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Coping and Choreography

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ABSTRACT

In this paper, I study the choreographic process of Merce Cunningham in order to understand better how refined kinesthetic and proprioceptive responses come to constitute the expressive matter of dance. Employing first chance operations then a software program to generate unexpected sequences of movement, Cunningham strains the coping mechanisms of his dancers to the limit. His choreography requires dancers to become experts at adapting their own sensorimotor instrument to the situation at hand. When dancers are asked to imitate the movement sequences of a computer-generated avatar, their bodies can truly be said to be "co-constructed"; they evolve muscle memories and skills that correspond to the technology with which they interact.

Keywords

Choreography; kinesthesia; proprioception; sensorimotor; embodiment; co-construction; performative; computer simulation; avatar; body *hexis*; gesture; operating chain.

1. INTRODUCTION

What happens if we look at choreography not as an aesthetic practice but as the production of puzzles for the body to solve, puzzles that require it to cope, to enact its kinesthetic and proprioceptive capacities, in unusual and taxing conditions? What if choreography poses a singular challenge to our ordinary modes of embodiment, if it urges new bodies into existence that did not exist before?

The practice of choreography, of inventing new movement vocabularies and sequences for the body to execute, entails nothing less than the performative construction of that body. As a result of iterated performances, the shape of muscles, the length of ligaments, and even ways of ambulating and holding the body are all recast in order to satisfy demands that are neither socially mandated (part of a collective *habitus*) nor anatomically over-determined. Choreography in general tends to explore possibilities of human anatomy not exploited elsewhere, but when aligned with, and executed within, new technological environments, choreography requires dancers to become *virtuosos of coping*, experts at adapting their own sensorimotor instrument to the situation at hand.

Merce Cunningham's choreography is particularly suited to an approach that seeks to discover the ways human bodies produce themselves (how they refine their capacities and thus assume new shapes) in relation to technological environments and situated demands. Over the years, interviews with Cunningham's dancers have confirmed that the greatest challenge they face is to augment their ability to enchain movements never enchained before in either everyday life or the traditional technique classroom.[1] Dancers must internalize time, embody their own cues, sense—through highly developed capacities of hearing and proprioception—the presence of other bodies in their midst. Cunningham has stated that his most fulfilling aesthetic experiences have been produced by the spectacle of a dancer learning to embody his nearly impossible choreography, that is, by the spectacle of a human body in the process of rearticulating its very motility in order to perform inorganically derived choreographic "operating chains" (to evoke the terminology employed by André Leroi-Gourhan). Cunningham has also suggested that this spectacle of virtuosity constitutes the expressive content of his dances; meaning is derived neither from narrative nor from individuated emotion, but from what he calls the "human drama on the stage" (Vaughan, 1997; 7).

2. MERCE CUNNINGHAM'S CHOREOGRAPHY

For readers who are unfamiliar with Merce Cunningham, I will provide a short guide to his innovative practice. The Seattle-born dancer is known for his intractable dedication to emotional neutrality, his rejection of kinetic habits (already learned movement patterns), and, most dramatically, his unceasing efforts to displace elements of creative decision-making from subjective to objective (external) means. After meeting John Cage in 1938, Cunningham revolutionized twentieth-century concert dance by adapting and reinterpreting many of Cage's compositional methods for the medium of movement. Throughout the 1940s, Cunningham was experimenting with Cage-inspired innovations; distancing himself from the practice of Martha Graham, whose company he quitted in 1946, he started to approach the bond between music and dance as one that could be attenuated and,

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[1] Cunningham's practice is significantly different from that of William Forsythe. Forsythe employs what he calls "improvisation technologies"—defined tasks—that stimulate dancers to explore the full articulatory potential of joints and therefore develop new types of movement. The enchaining of these movements arises from the dancer's own kinesthetic sense as it is engaged in improvisational exercises. In Cunningham's style, there is no improvisation; dancers must find ways to connect one movement to another, but each movement and its sequence is determined well in advance by the choreographer.

