Article

Machine Bodies: Performing Abstraction and Brazilian Art

Mariola V. Alvarez

Tyler School of Art and Architecture, Temple University, Philadelphia, PA 19122, USA;
mariola.alvarez@temple.edu

Abstract: In 1973, Analívia Cordeiro produced the videodance *M3x3*. Filmed in a Brazilian television studio and choreographed by Cordeiro with a computer, the work explores the limits of the human body through abstraction and its inhabitation of a new media landscape. Tracing the genealogy of *M3x3* to the history of videodance, German and Brazilian art, and Brazilian politics, the article spotlights the media central for its conceptualization, production, and circulation to argue for how the video theorizes the posthuman as the inextricable entanglement of the body and technology.

Keywords: Brazilian art; videodance; computer art; Analívia Cordeiro; modern dance; abstract art; posthumanism

1. Introduction

With an invitation from the annual performing arts celebration of the Edinburgh Festival in Scotland to show her work, Analívia Cordeiro recorded *M3x3* in 1973 in black and white in the studios of TV Cultura in her hometown of São Paulo, Brazil, based on choreography formatted with a computer.[1] Technology overdetermined *M3x3* in multiple ways: a camera recorded it, a television served as the medium for viewing it, and a computer programmed it. Nine female dancers, dressed in black and white costumes, move across a 3 m × 3 m gridded stage for over six minutes. The title emerges from this set design. The camera cuts between two points of view—from above and squarely in front of the dancers, making visible the lines of the dancers' positions and their placement within the dotted line matrix. Each dancer moves independently and autonomously, adhering closely but not completely to her assigned square. In the course of the video, the group does not come together or synchronize except in the timing of the whole work. As a result, the viewer's attention remains distracted and dispersed. With the absence of any plot, the dance abruptly ends with the completion of the choreography.

The article does not claim that Cordeiro was the first artist to connect dance and video, though within Brazilian art history, she was a pioneer, and *M3x3* is considered to be "the oldest tape admitted as belonging to our [Brazilian] video history" (Machado 2007, p. 277). Cordeiro, unlike most Brazilian video artists who identified as visual artists, came from the world of dance. The inherent interdisciplinarity of her work marks the tape as constitutive of contemporary art and worthy of attention, but unfortunately it has also been the reason for the neglect of her practice.[2] Cordeiro's early videos loop between dance, television, and computers, and this entanglement of bodies in movement, machines, and data is at the heart of this analysis. Given the significant interest in the body in postwar Brazilian art, whether the phenomenology of Neoconcrete art or the body in pieces with art under

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[1] The video can be viewed on Cordeiro's Vimeo site, see https://vimeo.com/46551344.
[2] I borrow this idea of video's interdisciplinarity from (Ma and Suderburg 2012, pp. ix–xxx).

the dictatorship, dance is uniquely able to visualize the impacts of technology on the body.[3] *M3x3* was produced during an almost decade-long military dictatorship in Brazil, in which citizens lived in a pervasive climate of fear and endured brutal repression. Yet, the military leaders continued the programs of previous administrations to power the economy through national industrialization and production. This essay locates *M3x3* at this intersection of machines and bodies in order to think with Cordeiro about the effects of technology on the physical body, its movements, behaviors, and organization.

Abstraction can be seen throughout the video artwork including in the non-narrative format of the dance and, most importantly, through the fragmentation of the dancers' bodies which this essay elucidates in its discussion of the recording techniques, computer programming process, and costume design. The resistance to the unification of the body challenges the autonomy of the human itself, theorized through the lens of posthumanism and considered in particular through the historical context of the Brazilian dictatorship at the time of the video's production. I argue that the hybrid form of dance and technology—in its production, choreography, and circulation—underlines the limits of the human. The video questions the ways in which the body will inhabit new media in its movements and behaviors and how advanced technologies will reshape the category of the human. To perform, or in other words to experiment with the effects of technology on the body and its biomechanics, Cordeiro abstracted the body. Significantly, given Cordeiro's focus on the discipline of dance, the human is defined through its physicality, not just as a rational animal. My essay examines the posthuman body in *M3x3* as embodiment altered by new media.

