flow, and explore creating movement dependencies akin to cueing system in *One Flat Thing*, reproduced. Credit: Synchronous Objects Project, The Ohio State University and The Forsythe Company

Another proposal for enhancing audience understanding exists on the *Synchronous Objects* site in the Counterpoint Tool **[Figure 7]**. This is a small interactive program that lets one explore the concept of choreographic counterpoint through direct experience. The small clock-like forms can be moved in and out of unison by varying the shape, speed and motion using the sliders. The Counterpoint Tool is a kind of dynamic interactive drawing device that enables one to discover an elusive structure that as contrapuntal interplay can easily slip out of balance. The question is: might working with it enhance one's ability to perceive this kind of coherence in any subsequent viewings of non-narrative dance, where the meaning and intelligence of the dance is grounded in such structures?

The aim of this essay has been to provide evidence to support the view that dance artists are in a unique position to shift prevailing attitudes toward physical intelligence as being a "lesser form of intellect confined to the bodily achievements".²² This evidence has been shown in examples culled from the growing collection of choreographic resources being developed by research groups working in collaboration with contemporary choreographers. These efforts if extended and multiplied might help ensure that dance enters into a constitutive relationship with emerging conceptions of our intelligent thinking selves.

Bio: Scott deLahunta has worked as writer, researcher and organiser on a range of international projects bringing performing arts with a focus on choreography into conjunction with other disciplines and practices. He is currently Senior Research Fellow Coventry University/ R-Research Director, Wayne McGregor|Random Dance and Program and Research Coordinator Motion Bank/ The Forsythe Company.

²² Gould, *ibid.*