eventually, entirely broken. He realized that collaborators could work separately and aimed to disentangle the movement material from the dynamics, rhythmic structure, and tonal moods of the accompaniment. The result was the liberation of the moving body from the phrasing and the dynamics of musical accompaniment and thus a transformation of its traditional narrative, illustrative, or expressive role. Like Cage, Cunningham also reconceived the structure of his compositions as time-based: his choreographies consisted of so many minutes to be filled, with units of action calculated mathematically. As he stated in 1948, dance could be defined, at bottom, as nothing more than "organized movement in a specified time and space" (Vaughan, 1997; 44). The important break with modern dance had been made; "constructivist"[2] principles would from now on guide movement sequences, "specifying" the time and space into which gestures would be "organized," or enchained.

Remaining faithful to this astringent poetics, Cunningham then explored the practical effects of adapting a further Cage doctrine, to wit: that in life, continuity—what we might call history, or the existence of things in time—is produced by one thing following another. Cage always took a lively interest in the way everyday aural phenomena unfold unpredictably, and he wished to emulate this unpredictable order in his own music. To Cage, this meant that the flow of sonic events in music required no more intentional organization than the flow of natural events. By 1950, to replicate this aleatory continuity of the ambient world, Cage began developing chance operations, methods for shifting the responsibility of sequencing from composer to external device.[3] Inspired by the I Ching, he allowed coin tosses or the surface imperfections on a sheet of paper to determine the order of notes, meters, durations, and instruments in a work. Cunningham soon followed suit. This approach to continuity as conditioned by external constraints would prove to be the source of Cunningham's most rigorous innovations in twentieth-century aesthetics.[4] The use of chance operations and other external devices has turned out to be doubly productive—responsible for a set of exquisite choreographies while at the same time generating an aesthetic counterpart to investigations taking place in the realm of cognitive science with respect to the phenomena of "distributed creativity," "extended cognition," and the "co-construction" of subjectivity in technological environments.[5]

3. THE PERFORMATIVE INSTANTIATION OF A NEW BODY

Much attention has been given to chance means as a general avant-garde technique; however, little has been done to theorize Cunningham's adoption of chance methods of construction as they apply specifically to *moving bodies on stage*. A constructivist, procedure-oriented aesthetics presents a particular challenge to dance, and it is therefore important to examine how chance operations impact choreography, specifically. In dance, the medium involved is the human body; this body is an organic unit with a bipedal, cephalized, symmetrical, mobile-through-the-midline-axis skeletal structure. It is not as infinitely manipulable as, say, words on a page or notes on a staff. When constructivist methods are applied to sequences of human movement, what emerges clearly are the limits to flexion and the constraints of gravity that necessarily inhere.[6] At the same time, constructivist poetics do allow the choreographer (and thus the audience) to discover new potentials of the human neuro-musculature while offering the opportunity to explore how human sensory systems may be extended and revised in directions not demanded by normal, everyday environmental conditions—in other words, beyond the constraints of the evolutionary process. When confronted with sequences found in no previous training or any other human social context, dancers must *cope*: they must engage their senses, muscles, and memory to master the transitions from one movement to the next. The dances *and* the bodies revised to perform these dances may be considered, then, to be co-constructed: performatively produced in dialogue with external devices, subject to a rigorous training that transforms dancing subjects into virtuosos of sensorimotor embodiment.

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[2] By "constructivist," I am referring to a tradition of art making (identified with but not initiated by the Russian Constructivists) based on applying pre-determined (and sometimes whimsical) procedures and constraints (e.g., geometry; mathematical formulas or algorithms; patterns of repetition or fragmentation, as in the mesostic; the elimination of an alphabetic letter; a combinatory or chance operation, and so on). Constructivism is often treated as the opposite of expressionism, but both are involved in any art-making activities to differing degrees (e.g., for instance, even the most lyric sonnet employs syllabic, metric, or rhyme constraints).