In order to make my case I address how technology determines the work by organizing the article around the media that produced the work: video, television, and computers. Cordeiro's interweaving of dance and video art proposes a new chapter in the history of "videodance" which I explain in the first part of the article, before turning to the radical decision to format a computer to aid in the choreography of the dance and, thus, its engagement with the discourse of digital embodiment in posthumanism and Brazilian history. Prophetic and revolutionary Cordeiro envisioned a future that has now come to pass in which bodies have been re-shaped by the technologies with which they interact daily.

2. Videodance

Cordeiro's video operates as an example of videodance which can be defined in one way as the perceptual difference in the experience of live versus recorded dance. The term, attributed to the writings of Jeffrey Bush, Peter Z. Grossman, and Vera Maletic, originally considered the relation of dance to television broadcast and how video would produce a new spatial and temporal performance of dance (Bush and Grossman 1975; Maletic 1987–88).[4] In this way, the development of new media and its application to dance forced the evolution of the field and, simultaneously, the body's capabilities and its perception. Bush and Grossman's article, written only two years after *M3x3*, reminding us of the incipient theorization of the form, challenged videodance to address "both halves of the word" and, therefore, rethink the performance of dance. Videodance does not include a live, in-house audience and instead must rely on "the movement of the dance within the window" of the television monitor (Bush and Grossman 1975, pp. 12–13).

For much of the history of performance, the live act has been privileged as the site of authenticity, originality, and present-ness (Jones and Heathfield 2012). Documentation of the event whether by a still or moving camera only highlighted the gap between the original and the copy and, thus, the viewer's distance from the "missed" event. In contrast, videodance is not a recording of a live performance

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3　On phenomenology and Neoconcretism, see (Alvarez 2013). On Brazilian art during the dictatorship, see (Calirman 2012).
4　Douglas Rosenberg (2012, p. 3) has more recently proposed an expanded concept, "screendance," to include "film or video as well as other screen-based software/hardware configurations." I have decided to use the original term, videodance, to describe Cordeiro's work given its historical context and its specific considerations of dance and television.

in front of an audience, but rather the dance is performed for the camera and, thus, the viewer's experience is mediated by the camera. Videodance challenges the categorization of dance as only a live experience, and through its cross-disciplinary promiscuity pushes dance into the visual arts and addresses the corporealization of the body through media. The time or "liveness" of videodance never ceases to exist—its mediation makes every repeated viewing the live act and connects audiences, now potentially at great geographic distances, in radically new ways. The dancers' bodies materialize only through the mechanisms that record them and present them.

Artists such as Len Lye (*Rainbow Dance*, 1936) serve as early precedents of this form, though Maya Deren's film *A Study for Choreography for Camera* (1945) perhaps most famously takes recorded dance as its central preoccupation. The dancer, Talley Beatty, moves in front of the camera, but more radically the camera controls the point of view and through expert editing Deren created movement with the camera. The camera dances, jumps, and glides, shifting the viewer from the natural world to inside a domestic space and back again over the course of the short avant-garde film. Videodance offered the potential for surprise location changes, multiple viewpoints of the dancer's body including a focus on only a specific part like the head or leg, temporal dissolution, and a sense of weightlessness. Deren's film concludes with a sense of flight as Beatty jumps and the camera-eye shows us multiple parts of his body through quick editing, holding him suspended in the air before touching down gently onto the ground. The camera extends the spatio-temporal dimension of the dance and transforms the human body into an imaginary potential. Consequently, the body is abstracted; the artist refuses the wholeness of the body visible on the stage. Videodance alters the body in both space and time in order to transcend its physical limits and to reduce it to disjointed body parts.

