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Screendance as enactment in Maya Deren's At Land: enactive, embodied, and neurocinematic considerations **

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Abstract *The dancer, choreographer, and filmmaker Maya Deren can be seen as one of the pioneers of screendance. Her experimental films have challenged conventional plot- driven mainstream cinema by emphasizing an ambiguous experience, open for multiple interpretations. For Deren film viewing is a socially determined ritual embodying intersubjectively shared experiences of participants. This makes her films particularly interesting for today's neurocinematic studies. Deren's ideas also anticipate the recent enactive mind approach, according to which the body-brain system is in an inseparable manner situated and coupled with the world through interaction. It assumes that both private, such as perception and cognition, and intersubjective aspects of human enactment, such as culture, sciences, or the arts, are based on the embodiment of life experience. Reflecting this discourse, Deren's film At Land is analyzed as an expression of a human body-brain system situated and enactive within the world, with references to neuroscience, neurocinematic studies, and screendance.*

Keywords *Screendance, Choreographer, Maya Deren, At Land, Enactive mind, Neurocinematics, Ritual, perception, Intersubjectivity.*

Videodança como enação em At Land de Maya Deren: considerações enativas, incorporadas e neurocinemáticas.

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Resumo A bailarina, coreógrafa e cineasta Maya Deren pode ser vista como uma das pioneiras da videodança. Seus filmes experimentais desafiaram as tramas convencionais do cinema ao enfatizar uma experiência ambígua, aberta para diversas interpretações. Para Deren, assistir filmes é um ritual socialmente determinado, incorporando experiências dos participantes, compartilhadas intersubjetivamente. Isso torna seus filmes particularmente interessantes para os estudos neurocinemáticos de hoje. Suas ideias também antecipam a recente abordagem sobre mentes enativas, conforme a qual o sistema corpo-cérebro é inseparavelmente situado e acoplado com o mundo pela interação. Isso faz supor que aspectos privados da enatividade humana, como a percepção e cognição, e intersubjetivos, como cultura, ciências ou artes, estão baseados na incorporação da experiência de vida. Refletindo esse raciocínio, o curta de Deren: At Land é analisado como uma expressão de um sistema corpo-cérebro situado e enativo no mundo, com referências à neurociência, estudos neurocinemáticos e videodança.

Palavras chave Videodança, Coreógrafa, Maya Deren, At Land, Mente enativa, Neurocinemática, Ritual, Percepção, Intersubjetividade.

> The entire alphabet is insufficient
> to describe the infinite complex of variables
> which the theoretical formula of life
> or great art would involve. [47]
>
> — *Maya Deren*

Maya Deren describes the scientific and ideological cornerstones of her creative drive in *An Anagram of Ideas on Art, Form, and Film* (1946), in which she admires the innovative and creative achievements of science as inspiring models for film artists. At this point, Deren, a dancer, choreographer, poet, author, photographer, and filmmaker, had already completed four independent short films of experimental nature. In the preface to *An Anagram on Art, Form, and Film*, she explicitly points out that the book is not a manifesto. Yet, the reader recognizes in it an antithesis of the view that films try to imitate nature and things as they are. In Deren's view, the powerful potential of filmmaking was wasted in the mere documentation of the natural, everyday world. This applied equally to the plot-driven Hollywood films and the war documentaries whose popularity had increased in the aftermath of the World War II. The fundamental problem with many filmmakers, according to Deren, was that they did not take advantage of the creative power of the human mind, but instead allowed mere coincidences and natural world events to dictate their artistic decisions. Perhaps surprisingly, Deren also considered this to be the case with surrealist films, which claimed the artist's total freedom from the slavery of intelligence but surrendered their images to that of Freudian subconsciousness. Against such approaches, Deren praises the holistic abilities of the human mind, particularly memory, as an infinite source of poetic imagination. Without one's continuously updated embodied sources of experiential memory, creative processes would eventually become extinct. As Deren puts it: "Memory makes possible imagination, which is the ability to so accelerate real, natural processes that they become unreal and abstract. It can telescope into a moment's thought an evolution which might take centuries and fail to occur altogether."[1] Her mission was to use cinematographic imagery as an instrument for constructing social and intellectual consciousness.