[3] Cage was a student of Arnold Schoenberg, who applied a constructivist principle to the production of a-tonal sequences. Cunningham's own interest in non-subjective creative processes was both a negative reaction to Graham's hyper-subjectivity and a positive response to Cage's compositions. Cunningham's guiding principle: "It is possible for anything to follow anything else" (Charlip, 1954; 41).

[4] In 1954, upon receiving the Guggenheim award, Cunningham explained: "the use of chance [is] a method of finding continuity, that is, continuity thought of as being the continuum of one thing after another, rather than being related by psychological or thematic or other cause-and-effect devices" (Vaughan, 1997; 84-85).

[5] See, for instance, Andy Clark, *Supersizing the Mind*: "the loop into the external medium [is] integral to his intellectual activity" (Clark, 2008; xxv); "It matters that we recognize the very large extent to which individual human thought and reason are not activities that occur solely in the brain or even solely within the organismic skin-bag. This matters because it drives home the degree to which environmental engineering is also self-engineering. In building our physical and social worlds, we build (or rather, we massively reconfigure) our minds and our capacities of thought and reason"—and movement, I would add (xxviii).

[6] It is at this point, incidentally, that I part ways with Deleuze-inspired readings of Cunningham (and modern dance in general). Although I admire work on movement by José Gil, Erin Manning, and Brian Massumi, I believe their account of how new movement is created lacks an awareness of how great a role social conditioning as well as innate anatomy play in determining movement options. For a more developed critique of the Deleuzian turn in movement theory, see my *Agency and Embodiment* (2009). See also Gil, 2002; Massumi, 2002; and Manning, 2009.

How does a performative instantiation of a new body (and a revised sensorimotor apparatus) develop out of a dialogue between internal and external means of creative decision-making? More specifically, what are Cunningham's methods for producing continuity—the advance from one movement to the next—and what does he mean by "continuity" anyway? To answer these questions, let us return to the moment when "continuity" first became an issue in art: the Dada moment when a set of influential chance operations was devised. Prior to World War I, the sequence of material events in art was determined—or at least thought to be determined— organically, subjectively, or according to conventional (narrative, prosodic, representational) principles. In short, continuity resulted from a recognizable logic attributed to nature, psychology, or artistic tradition. With the invention of continuity-producing technologies, such as Tristan Tzara's word cuttings or the *cadavre exquis*, the source of continuity was explicitly displaced onto external devices, random or objective processes. The Dadaist (and Surrealist) emphasis was theoretically not on creating artworks but on unearthing some kind of preconscious, unintentional, and collective reality that could not be accessed unless conventional methods of sequencing were jettisoned. A hint of this notion remains in Cunningham's practice (and in Cage's Buddhist explanations of it);[7] however, Cunningham stresses that his main reason for employing chance procedures is not to locate a truer, more profound reality, but simply to generate alternative possibilities, to explore unrealized virtual potentials of the body.[8] Chance operations—and later computer motion capture programs—allow him to evade habitual ways of stringing movements together.[9] And I want to underline once again where Cunningham's emphasis lies: on enchaining movements in new ways, not primarily on inventing new movements. As opposed to William Forsythe, Cunningham takes

as his *matière brute* the already given (and this explains his affinity with Robert Rauschenberg and the aesthetics of collage).[10] Cunningham works with a fairly traditional vocabulary of balletic and modern positions and movements, with a few idiosyncratic exceptions (such as his characteristic flip of the wrist). Thus, experimenting in the domain of continuity means, to him, exploring new ways of sequencing, playing with the ways one thing can follow another.