Like Deren, Cordeiro did not choreograph *M3x3* as a dance intended for the stage, but for the camera. *M3x3* begins with a shot from above, immediately foregrounding the camera-eye and not the frontal positionality of a viewer in a theater. Moreover, this camera position, which alternates throughout the video, contrasts with the desire in classic Hollywood dance sequences to privilege the full frame of the dancer's body and movements, often tracking the horizontality of progress through space and centering the protagonist within that space. Obviously, Busby Berkeley's pioneering camerawork took advantage of the top shot, but Cordeiro's dancers never synchronize their movements into a careful composition, instead remaining discrete units, visually emphasized by the divisions of the grid that separate the dancers and stress their intrusions across the lines.

In fact, no single dancer dominates the frame nor emerges as the central "character." Unlike Hollywood films or classical ballet, *M3x3* lacks any narrative device as the means by which to interpret its "message." Dance scholar Mark Franko centers this "resistance to narrative and character" as a defining quality of abstraction in dance (Franko 2013, p. 36). This "resistance" establishes a genealogy for the video within a history of modern film art, such as Deren's work or more contemporaneously Mexican artist Pola Weiss's own intermedial videodance form (Giunta 2013). Both Deren and Weiss appropriated more radically the ability to move between distinct spaces and settings as a way to communicate the technology of the camera and layer meaning in their work. In the case of Weiss, her video *Ciudad Mujer Ciudad* (*City Woman City*, 1978) overlays and intercuts between a woman's nude figure and street scenes of Mexico City in order to analogize the city as a gendered body and the erotic liberation of the feminine through media. Cordeiro limited her use of space, relying on a more traditional proscenium set and, therefore, does not require cuts or even camera zooms to direct the viewer's eye. The only two moments when we are transported to different spatial registers are at the beginning and the end of the video, to which I return later in the article.

An unexplored link thus far in the scholarship between Cordeiro and videodance is her relationship to Austro–Hungarian dancer and choreographer Rudolf Laban. Her dance teacher in Brazil was

Maria Duschenes, a Hungarian exile who studied with Laban at Dartington Hall[5] from 1937 to 1939, when the war forced her to move to South America. Laban, whose career flourished during the Weimar Republic and the early Nazi years in Germany, arrived in Devon, England, in 1937 at the behest of his former student Kurt Jooss, who was living and teaching at Dartington Hall. Duschenes taught Cordeiro Laban's method and Labanotation, a system of writing movement to aid memory, to record dance steps for future iterations, and to serve as a script. Importantly, this latter rationale has been underscored recently by scholars who have begun to research Laban's engagement with film and his early recognition of how the interdisciplinarity of film could advocate for the modernity of dance (Franco 2012, pp. 63–78; Köhler 2017). In particular, Susanne Franco makes a case for how Laban recognized immediately the expressive and, therefore, transformative power of what we now call videodance. Writing in 1928, Laban predicted the challenge dancers working with technologies of reproduction would have to address: "It is not an obvious matter to bring to the screen dances conceived for the stage; choreographed movement has to be transformed in such a way that it responds to the expressive character of film" (Laban quoted in Franco 2012, p. 67). Labanotation was used to choreograph movement for his own films, but he also envisioned it as a system for feature film production and, therefore, instrumental for the emerging movie industry (Köhler 2017).

3. Computer Dance

Like Laban and his Kinetography, Cordeiro was thinking expansively of how choreography and its graphic system could be continually innovated. *M3x3* is not just a televisual dance—Cordeiro did not limit the mediation of the body to only its recording. A computer aided in programming the choreography. Within this system Cordeiro imagined the choreographer as a programmer giving instructions to the dancers, TV crew, and the camera simultaneously but based on a random computer output, freeing "the choreographer to utilize the computer in the creative act, giving greater potential for new aesthetic results" (Analívia Cordeiro 2016, p. 27). She described the "computer dance for TV" as "a system that relates the elements of dance language with elements of TV language through a computer system" (ibid., p. 10). The Fortran IV programming language, developed by IBM, was used to input information in the computer. With this system in place, all the participants were aware of their engagement with and mediation through technology.