Deren follows, in significant ways, the theoretical path of one of the most influential film theorists of her time, Sergei M. Eisenstein. Both actively studied the effects of bodily movements and gestures on the screen. In addition, they shared the interest in analyzing the inseparable coupling of an individual and her social situatedness, as it is exemplified in rituals.[2] Deren even adopted Eisenstein's theoretical tools of *vertical* and *horizontal* montage as the fundamental concepts of her own theoretical explications. For her, these terms meant the interdependence of (1) momentary presence as a kind

of freeze-frame or close-up that expands outwards to intellectual sense-making (vertical), and (2) action- goal-oriented movement in experiential time-space that allows exploring the cinematographic world (horizontal). Interestingly, just as Eisenstein defended his theory- based approach to cinema against the practice-based tradition of filmmaking in the Soviet Union,[3] so one finds Deren herself being criticized by prominent filmmakers and practitioners of art.

In 1953, together with the poet Dylan Thomas, the playwright Arthur Miller, the critic Parker Tyler, and the filmmaker Willard Maas, Deren was invited onto a stage to discuss the topic "Poetry and the Film" in front of a New York audience.[4] The following excerpts allow the reader to capture the focus and atmosphere of the heated discussion:

> TYLER. ... Now it becomes the problem, especially here tonight, as to why [Ms. Deren] started out by using a very difficult vocabulary, a technical vocabulary, to express a sort of intellectual specialty in the way she regarded her art.

> DEREN. I wish mainly to say that I'm a little bit flabbergasted at the fact that people who have handled words with such dexterity as Mr. Thomas and Mr. Miller, and Mr. Tyler, should have difficulty with such a simple idea as the "vertical" and the "horizontal" (applause)...These seem to me the most elementary movements in the world and really quite fundamental.

Regarding the art of filmmaking, Deren's reply to Tyler shows how fundamental the concepts of vertical and horizontal were for her thinking. Elsewhere Deren reflected contemporary achievements of psychology, anthropology, and natural sciences, such as the ideas of complex dynamical systems. She lamented that most of her fellow artists dismissed the character of their art as an instrument for innovating something totally new, something that did not exist before in the natural world. Like a scientist, even an artist can dramatically reorganize the elements of nature, and therewith reshape the way people see the world—for good or for ill. Here Deren refers to the effects of an atom bomb, which she and the rest of the world just had witnessed in action.[5]

Deren's thinking concerning art reflects discussions with her father, the Russian emigrant psychiatrist Solomon Derenkowsky, whose superior in the Psychoneurological Institute, the neurologist Vladimir Bekhterev, is credited for reimporting to the Russian experimental school of neurophysiology "the art as avant-garde science."[6]

Another of his colleagues, Hugo Münsterberg, is recognized as one of the first psychologists concerned about the power of the film medium over the minds of people.[7] However, instead of following the track of psychological considerations further, Deren eventually turned to anthropological considerations and religion, myths, and rituals.

Deren's films have been classified within the genre of *trance films*.[8] As Moira Sullivan notes:

> The "somnambulists" or "sleep walkers" of her films had a mythical anchor beyond surface appearances. As in voodoo, they make journeys to the *crossroads* or point of access to the world of cosmic memory. At this junction, a vertical plane "plunges" into the "world of the invisible," while a horizontal place remains fixed in the mortal, "visible world."[9]

In her early article called "Religious Possession in Dancing" (1942), Deren's research on the intensity and vitality of religious possession in Haitian Voodoo tradition contributed to her ideas on dance performance. She was particularly inspired by how an individual's ecstatic state is desired and encouraged by the social community. As Deren notes, the most significant obstacle for the audience to participate in dance performances lies at the core of the individualist egocentric attitudes and the consequent lack of altruist togetherness in the Western society.[10] To surpass these obstacles became Deren's leading mission in *An Anagram* and in *Divine Horsemen* (1953).[11] Her concept of ritual refers to an intersubjectively shared, socially defined situatedness that dictates an individual's behavior, an idea of particular interest from the perspectives of the embodied mind approach, enactive cognitive sciences, and neurosciences of the twenty-first century.