4. CONTINUITY AND CHANCE

But what, specifically, constitutes the "one *thing*" and "another" that Cunningham subjects to re-sequencing? According to David Vaughan, Cunningham's archivist, and Carolyn Brown, for twenty years one of his lead dancers, the first unit of matter that Cunningham subjected to re-sequencing was the entire danced section, such as a solo, trio, or duet. In 1951, the choreographer began tossing coins to determine the sequences of *sections* in a dance.[11] Soon after, Cunningham was experimenting with chance and continuity more broadly, drawing up charts for each spatial, temporal, and motor element. With reference to *Suite by Chance*, a 1954 choreography strongly defined by chance procedures, Remy Charlip (a Cunningham dancer) has written:

> These charts, which defined the physical limits within which the continuity would take place, were not made by chance. [In other words, the movement that went into each box was chosen by Cunningham.] But from them, with a method similar to one used in a lottery, the actual continuity was found. That is, a sequence of movements for a single dancer was determined by means of chance from the numbered movements in the chart; space, direction, and lengths of time were found in the other charts. At important structural points in the music, the number of dancers on stage, exits and entrances, unison or individual movements of dancers were all decided by tossing coins. In this way, a dancer may be standing still one moment, leaping or spinning the next. There are familiar and unfamiliar movements, *but what is continuously unfamiliar is the continuity*, freed as it is from usual cause and effect relations.[12]

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[7] Cunningham: "Some people seem to think that it is inhuman and mechanistic to toss pennies in creating a dance instead of chewing the nails or beating the head against a wall or thumbing through old notebooks for ideas. But the feeling I have when I compose in this way is that I am in touch with a natural resource far greater than my own personal inventiveness could ever be, much more universally human than the particular habits of my own practice, and organically rising out of common pools of motor impulses" ("The Impermanent Art," 1952; quoted in Vaughan, 86).

[8] In contrast to his avant-garde predecessors, Cunningham seeks to generate aleatory sequences only as a basis for further elaboration. He self-consciously wants to make works of art. Accordingly, he almost always subjects the sequences generated through chance operations or LifeForms software to further refinement and alteration. These refinements and alterations appear to be based on two criteria: 1) *aesthetic interest*—How does the sequence look? Does it produce a form experienced as integral, necessary, beautiful; and 2) *practicality*—Can the sequence be performed by a human being? Can the multiple and contemporaneous sequences be performed by several human beings within the physical coordinates of a proscenium or in-the-round stage?

[9] Chance procedures are, Cunningham writes, "a present mode of freeing my imagination from its own clichés and… a marvelous adventure in attention…. [gestures are as if] jabbed by an electric current" (Vaughan, 1997; 87).

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[10] See Roger Copeland, "Cunningham, Collage, and the Computer."

[11] This is perhaps the dominant way Cunningham plays with the sequencing of, or the continuity between, one thing and the next; up until his recent death, he was still using chance operations to determine the order of sections in a longer piece. My own research, however, suggests that even as early as 1951, Cunningham was exploring the use of aleatory sequencing to produce new connections among discrete *phrases* and even discrete *movements within a phrase*. Speaking about *Sixteen Dances for Soloist and Company of Three,* a 53-minute long work first presented in 1951, Cunningham states: "in the interlude after Fear, number 14, I used charts of separate movements for material for each of the four dancers, and let chance operations decide the continuity" ("A Collaborative Process Between Music and Dance," quoted in Vaughan, 1997).

[12] Quoted in Vaughan, 1997; 70; added emphasis. Cunningham: "In my own work, wanting to find the utmost in freedom from my own feelings, directly, or my memory of continuities and