Cordeiro formed part of a growing international community of choreographers and dancers, including Jeanne Beaman in the United States, using this "computer-generated approach" to dance, dating back to the early 1960s (Le Vasseur and Beaman 1965, pp. 25–28). The history of this early technology, including human modeling, was developed by the US military for defense purposes, and one of the earliest computer-generated ballets from 1967 was designed by a legendary pioneer of computer art, A. Michael Noll, in the AT&T Bell Laboratories, a science and research development company.[6] Not surprisingly, the artistic, scientific, and militaristic promises of this technology were always intertwined.[7]

In fact, the invitation for Cordeiro to exhibit at the Edinburgh Festival came from the Computer Arts Society (CAS) for their program of computer in the arts called, "Interact: Machine: Man: Society." Along with *M3x3* multiple computer-generated dances were featured as part of "Interact: Machine: Man: Society," including a work by CAS co-founder John Lansdown who also experimented with dance notation. Computer Arts Society was founded in 1968 with the aim of connecting global innovators in the field of computer arts and to encourage the free exchange of ideas. In 1969, they organized

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[5] Dartington Hall was part of a 14th century estate purchased by Dorothy and Leonard Elmhirst in 1925 which they transformed into an arts school, community, and retreat. For more on its history, see https://www.dartington.org/.

[6] After leaving AT&T, A. Michael Noll was on faculty at the University of Southern California since 1984 and then Dean of the Annenberg School from 1992 to 1994. For more on Bell Labs and their intersection with art, in particular Experiments in Art and Technology (E.A.T.), see (Kuo 2016; pp. 260–71).

[7] Harun Farocki's video art returned to this subject throughout his career. See (Elsaesser 2004).

their first computer art exhibition and in the same year began publishing their bulletin, *PAGE*, which highlighted activities from members around the world until 1985.[8] Computer Arts Society formed only one node in an increasingly global network of new media arts.[9]

In order to use the computer as an intermediary for dance, Cordeiro broke the body down into digits. With six as the limit of the computer output, she determined "the first was the right leg position, the second the left leg position, the third was the right arm position, the fourth was the position of the left arm, the fifth of the trunk and the sixth the head position" (Analívia Cordeiro 2016, p. 11). In the absence of a readily available plotter, she drew stick figures, a common early model, also used by Noll in his computer ballet and by other computer dance pioneers. In a parallel way to Deren's filmic fragmentation of the body, the medium, in this case, the computer and its operational language required the body to be abstracted to lines and code.

Given that Cordeiro continued to work with human performers, the computer-generated approach granted interpretive freedom to the dancers to work within the "rules." The instructions communicated to the dancers concerned the length of time to hold a movement, the position of the body in that movement, the camera angle, and then where to move next also known as displacement in space. The dancers determined their own movements in the transitions, and even within the instructed positions of the body the dancer had a host of potential options. Throughout the recording process, the dancer and the camera were in harmony—the dancer knew from which angle the camera perceived her and the camera-eye knew where to look. Cordeiro argued that this mode of working eliminated verbal or mimetic communication with the dancers and film crew, which added objectivity and efficiency to the process and lowered the cost of the production.

This desire to eliminate authorial subjectivity can be traced in many ways to the enormous influence of her father, Waldemar Cordeiro, the founder of the São Paulo Concrete art group (*Grupo Ruptura*, 1952–59) and relevant for our discussion, a leader in Brazilian computer art. Analívia Cordeiro remembered long conversations and shared readings with her father through which she "learned to observe the artistic phenomenon according to an objective approach" and that "visual language has a syntax independent of a subjective interpretation" (Analívia Cordeiro 2016, p. 9). Her father and his work with digital imaging taught Analívia how to use the language of the computer as a way to create a feedback loop between the choreographer, dancers, and camera. This "interactive dance-TV system" relied on the random chance and thus objectivity of the computer output, "independent of a subjective interpretation" (ibid., pp. 9, 29).