The enactive view of body-mind system

The *enactive mind* refers to a holistic view of the body-brain system in which the mind is inseparably situated and systemically coupled with the world.[12] This approach strives to harmonize the view of the *embodied mind* by combining natural science explanations of human mind and phenomenological discourse, particularly the work of Maurice Merleau- Ponty. The theorists of enactive mind—Francisco Varela, Evan Thompson, and Eleanor Rosch—use the term "embodiment" to signify that human consciousness has its counterpart in organic structure—that "there is no consciousness outside the reality of bodily experience."[13] While the realistic approach of the ecological psychologist James J. Gibson might say that a path af-

fords walking,[14] the enactive approach would instead claim that the path is created by walking.[15] Recently, this two-way relation of the individual and a system has been expanded to an enactive media system, in which the viewer and artwork influence each other's behavior in real time.[16]

Further, the related biocultural approach to film assumes that the viewer's embodied meaning-construction involves social and cultural dimensions of human enactment within the world.[17] A parallel to this exists also in philosophy. While Deren's contemporary, pragmatist John Dewey,[18] regarded "art as experience," today's philosopher Alva Noë reframes "art as enaction," thereby suggesting an ongoing emergent process: "Artists expose enactment for what it is, and so they enable us to understand our active role in perceptually experiencing the world."[19] Dewey, in turn, writes, "It is a matter of communication and participation in values of life by means of imagination, and works of art are the most intimate and energetic means of aiding individuals to share in the arts of living."[20] From the pragmatist point of view, the determining aspect in Deren's filmmaking relies on the sense of shared observation experienced by the audience in cinema theaters, and as such, comparable to the shared participation in live performances.

Intersubjectively shared world

Despite situational, cultural, and biological differences, human beings tend to experience and respond to certain aspects of everyday life in a very similar manner. For example, emotional experiences related to motherhood, family bonds, or even to more complex affects such as revenge or empathy for those badly treated, are to a great extent commonly manifested. Yet, individuals prefer to emphasize personal differences between themselves and others. As the cognitive scientists George Lakoff and Mark Johnson have put it, subjective idiosyncratic experiences form the tip of an iceberg, while the major portion of the iceberg—under the surface—forms those aspects of experience that are shared between people.[21] With regard to the performing arts, these individual differences add richness to the construction of social togetherness and altruistic well-being, which, in turn, are fundamentally grounded in the shared similarities. *Prototypes* are instances of such shared elements often located between higher generalizations and detailed specifications, as described in the psychologist Eleanor Rosch's *prototype* theory.[22] Cognition may, for example, position the prototype of a chair somewhere between the more general category of "furniture" and specific identification (e.g., "rocking chairs").

Interestingly, Deren's filmmaking method seems to suggest this type of conceptual approach to prototypes many decades earlier, as will be exemplified later.

Similarly interesting is that, in *An Anagram*, Deren explicitly rejected the use of metaphors and symbols in the form they were applied, for example, in her contemporary surrealistic films. Nevertheless, it is worth speculating how she would have responded to the idea of *embodied metaphors*, as suggested by Lakoff and Johnson much later. In *Metaphors We Live By* (1981), a metaphor describes an embodied conceptual structure that "involves all the natural dimensions of our sense experiences: color, shape, texture, sound, etc."[23] They refer to works of art as "one kind of experiential gestalt" emerging from the repetitive patterns of everyday life.[24] Julian Kiverstein's notion of *body-enactivism* emphasizes this type of common-sense knowledge in everyday practical engagement with the world, "concerned with articulating the ways in which the body can enact or make a situation meaningful to an agent." [25] Deren's ambitious goal was to embrace simultaneously the intersubjectively shared general idea of the world and the subjective particular experience of an artwork.

To sum up, the enactive approach to the human mind allows a conceptual expansion from the personal private domain to the domain common to all, paving the way to the conception of filmmaking as an art of shared enaction. In the following, the enactive ground of sharing is discussed from the point of view of neuroscience.

Neuroscience of enactment

Deren emphasized holistic, socially shared intellectual experience over the private and the emotional. However, it is reasonable to assume that she took the private and social to be fundamentally intertwined in a similar manner as the vertical and horizontal dimensions are in her conceptual model of film structure. Analogously, in today's paradigm of social neuroscience, cinematic stimuli serve functional neuroimaging experiments that focus on shared meaning-making.