Documentation indicates that at certain points Cunningham even used chance to govern the type of movement employed. With respect to a 1957 solo, *Changeling,* Carolyn Brown recalls that he divided "the body into parts, listing the possibilities of those parts, and then superimposing one action on to the other by tossing coins to determine the final movement"; after embedding chance at this level, "he discovered that the execution of the resulting choreography was nearly impossible, and it took months of rehearsal to accomplish it."[13] Fully resolved to master the "unfamiliar continuity," Cunningham practiced hours and hours to make his body fit the unfamiliar chain of motions. He was not so much attacking the organic body as attempting to defy its habits and extend its given possibilities. His logical next step as a choreographer was to impose these externally devised chains onto the bodies of his dancers; "It was physically very difficult," recounts Charlip: "getting from one thing to another… was in itself part of the drama, because just to do that was so intense" (quoted in Vaughan, 1997; 88). To this day, Cunningham's choreography demands of his dancers that they develop a new type of virtuosity, a specific variety of kinesthetic flexibility that involves being able to intuit kinesthetically how to proceed from one movement to the next—a dilemma that Cunningham considers to be at the very heart of dancing. Due to the "unfamiliar" and even counter-intuitive nature of the sequencing, the dancer cannot follow a habitual kinetic impulse, an inscribed neuronal route; instead, she has to forge one with her own energetic flow, thereby creating the dynamics we witness on stage. "*Dynamics in movement come from the continuity,*" he underscores in his rehearsal notes for the 1956 *Suite for Five.*[14] Extensive rehearsal time (which dancers often complete in isolation) is necessary to realign the neuromuscular connections such that one momentum can be grafted onto—and continued in—the next.

5. MOTOR CHAINS

To cope with the demands Cunningham's choreography makes, dancers have to rely on the same skills required for the acquisition of all motor chains. That is, dancers need to extend the very capacity that paleoethnographer André Leroi-Gourhan claims is what distinguishes humans from other animals: the ability to increase exponentially the number of neural connections among various parts of the body and brain, an ability made possible as a result of the larger cerebral cortex gained through the long course of evolution. In *Gesture and Speech,* Leroi-Gourhan argues that over millennia, *homo sapiens* has acquired a "refined sensitivity" and "an intelligent motricity" nourished by—and recursively responsible for—the multiplicity and complexity of what he calls "operating chains."[15] Environmental conditions (and this includes natural and man-made objects as well as learned techniques) demand a gestural response; a self-correcting kinetic-kinesthetic system forges new connections in the brain, which then produces change in the environment (new technologies and techniques requiring, in turn, a new gestural response). According to this paradigm, human bodies come into existence as a result of performing sequences of movement that are functional or expressive in purpose, sequences that differ from one ethic group to another and thus cannot be considered either necessary or inevitable. Dance is an exemplary form of enchained movement, a repertory of specialized "techniques of the body" (Mauss) or operating chains, made available by the impressive flexibility of the human neuromusculatory and sensorimotor system.

The flexibility noted by Leroi-Gourhan is expanded and transformed into an aesthetic value in Cunningham's choreography. With sequencing determined by chance, Cunningham calls on his dancers to go beyond even the normal apprenticeship in a specialized dance vocabulary. As his classroom exercises demonstrate, he seeks to amplify a dancer's ability to change sequencing on the spin of a dime. Cunningham dancers need to be flexible enough, adaptable enough, to perform "unfamiliar continuities" in practically every class. It is as though the choreographer were asking a toddler to walk first one way, then another way, then yet another—and in each case, the "walk" has to appear as natural, as *purposive,* as a conventional, socially-sanctioned mode of ambulation.[16] To borrow Malcolm MacIver's phrase, the "sensory ecology of the [Cunningham] animal" is one that demands a hyper-development of the imitative, self-molding plasticity that humans naturally exhibit when learning new tasks.[17] Determining the extent of that plasticity—at once kinetic-kinesthetic and neuro-morphological—is part of the exploration

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ideas about how movement ought to follow one from another, I have used a chance procedure to obtain the continuity. That is, in the choreography, chance is used to dictate what movement followed any given movement, and correspondingly so, the time and space, that is, the duration and division of the given movement, and what place it happened in" (Vaughan, 101).