Waldemar Cordeiro throughout his career underscored the intellectual nature of artmaking in which the artist relies on logic and mathematics, and the artwork, as a result, becomes "a product" (Waldemar Cordeiro [1956] 2004, p. 495). In his writings from the early 1950s, as the outspoken leader of the Concrete art group, he railed against the artist as a romantic and expressionist figure in favor of one "endowed with clear and intelligent principles" who would produce art "as a means of knowledge deducible from concepts" (Waldemar Cordeiro [1952] 2004, p. 494). Concrete or geometric abstract art with its simple shapes and pure design provided the exemplary means to communicate these concepts to the viewer. His computer art, or what he called "the art of data processing", begun in 1968, offered another vehicle to work with art as a system of communication that did not hinge on artistic intuition but rather on technological precision (Waldemar Cordeiro [1973] 2004, p. 495). Yet, as Rachel Price has argued, although computer art has the potential to "remove subjectivity from representation", the digital or the processing of information in Waldemar Cordeiro's work remains thoroughly embodied due to the artist's intense manual labor needed to prepare the computer programming and the alteration done by hand of the digitally produced images (Price 2012). This same argument could be applied to

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8   All of the issues of *PAGE* can be found at https://computer-arts-society.com/page.
9   For more on this topic, see (Fernández 2008; Weisburg 2018).

Analívia's videodance since the dancers' bodies first needed to be drawn and assigned a numerical system before feeding the information to the computer.

4. Posthuman Dance

Carrying on this significant legacy into videodance, and ahead of its time, Cordeiro's *M3x3* represents an embodied posthumanism. With its intersection of dance and camera and dance and computer, the body in *M3x3* is definitively a hybrid body, a mediated body, a machine body while also a human body. She chose to work with human dancers rather than create an animation. Hence, the video proposes the effects of technology on the body in consistently layered ways: (1) Most literally, television is the medium through which we perceive these mediated bodies, so the bodies exist only as a result of the medium by which we view them. (2) The bodies' movements are the outcome of computer programming, instruction, and information. (3) The movements themselves, "broken in [their] quick and stiff gestures" mimic the rigidity and stutter of the machine (Machado 2016, p. 88). (4) Lastly, the black and white costumes and gridded stage simulate the black and white of the camera and television monitor.

The costumes contribute in a significant way to the abstraction of the figures. This attention to the costumes most likely stems from Cordeiro's early study of Oskar Schlemmer's dance performances during his years as a faculty member at the Bauhaus in Germany.[10] *The Triadic Ballet* (1922), one of his most well-known works, originally presented three dancers in three acts, dressed throughout in sculptural costumes that limited and often resisted the wearers' movements. The dancers' bodies were turned into geometric abstract shapes and patterns such as a series of circular wires jutting out from the top of the performer's head and waist. With this drive for abstraction, the reviewers described the ballet as machinic and argued that the expressiveness of the human form had been sacrificed (Elswit 2014). Though Cordeiro's costumes do not inhibit the dancers, they become the site of abstraction wherein the body and the grid unite. In flickering moments throughout the video, the dancers and stage appear to fuse together when the black and white costumed bodies shift positions and align with the grid, bringing into existence a symbiosis of the dancers, the architecture, and the media. Body parts seem to disappear; the dancers become an *ur*-form of abstraction—the grid. The extension of the black costume over the hair and the paint that covers the face are central to the operation of the costume as a device for abstracting the dancers. Especially when seen from the top shot, the faces can appear like masks, devoid of facial expression, and therefore, contributing to the dehumanization of the performers.