In terms of recent understandings of the brain functions involved in meaning-making, the neuroscientific notions of *mentalizing* and *mirroring* allow description of how the bottom- up sensorimotor processes and the top-down decision-making complement each other.[26] *Mentalizing* refers to an individual's ability to interpret other's emotional or bodily states from their behavior in order to anticipate their intentions, or next moves.[27] According to a common assumption in neurosciences, people rely both on their survival-based functions and their earlier experience when detecting the continuously changing events around them. This may also hold in terms of judging the meaningfulness of actions that the fictional characters take on the

screen. The activity of mentalizing supports such critical survival functions as action tendency, fake-action detection, risk evaluation, and decision-making in order to maintain the continuously monitored safe interaction with the world. Human behavior is always context-dependent and in dynamic relation to its environment.

The idea of neural imitation, or mirroring, assumes the involvement of so-called mirror neurons that are active both when perceiving an act and producing an act. Since emotions and intentions are expressed to other people via motor acts (bodily postures, dynamic facial expressions, and utterances), mirroring of other person's actions could go beyond mere motor imitation, especially in understanding another person's action goals and in anticipation of the consequences of those actions.[28] This unconscious neural simulation of the behavior of the others is referred to as embodied simulation.[29]

Neuroscientists have studied the experts of motor-coordination, namely professional dancers, by means of functional magnetic resonance imaging. The findings show that when a dancer observes another dancer performing movements the dancer herself has trained, the brain areas assigned to neural mirroring are activated to a significant extent, in comparison to those for totally new motor movements.[30] The studies of dancers' action-observation processes are associated with naturalistic neurosciences, which have an increasing interest in utilizing audiovisual material for studying human brain functions. In a neuroscientific interpretation, also "imagination, like perceiving and doing, is embodied, that is, structured by our constant encounter and interaction with the world via our bodies and brains."[31]

Narrative comprehension is based on the embodied knowledge of everyday life.[32] The paradigm of *neurocinematics*[33] applies the naturalistic method of free viewing of films. The attribute of "naturalistic" is adopted from psychology to neurosciences in order to describe experimental conditions as natural as possible, addressing the issues of ecological and situational validity that have been discussed in psychology for many decades. With this aim, in the free viewing paradigm test subjects are asked to freely engage in viewing film footage of long durations without any other specific task while their brain behavior is recorded by means of functional magnetic resonance imaging (fMRI). The results from neurocinematic studies have indicated that the way a film is narrated has an influence on how much experience is shared between individual viewers. The closer the film follows the conventions of mainstream storytelling in terms of plot structure, frame composition, continuity editing, and above all emotional drive, the more accurately the viewers' brains seem to tick in synchrony, a phenomenon referred to as *intersubjective synchronization*.[34] For example, a randomly recorded surveillance video results in an insignificant degree of intersubjective synchronization among the test subjects' brain activation compared to the

plot-driven Italian western *The Good, the Bad, and the Ugly* (1966) by Sergio Leone.[35] So far, most films that have been successfully used in the neuroscience studies have been chosen from the repertoire of traditional feature films, based on the conventions with which large audiences are familiar.[36]

Obviously, many of the factors present in mainstream films are markedly absent or displaced from experimental films. One may inquire, however, whether experimental films can construct alternative factors that would engage the viewer equally strongly? In this way, neurocinematic studies of experimental and alternative film may help learning new ways of engaging the viewer beyond the mainstream filmmaking conventions.

At Land

At Land opens with waves that are washing ashore a seemingly lifeless, barefooted woman, Maya.[37] But she opens her eyes. The waves descend, rolling backwards unnaturally, leaving Maya's body motionless in the sand. Lying on the ground, she gazes around, looking at the seagulls flying above. She stretches out her hand, reaches an upward standing piece of driftwood, pulls herself toward it and starts climbing up. With her feet on the driftwood branch at the beach, simultaneously, her hands reach the edge of a table covered with a white tablecloth indoors. Maya's face follows her hands. Her point of view shows people gathered around a long table under chandeliers; they are in a party mood, talking, smoking, and laughing.