[13] Carolyn Brown, "On Chance" in *Ballet Review* 2, no. 2 (1968): 18, reprinted in Vaughan, 103. Again in 1990: "[In *Polarity,* he] used chance processes to determine which part of the body would be moving at any given moment. (To some extent, therefore, he was returning to the process he used in his earliest chance solo, *Untitled Solo,* of 1953)" (Vaughan, 252).

[14] From "rehearsal notes 1952-58" in the Merce Cunningham Archives, Westbeth NY (original emphasis). *Suite for Five* was an extension of *Solo Suite in Space and Time* with an added trio, duet and quintet.

[15] André Leroi-Gourhan, 1964; 115; my translation.

[16] In *The Perception of the Environment: Essays in Livelihood, Dwelling, and Skill,* Tim Ingold argues that learning to walk is no more underwritten by the human genome than learning to bicycle; neither is an inevitable outcome of bipedalism. All ambulatory forms (and by extension, operational chains and gestures) are potentials of a developmental system that can only unfold through the pressure of a specific set of conditions: "what people do cannot be understood as the behavioral output of an inner programme but only as the intentional activity of the whole human organism in its environment" (387). Ingold's perspective clarifies an unstated premise of Cunningham's choreography: a certain arbitrariness inheres in the way we are performatively created as moving bodies—both within aesthetic situations and without.

[17] The "sensory ecology of the animal" is the set of conditions that cause it to employ and refine sensory capacities; see Malcolm A. MacIver, "Neuroethology: From Morphological Computation to Planning" in *The Cambridge Handbook of Situated Cognition.*

that artists we call "experimental," or "avant-garde," pursue in the choreographic realm.[18]

6. THE AFFECT OF SKILL

It is instructive to listen to Cunningham dancers recount how they developed the faculties he requires. Carolyn Brown, for instance, remembers that she would learn the choreography and first practice it alone for many hours before attempting it with a partner or group. "There was only one way for me to approach [the choreography's] abruptness," she writes, "the going from one isolated movement to another without flow or intended continuity, without a rhythmic pulse dictated by the music, … and that was with absolute concentration on each single moment" (Brown, 2007; 49).[19] Cunningham was by no means insensitive to the effort required; in fact, he discovered in that effort the very basis of his aesthetic, the "energy geared to an intensity high enough to melt steel" that he wanted his audience to view ("The Impermanent Art," quoted in Vaughan, 1997; 86). In "Two Questions and Five Dances," Cunningham describes his exhilaration as he observed Joan Skinner take a notoriously difficult sequence of movements and thread them together seamlessly with her own body. According to Cunningham, Skinner introduced a type of "coordination, going from one thing to another, that I had not encountered before, physically" (quoted in Vaughan, 1997; 59). To this day, the best Cunningham dancers are able to make an "unfamiliar continuity" seem like "a new pattern," a gestural sequence possessing the same "inevitability" as an operating chain required to complete a specified task.[20] Indeed, it has been remarked that while performing, Cunningham dancers exhibit a task-like attitude, a pensive concentration; they are emoting what we might call the *affect of skill*. For the dancer, the goal is not to *look* like she is revealing, through improvisation, a new possibility for the body, a new way of riding an energetic wave (as in the work of Forsythe); rather, her goal is to *feel* as though she were executing an operating chain, following the course of what might look unfamiliar but is actually lived on the order of the body as habitual—but habitual only because repeated a brutal number of times. The work on the body that occurs during those arduous "months of rehearsal" mirrors the process whereby a young body assumes a culture-specific body *hexis*. Cunningham's practice has a critical edge, then, for it implicitly suggests that any body *hexis* is to some extent inorganic, conventional, and arbitrary—a matter of chance.