Schlemmer was criticized for the mechanical turn in his ballet since he sought to examine the limits of the human through sculptural costume design and choreography. As I argue, Cordeiro pushed at the bounds of the human and machine not just with the dancers' costume but especially through the use of the camera, computer, and television. *M3x3* does not just image machines in the dancers' appearance and movement but implements the tools of advanced technology to produce the work. Considering then this fusion and confusion of human and machine in the videodance, I propose a reading of the work as a presentation of a posthuman world, one where as Cordeiro noted, "Technology is essential to human life. This reality challenges people to put themselves comfortably, emotionally, with[in] the rules imposed by technology, inducing them to create behavioral alternatives" (Analívia Cordeiro 2016, p. 11). My use of "posthuman" does not reject the human or claim a time after the human but instead argues for how Cordeiro imagines the continual re-formation of the material world in its evolution with new media.

Posthumanism theory has many authors. I follow here the definition of the posthuman put forward by Cary Wolfe in which he "attend[s] to the specificity of the human—its ways of being in the world, its ways of knowing, observing, and describing—by . . . acknowledging that it is fundamentally a prosthetic creature that has coevolved with various forms of technicity and materiality, forms that are radically 'not-human' and yet nevertheless made the human what it is" (Wolfe 2010, p. xxv).

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[10] Cordeiro (2016, p. 10) notes that she watched many films by Schlemmer at a young age.

Wolfe does not abandon the human, in some sense of transcendence, but rather posits a historical change in the co-development of the contemporary human and "its imbrication in technical, medical, informatic, and economic networks" (ibid., p. xv). My interest in theories of posthumanism stem from Katherine Hayles's landmark book, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*, in which she calls attention to the potential problems of the posthuman as conceptualized in its origins by the "fathers" of cybernetics in the late 1940s and early 1950s, since it often conjures "informational pattern over material instantiation," consciousness as transcendence, and the body as a prosthesis and, therefore, able to be subsumed easily and readily into machines (Hayles 1999, pp. 2–3). She argues that embodiment has been theorized falsely as secondary to human life in favor of intelligence, therefore establishing the posthuman as very much part of the lineage of the Enlightenment. Wolfe diverges from these forefathers to reclaim posthumanism as a critique of disembodiment and autonomy, and to describe a historical shift.

Cordeiro, like Wolfe, wants to make a case for the inability to divest the posthuman of its material container. Interestingly, Cordeiro began the video with an introduction to the dancers as gendered bodies, we are shown the women in their individual and "natural selves," before transforming them into a cybernetic system. Should this introduction be considered outside the frame of the dance? Or what about the final image of two heads speaking to each other? I prefer to read them as symbolic for the idea of communication as central to a successful system, and thus intentionally part of the video. In these moments, and in the freedom afforded the dancers within the rules of the computer program, *M3x3* resists the long-standing philosophical division between the mind and body, favoring intellect over flesh, and instead proposes a fully embodied posthuman, or again in the words of the artist, "comfortably, emotionally, with[in] the rules imposed by technology."

Even before the invention of the videodance genre or computer ballets produced in research and development labs, modern dance was engaged with advanced technologies, due in part to their shared interest in movement across space and time and in the control of bodies. Felicia McCarren's book, *Dancing Machines: Choreographies of the Age of Mechanical Reproduction*, argues that while modern dance can be historicized through its innovation of expressionism it simultaneously demonstrated the machinic motor of bodies (McCarren 2003). In the early twentieth-century, dancers, photographers, and filmmakers naturally came together making work that performed the robotic or the effects of the industrialization of labor on the body, transforming dancers and performers into "technobodies" (ibid., p. 63). Like Hayles's reflection on the binary of body and mind, McCarren asserts that dance and the machine or the robotic are not antithetical but, in fact, constitutive of one another within the history of modern dance. Since Cordeiro's videodance depends on the basic language of translating body parts into computer code, the technobodies stutter, repeat movements, and extend along an orthogonal axis. The videodance should be understood as an extension or contemporary iteration of the history narrated by McCarren, but with the most advanced tools. The computer prescribes the dancers' movement; they embody the rhythm of computer language. The regular and aggressive beat of the single percussive soundtrack underscores the mechanical performance, slow and disaggregated.