Maya starts crawling along the white tablecloth toward a man playing chess at the far end of the long table, yet no one pays attention on her. Her movements are continuous as two spaces alternate: she is crawling along the table amid people in a social environment, and the next moment crawling through the bushes in a natural environment. Just when she is about to reach the man at the other end of the table, he stands up and disappears in the partying crowd. Maya is left lying on top of the table, staring at the chess pieces, which start moving on their own on the chessboard, as if directed with Maya's gaze. Or, instead, she passively observes animated movements of the independent chess pieces. One of the pawns falls off the chessboard, falls down and into a stream of water running between the rocks somewhere outdoors on the sunny cliffs. The water starts carrying the pawn away as Maya, barefoot, follows it between the rocks. Soon she is shown walking along a country lane, engaged in a conversation with a man in a white shirt. The camera pans between Maya and the man as they walk and talk. Eventually, unable to keep up the pace of her male companion on the road, she is left behind. He enters an abandoned shack. A sharp piece of wood almost scratches her back as Maya enters the house through

a hole in the wall. She finds herself in a room, where all the furniture is covered with white sheets. The camera detects a man also covered with a white sheet lying in the bed. With only his face visible, he stares at Maya, motionless. While staring at the man, a cat jumps from Maya's arms. The man's expressionless eyes follow Maya when she starts moving in the room in an observant manner, opening several doors, exiting through the last one.

Now outdoors, on a top of a cliff, Maya looks like she wants to go down. She jumps from the cliff, falling violently toward the rough surface of an opposing cliff, sliding down along it, her cheek pressed against the rough surface. When on her feet she looks up to a wooden watchtower construction. She turns and walks away across the sand dunes, disappearing into the distance. Up from the edge of a cliff the camera captures Maya at the shore picking up stones. They keep falling from her lap as she tries to collect them. A chess game between two women on the water's edge catches her attention. When she reaches the women, she cautiously looks down at the game and the two women. Suddenly the two women and Maya are side by side on the same side of the chessboard. Maya stands behind them and starts caressing their hair with both hands. The women, distracted, close their eyes, seemingly enjoying her touch. She quickly snatches one of the pawns from the chessboard and starts running away, her hands in the air holding the pawn.

A sequence of images of Maya follows. She caresses the hair of two women, picking up stones, standing at the top of a cliff; then she stops her activities and turns to stare out of the frame, seemingly, after she continues running away along the dunes. She runs along a country lane and through the house. Still lying on top of the table, she stares at herself as she returns to the chess game at the party. Returning to the beginning of the film, Maya at the beach by the driftwood seems to be getting up. The film ends with Maya leaving her footsteps in the sand as she runs away along the seashore.

Analytical reflections: cinematography and choreography

Deren rejects the established narrative conventions of filmmaking as the only way of creating intersubjectively synchronized viewing experiences, and instead struggles to create new ways of inducing social synchrony across the audience. In this endeavor Some can see Deren as the high priestess of the cinematographic ritual in which her audience willingly participates, living by the choreographed enaction on the screen.

At Land gains unique poetic expressiveness by means of cinematographic manipulation of a staged performance similar to that of a choreographed dance. The film explores the psychological and physical conditions of a situated human body in movement, inseparably coupled with the cinematographic time and space. Deren applies a number of technical tricks such as slow motion, stop frame, dissolves, and double exposures.

However, these effects are applied in such a delicate manner that they may remain unnoticed for the uninitiated viewer, unlike the famous George Méliès, who used tricks deliberately to entertain. Instead, Deren uses the cinematographic tricks to construct an intimate physical relationship between her protagonist and her environment.

The whole film is characterized by Maya's various bodily efforts. These can be projected onto Deren's concepts of vertical and horizontal, interpreted here as follows: (1) vertical, i.e., momentary sensorimotor feelings or actions detached from the protagonist's goal- driven movements; and (2) horizontal, longer-duration goal-directed actions that appear driven by some unidentified force (e.g. social, mental). These can be exemplified by (1) the feel of a grasp and (2) the act of grasping in order to reach something by climbing, respectively. Eventually, the viewer's cognitive effort allows these dimensions to emerge as one holistic experience.

Vertical: momentary sensorimotor actions and integration of senses in the brain

The first scene is established by Maya's passive body being rhythmically moved by the waves that wash onto the beach. In another moment, when Maya pulls herself up using her hands, one can sense the feel of a dry sunburned surface of driftwood under her grasp. As she starts her barefoot climb, the viewer's experiential embodied knowledge allows the imagining of the smooth dry wood under one's foot. Also, the sense of pain is occasionally present. In one instance, when Maya crawls into a wooden shack through a small hole, a viewer may anticipate the possible scarification by the needle-sharp downward-pointing piece of wood that almost scratches her back. One may even empathize with shock when Maya makes a long jump from the top of a cliff and falls with force against a rock, then slides down with her cheek against its rough surface.