The advantage of Leroi-Gourhan's model is that it situates the emergence of gestural sequences in the context of both the evolution of the human body and the history of its material and technological interactions. He insists that bodies become articulate only in relation to the objects they skillfully manipulate and that manipulate them.[21] If we follow his logic, then a change in technological conditions would necessarily register a change in the operating chains devised to manipulate these technologies, which would eventually produce alterations in the body primed to perform them. This is an important set of arguments, entirely pertinent to Cunningham's craft. For Cunningham is one of the pioneers in the use of advanced technologies—first video, then digital programming—and he has himself noted the choreographic changes each technology suggested or imposed.[22] In 1990, Cunningham began collaborating with Thecla Schiphorst and Catherine Lee to adapt LifeForms, a three-dimensional computational tool, to the choreographic task. By turning to a computer software program developed by Dr. Tom Calvert, a professor at Simon Fraser University, Cunningham was accomplishing in the most technologically advanced way available the transfer of sequencing decisions from his own will (replaced in the 1950s with coin tossing) to the programming "will" of an external device. In conclusion, therefore, I must ask whether the move from employing what we might call "low tech" chance operations to employing the sophisticated LifeForms software produces not only new gestural chains but also a slightly different body (not to mention a slightly different type of dance). It is likely that in each case, the dancer as well as the dance are co-constructed: the movement continuities of the dance and neuromuscular connections of the dancer's body are generated by means of an external prompt. But what are the differences between these two technologies, these two modes of generating embodiment?

7. LIFEFORMS AS A CHANCE OPERATION

If I cannot provide a detailed account of the ways Cunningham used LifeForms in the space permitted, I can at least point to the

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[18]On "plasticity," especially with regard to the brain and the brain-body connection, see Catherine Malabou, *What Should We Do with Our Brain?*

[19]The film version of Cunningham's 1993 *CRWDSPCR* (text-messaging language for "Crowds Pacer" or "Crowd Spacer") has some remarkable passages in which dancers recount their experiences learning Cunningham's choreography. Many speak of the "kinetic memories" they must create through repeated practice; they marvel at how, over time, the awkward and seemingly impossible sequences of movement become part of their daily movement vocabulary, as natural to them as watering a plant or riding a bicycle.

[20]Dee Reynolds: "It's very remarkable—and many people have commented on this—that although it [the sequence] is random, and although it is chance, when you see it, you get a tremendous sense of inevitability, in fact more than with something that's more conventionally structured, because there it looks contrived" (from "The Possibility of Variety: Dee Reynolds Phones Merce Cunningham").

[21]A similar understanding of how movement patterns—and thus bodies—are performatively constructed is embedded in Cunningham's choreographic practice. Implicitly, and sometimes explicitly, his works foreground the extent to which the supposedly "external" device or element is actually intrinsic to a process of performative embodiment. Sensorimotor development is always context-based. Theodor Adorno already argued in 1970 that artistic techniques and conventions are an objective force (means of production) assimilated into the body of the artistic producer, serving as internalized means of making artistic decisions (Adorno, 1997). I develop the relation between Cunningham's practice, theories of "extended cognition" and Adorno's aesthetics in a current book project entitled "Aesthetic Subjectivity."

[22]See "Four Events That Have Led to Large Discoveries (19 September 1994)" in Vaughan, 1997; 276.