Cordeiro's exploration of dance, the posthuman body, and the machinic were not only informed by the experimentations in early twentieth-century Germany but also by her contemporaries in modern dance in the United States, in particular the Merce Cunningham Dance Company (MCDC). Though Cunningham would not choreograph with a computer until 1989, for the more than three decades prior he had incorporated the mechanical in his performances and "de-naturalized" or abstracted the body. Cordeiro had a chance to see MCDC in Rio de Janeiro when she was just a child. We can safely assume the production left an impression on her and her practice since she moved to New York City in 1976 and took classes with Cunningham.[11] In turn, the coincidence or shared time of

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[11] Cordeiro (2016, p. 9) states that she saw MCDC at the age of 11, which would put the visit at 1965, but in fact MCDC visited Rio in 1968.

Cunningham and Cordeiro, though separated by geographic distance, demonstrates the interest of performers to relate the human body to the booming technologies of the postwar world. In both *Aeon* (1961) and *Winterbranch* (1964), the latter performed on the MCDC Rio tour, machines roved the stage and lights blinked on and off, which dance historian Copeland (2004, pp. 183–84) has linked to the larger efforts in this period to integrate art and technology, such as with the human-sized construction of metal and wire, *Robot K-456* (1964), by Nam June Paik or E.A.T.'s *9 Evenings: Theatre & Engineering* (1966).[12] Cunningham and Paik collaborated in 1965 on *Variations V*, in which the dancers moved through a field of antennae that would then trigger sounds altered by musicians sharing the stage. In addition, film and video projections by Stan VanDer Beek and Paik also contributed to the viewer's distracted attention.

This sense of dissonance, exemplified by Cunningham's refusal to synchronize the dance with the music, could also be examined through his use of chance operations for the choreography. The roll of a dice or toss of a coin removed authorial subjectivity and, therefore, multiplied the possibilities of how to move the body and its displacement. As a result, Cunningham's choreography was very challenging to perform exactly because it did not "*come naturally* to the human body" as Copeland (2004, p. 92) emphasizes. In contrast to one form of modern dance as the expression of emotion or psychological interiority, Cunningham explored the ability of the body to communicate its conceptual nature, and in the contradictions of movement determined by chance operations to show the dancers thinking, changing their mind, and their endless permutations of moving in space. Similarly, Cordeiro by working with the computer to choreograph the dance of *M3x3* abstracted the body from its "natural" rhythm, performing the effects of new technologies on the posthuman body.

The intersection of dance and the abstraction of the body in Brazil has a precursor in the work of the Neoconcretists, a Rio de Janeiro-based group (1959–61) that in many ways served as the rival to Waldemar Cordeiro's Concretists.[13] The Neoconcretists Lygia Pape (a printmaker) and Reynaldo Jardim (a poet) choreographed and designed two ballets using abstract shapes "motored" by dancers below or behind them. The first Neoconcrete ballet in 1958 featured eight rectangular blocks and cylinders, all $6\frac{1}{2}$ feet tall, made of wood. The dancers fit inside the geometric costumes and moved the forms around the stage with the aid of wheels at the bottom. Pape and Jardim collaborated again on a second Neoconcrete ballet in 1959 which included two geometric shapes constructed out of movements along orthogonal lines. Instead of cylinders and rectangles, two flat forms also about $6\frac{1}{2}$ feet tall move in and out of perceptual space. Similar to the original iteration, the human body is occluded by the geometric forms; in this case, the dancers are behind the wooden forms. Pushing further than Schlemmer's costume design for *The Triadic Ballet*, the Neoconcrete ballets' costumes, which hinder the viewer from seeing the human body behind or below them, draw attention to the arrangement of the animated composition as if an abstract painting had come to life.