Maya's sensorimotor acts are by no means independent of her environment. In terms of Gibsonian *affordance*, a tree trunk affords climbing, the distance between rocks affords jumping, and pebbles afford collecting. The environment's features, such as gravitation, are made visible and given particular meaningfulness through her enactive engagement with them. Consequently, seeing events on the screen elicits momentary multisensory experiences. Even though the film is silent, one may "hear" the sound of the roaring waves when they crash to the shore. Many of the images are particularly windy, with the sound of the wind embodied in the images through the experiential knowledge of the viewers. Seagulls may be associated with the sounds familiar from the viewer's environment. Similarly, people around the dinner table seem to be involved in lively social conversation, which could be imagined by the viewer.

Based on an understanding of the brain's action-observation networks, all of Maya's bodily activities on the screen are reflected in the viewer's sensorimotor regions assigned to bodily movements. These sensorimotor activities have been identified in our study where functional magnetic resonance imaging was applied to see which functional networks activated when viewers watched the film *At Land*[38]. Associated with one's momentary sense of presence Deren's vertical dimension functions as a holistic grounding for the horizontal forward-moving goal-directed aspect of *At Land.*

Horizontal: goal-directed actions driven by unidentified force

Maya's enactment within the world is seemingly driven by some unidentifiable plan, something that looks like a ritual, an embodied choreography exposed to the viewer only through the act of viewing. In the first scene, Deren applies the trick of using reverse image: the waves move backwards as if they were telling us that the sea brought Maya the Mermaid to the waterline and is now pulling away. This gives nature a kind of animistic feel, suggesting the presence of some natural force. Likewise, her emotions are downplayed, and reactions seem slow-(motioned), resembling a trance-like condition. Maya seems to obey some inexplicable mental drive. In one moment she is chasing after a chess pawn, in another she is involved in a wasteful action of collecting big stones that keep falling from her lap. However, Maya's motivations remain obscure.

Instead of linking the viewer emotionally to the characters or locations, Deren engages the viewer's attention with continuous seemingly goal-directed actions. In a similar manner, as Maya's mental drive remains obscure, the physical interiors and exteriors seem anonymous and could be anywhere. In staged dance, the events often take place in a kind of any-space, or in no-space, which Harmony Bench describes as "an abstracted space, a blank or evacuated scene. It is, in a sense, nothing."[39] Indeed, each location in *At Land* resembles a Roschian kind of prototype of *any* beach, any party, any house, or any country lane. This is true also with the characters in the film, a prototype of a man (potential partner, a companion on the road), two women engaged in a game, people around a dinner table, including also Maya herself, a prototype of a woman, any woman as the leading character. Deren repeatedly changes her protagonist in the middle of her films to emphasize the insignificance of the actors' personal features.

In *At Land* she plays with what in psychological terms is often termed *change blindness*, the inability to detect some changes due to attention drawn on something else.[40] In a scene where Maya

is engaged in a continuous conversation with a man, most viewers will not notice that as the camera pans and cuts back and forth between the actors, as many as four different persons in succession play the role of the man. The viewer will by default anticipate action-continuity and visual coherence, based on their experiential knowledge of the physical world. In contrast, the trick is apparent at the end of *At Land* when several clones of Maya are interlinked in sequential images. In this case the experiential knowledge dictates that the same person cannot be in many locations at the same time; and yet, in film, it is possible.

When Deren in the beginning of the film manipulates *movement-contingency* and *spatiotemporal coherence*, the viewer immediately notices this. The surroundings alter continuously between the interior and exterior spaces; Maya's bodily movement continues without break between a natural space (beach, vegetation) and a social space (dinner table). The conflict between continued action and changing contexts is interesting from the neural point of view. On the one hand, one may assume that the activation in the brain would break due to radical changes in the context.[41] On the other, Maya's goal-directed movement overrides the effect of the momentary changes. In this scene, one could claim that the horizontal overrides the vertical dimension, thus suggesting that these Derenian dimensions may be hierarchically interdependent.