most salient aspect of its application with respect to the concerns I have raised.[23] In general, Cunningham's process has remained the same over time; beginning with *Trackers* in 1991, he continued until his death in July of 2009 to choose the movements for each part of the dancer's body from his own favored vocabulary, subsequently entering them into a "menu" that could be accessed by a "Sequence Editor." As before, he composed sequences of movements by chance methods, then tried them out on the animated figure—known as "Biped"—that could be manipulated on the screen. And again, as Schiphorst recounts, "When these movement sequences appeared physically impossible, Merce would work with his dancers at discovering how they could be made to work" (Schiphorst, 1992, 49). The salient difference, however, is that before mounting the chance-derived sequences on human bodies, Cunningham would test them out first on the avatar, "Biped," a generalized and abstracted version of the human body if there ever was one. That is, instead of working directly with the dancer's body, whose individuality he often praised and showed to advantage, he inserted into the process this strange intermediary, a set of animate pixels that couldn't help but influence the nature of the gestural chain produced. The dancer would then have to discover internally a continuity that was unfamiliar in part because it had been conditioned by the articulations of a *virtual* figure. The motions of this figure were pre-segmented into "keyframes," Schiphorst explains, "each [one] containing a body shape" (Schiphorst, 1992; 50). These body shapes were composed either of "a single limb segment" or "a chain of limb segments" (51) based on "reverse kinetics," or the way a movement in one part of a limb *habitually* affects movement in another. Of course, the programmer's segmentations of the animated figure, its "shapes," and the connections between them, constitute nothing more than an approximation, an extrapolation, of the potential articulations of the human body. Biped's body is divided into fourteen sections, vertically and horizontally, and its sequential possibilities are limited—and facilitated—by the way these fourteen sections can be connected in virtual space. But the human body is not divided into fourteen sections; it is articulated and plastic in an entirely different way. The result of employing LifeForms is therefore markedly distinct from that obtained by tossing coins and mounting unfamiliar sequences on individual dancers. As David Vaughan has observed, choreographies created with the aid of LifeForms have a certain "look": "angular movements of the arms performed in a counter-rhythm to those of the legs" are frequent, presumably because Biped is particularly good at those kinds of moves (1997; 257). Clearly, Cunningham's dancers—and with them his audiences—now face a new challenge: they must reproduce, either actively or imaginatively (through kinesthetic empathy), the energy flow of an *avatar* by means of a heightened kinesthetic sense that remains human—or does it?—as it evolves.

8. EPILOGUE

Biped, a 47-minute dance choreographed in 1999 by means of Lifeforms (and named after its avatar), is without doubt one of the greatest achievements of Cunningham's career. Although the argument I have been pursuing might lead one to suspect that the sequencing by means of LifeForms produces robotic movements, awkward phrasings, and incoherent couplings of dancers on the stage, even a brief glance at *Biped* solicits an entirely different appreciation (at least, on the part of this viewer).[24] There may indeed be moments of the dance that are strange and unsettling. The utterly original ways for two or three dancers to occupy the same space, for instance, could suggest that the dancers are indifferent to one another's presence, as if they were imitating avatars that were originally dancing in two different parts of a computer screen that the touch of a key subsequently digitally overlapped. Likewise, one might be tempted to call the sequence near the beginning of *Biped* in which dancers repeatedly arch their torsos somewhat "other-worldly"; the combination in rigorous succession of an arch with a *soulevé*, a *passé*, then an *arabesque* is so physically demanding as to seem nonsensical—emotionally unjustified—given the lack of narrative motivation, the neutrality of the dancers' countenances, and the uniformity of dynamics that accompany this explosion of energy and grace. But in the first case, the indifference of one phrase-executing dancer to another— even as they occupy the same cubic meter of stage—recalls nothing more vividly than the way bodies pass, insensibly, on the subway platform or city street. And in the case of the repeatedly arching backs, one is also reminded of something poignantly human. These extensions of the spine remain perfectly uniform and fully executed despite the changes in leg position that were suggested, through chance combination, by the "Sequence Editor" that was fed a "gamut of movements" based on the segmented lower limbs of the LifeForms avatar. The dancers executing these repeated arches of the torso (above the changing lower body) strike the viewer as litheness incarnate; what is being exhibited here, one realizes, is pure vestibular virtuosity in the form of a spine suspended and balanced precariously on an arched foot or extended toe. One senses not that Cunningham's dancers have achieved—or descended to—the order of the inhuman, that they have become imitations of an essentially cyborg motility. Instead, one feels that Cunningham's dancers have at last captured the most exquisite potential of human bipedalism—its ability to continue evolving in relation to the architecture and infrastructure of a postmodern world.

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