Traditional ballet, as well as modern dance, focus on the movement of the human body and privilege the potentiality of the human form. The Neoconcrete ballets obscure and constrain the body in favor of a rhythmic dance of geometry. In their own writings from the period, the artist and poet struggled with the tension within the ballets between the desire for human expression and a robotic movement, as well as express a fear of cybernetic systems. Jardim in a text written to accompany the first ballet in 1958 set up an opposition between the "human-motor" and "cybernetic motors" that I argue elsewhere exposed the artists' anxieties about the larger national political and economic changes occurring since the end of the Second World War (Jardim 1958).[14] Brazil committed steadily

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12　For more on E.A.T., see (Breitwieser 2015).
13　In my interview with Analívia Cordeiro, she explained that she had no knowledge of the Neoconcrete ballets when she made her own videodance. São Paulo, 17 July 2016.
14　I dedicate a chapter to the Neoconcrete Ballets in my forthcoming book, *The Affinity of Neoconcretism: Interdisciplinarity, Collaboration, and Brazilian Modernism, 1954–1964.*

and rapidly to industrial modernization, which threatened to replace the artwork with the machine, according to the Neoconcretists (Gullar [1959] 2007, pp. 157–60).

By the time Cordeiro was producing her videodance, Brazil as a country had changed dramatically from the optimistic spirit of the immediate postwar years. In 1964, the military led a coup, supported by the US government, and overthrew the sitting president. The military dictatorship remained in power until 1985. Whereas the Neoconcrete ballets expressed an anxiety about the increasing power of machines in a moment of incredible industrialization, Cordeiro's videodance reflects on the affective corporealization of the dictatorship's power through its brutal repression of citizens and continuing economic development. While Cordeiro's video has no political content per se, it must be read within the context of the political history of Brazil—specifically the years between 1969 and 1974 known as *os anos de chumbo* or the leaden years. These five years were the most repressive and violent of the dictatorship—and technology was central to the disciplining of the body. Elena Shtromberg makes a strong case for how the history of video art closely parallels the use of the television as a tool of control by the dictatorship. As she writes, "Television was an effective means to promote the regime's inflated patriotic agenda and also to unite audiences in collective celebrations of national triumph" (Shtromberg 2016, p. 97). The government understood that this new technology could spread their message to a mass audience across a large country.[15]

It also served as a technology of censorship, silencing and making invisible the protests against the government and the violence perpetuated by the military against the Brazilian people through torture, disappearance, and death. In one of the most famous cases from this period, the TV Cultura journalist Vladimir Herzog was arrested, tortured, and killed in 1975, though the government intentionally lied and claimed he died by suicide. Herzog worked for the same broadcast company where Cordeiro filmed her video only two years prior. Within these political conditions *M3x3* makes viewers reflect on how the entanglement of technology and the abstraction of the human body can work in tandem as a form of discipline. This culture of violence co-existed with the regime's consolidation of the link between development and security, in which the modernization and industrialization of the country through technological development was fundamental to its national militarization (Adler 1987).

5. Conclusions

The experience of living with advancing technologies has shaped the public in new ways and altered radically artistic practices and potentially the definition of art itself. Cordeiro turned to these new tools to research and visualize their effects on the body. As I have demonstrated, abstraction occurred in this process: in the camera work, the line drawings, and computer code necessary for the programming of the choreography, the costume design, and ultimately in the viewing of the dance on a screen. Yet, the sensorial capabilities of the flesh were not surrendered. The posthuman body, examined in this article, does not underscore a binary of body and intellect, but rather their dependent existence on each other and on the development of technical knowledge and processes. Cordeiro worked from the premise that technology has always been a part of human existence; rather than two bounded forms, they are entwined and constitutive of one another. *M3x3* proposes a world in which human physical and conceptual effort re-shape themselves in relation to machines. In particular, the field of dance can spotlight the kinetic body in its own postures and behaviors and in its interaction with the contemporary world, machines and all.

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15 Shtromberg (2016, p. 94) details the statistics of television ownership in Brazil and the increase in twenty years is incredible: two hundred televisions in 1950 to three million in 1965, and by the first part of the 1970s six million households had a set.

Conflicts of Interest: The author declares no conflict of interest.

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