Figure 1 A schematic illustration of human brain activity at the moment when a film viewer sees the protagonist of At Land grasping a chess piece. Film image courtesy of Anthology Film Archive. Brain image courtesy of Mika Seppä, Voxlab.

The vertical and horizontal dimensions can be addressed by studying intersubject correlation across the viewers' brain activations when viewing *At Land* in the functional MRI scanner—that is, measuring the degree to which subjects' brains process the same footage in the same way. Because Maya seems to obey some inexplicable mental drive and her motivations remain obscure throughout the film, one might assume that (1) the viewers would share embodied experiences (vertical) with each other, such as the mirroring of grasping or the effort of climbing, and vice versa, and that (2) they would not share a common understanding of Maya-character's goal-driven (horizontal) behavior.

It turns out that assumption (1) holds but only to some degree. This may be due to the viewer's failure to track a narrative (horizontal) continuity in the film, as usually expected, while the embodied (vertical) events may seem detached from each other and do not suffice to support a continuous tension. This observation seems to be in line also with the finding of Uri Hasson and colleagues that there is not much intersubjective correlation among viewers' brain responses to random surveillance camera footage.[42]

However, there was a very significant peak of synchronized brain activity associated with one of the only narratively intelligible moments, namely that point when Maya finally reaches her goal, and succeeds in snatching the runaway chess piece from the two women's chess game at the seaside. This response (Figure 1) is apparently related to the release of some (horizontal) anticipation of the kind that usually drives cinematic storytelling.

In sum, Deren's concepts of vertical and horizontal dimensions seem to correspond to two distinct observable neural phenomena. These, in turn, appear to shed light on why strictly guided narration elicits similar activity in viewers while that does not happen when this condition is not satisfied. Further, there are hints that the cognitive challenge viewers face in meaning-making during this particular film appears to elicit richer functional connectivity between different brain areas than standard story-driven films.[43]

Conclusions

Screendance in general - and *At Land* in particular - has a particular role among film genres in terms of creating alternative means of storytelling. The abstract and ambiguous narrative content of *At Land* may pose a considerably higher cognitive challenge than conventional storytelling, which Deren does all she can to break. For instance, socially oriented interpretations are automatically assumed to emerge in the beginning of the film, when Maya climbs from the deserted beach to middle of a crowded dinner table and starts crawling toward a man playing chess at the other end of the long table. As

she seems to be determinately drawn to the man, the viewer automatically assumes that behavior to be due to sexual desire. Yet, one soon realizes that the man as well as the other dinner guests totally ignore her presence.

Instead of relying on default expectations, Deren creates her own cinematic syntax with the vertical and horizontal dimensions of filmic expression. The scene actually reflects both the off-cinematic space in which the making of the film takes place (the director has asked the people not to pay attention to the crawling actress) and the absurd cinematic space (the crawling woman is invisible to the other people). In this way she opens an alternative window for the viewers to grasp, that which Noë describes as the process of image-making as an enactive perception-construction (i.e., enacting experience by a means of continuous exploration of the world).[44] As Maureen Turin has remarked, Deren "has found an action language of filmic expression in which each new act is registered by her female protagonist, Deren herself, as wide-eyed witness."[45] Each filmic close-up on Maya's wondering face highlights the vertical dimension of active presence, while the bodily movement through the landscape draws the horizontal dimension of continuous navigation on the screen toward some yet unidentified goal.

To construct socioemotionally effective events on the screen, filmmaking requires someone on the screen to see and react to those events. Deren's double role as director and actor has often been pointed out. The viewers' anticipated responses to screen events are thus played out—and played with—by Maya-on-the-screen, as a sort of avatar of the viewer long before such devices of virtual presence would appear in interactive media and games. Interestingly, this setting creates a loop of emotional responses between the screen characters and the viewer. In this sense, *At Land* can be regarded as a kind of forerunner of enactive cinema.

Deren's work provides an interesting contrast to the mainstream films typically studied in neuroscience labs. A holistic understanding of the world as a dynamical social system characterizes her thinking. According to her, any creative product, for example, a formulation of a theory, an expressive artwork, or a religious ritual, relies on the assumption of intersubjectively shared experiences between people. Following this thought, in this chapter, an attention has been given to the neuroscience of enaction. Deren's cinematographic imagery has been reflected against one's embodied abilities to anticipate other people's intentions.

Deren's reliance on shared embodiment and enaction makes *At Land* particularly interesting from the neurocinematic point of view: Will the spectators be able to live by and synchronize with the process Deren creates? Today, this is no more a speculative matter but purely experimental. Neuroimaging exp1eriments have already hinted that this may be the case—to a degree.[46] With respect to the already known

results that spectators respond the same way to common cinematic conventions, in contrast, comparing spectators' intersubjectively shared responses to nonconventional genres of film allows the inference of factors behind experimentally characterized conventions.

This chapter has suggested that embodied and enactive film-viewing, pointedly present in Deren's film but also characteristic of the genre of screendance in general, are good candidates for the study of the shared basis of film-viewing experience. It is to be emphasized that the brain's sensorimotor system forms the basis of the intersubjectively shared comprehension, not only in the case of action-goal type of behavior or purely emotional response, but also for higher-level inferences induced by the film. All things considered, the use of films as stimuli appears to open useful analytical windows to the cinematic comprehension of screendance films.

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b) Sobre o conceito de enação pode ser interessante ao leitor consultar o artigo Affordances e Enação: convergências fenomenológicas em interfaces afetivas, de Cleomar Rocha e Pablo de Regino nesta publicação.

1 Ibid.
2 Annette Michelson, "Poetics and Savage Thought," in Maya Deren and the American Avant-Garde, ed. Bill Nichols, 27.
3 Pia Tikka, "Enactive Cinema: Simulatorium Eisensteinense" (PhD diss., University of Art and Design Publication Series, 2008), 17.
4 Willard Maas, "Poetry and the Film: A Symposium," Film Culture 29 (1963): 55–63; Michelson, "Poetics and Savage Thought," 23.
5 Deren, An Anagram, 10.
6 Ute Holl, "Moving the Dancer's Soul," in Maya Deren and the American Avant-Garde, ed. Bill Nichols, 158.
7 Ibid., 161.
8 The term is coined by P. Adams Sitney, Visionary Film: The American Avant-Garde, 1943–2000 (New York: Oxford University Press, 2002), xiii, 20.
9 Moira Sullivan, "Maya Deren's Ethnographic Representations of Ritual and Myth in Haiti," in Maya Deren and the American Avant-Garde, ed. Bill Nichols, 212.
10 Maya Deren, "Religious Possession in Dancing," in The Legend of Maya Deren, vol. 1, part one, eds. VèVè Clark, Millicent Hodson, and Catrina Neiman (New York: Anthology Film Archives, 1984), 490.
11 Maya Deren, Divine Horsemen: The Voodoo Gods of Haiti. (London: Thames and Hudson, 1953).
12 Francisco Varela, Evan Thompson, and Eleanor Rosch, Embodied Mind: Cognitive Science and Human Experience (Cambridge, MA: MIT Press, 1991), 15.
13 Pier Luigi Luisi, "Autopoiesis: A Review and a Reappraisal," Naturwissenschaften 90, no. 2 (2003): 55.
14 James J. Gibson, "Theory of Affordances," in The Ecological Approach to Visual Perception, originally published in 1979 (Boston: Houghton Mifflin,), 127–143.
15 Francisco Varela, "Laying Down a Path in Walking," in Gaia: A Way of Knowing, ed. William Thompson, 48–64. (Great Barrington, MA: Lindis-

farne, 1987). The title of the article is inspired by a poem by A. Machado, from Preverbios y Cantares, 1930.

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17 Pia Tikka, "Cinema as Externalization of Consciousness," in Screen Consciousness: Mind, Cinema and World, eds. Michael Punt and Robert Pepperell (Amsterdam and New York: Rodopi, 2006), 139–162; Torben Grodal, Embodied Visions: Evolution, Emotion, Culture, and Film (New York: Oxford University Press, 2009), 5.

18 John Dewey, Art as Experience (New York: Minton and Batch, 1934; reprinted by London: Penguin, [1980] 2005).

19 Alva Noë, "Art as Enaction" (a presentation at The Art and Cognition virtual conference from November 2002 to February 2003. Last modified November 25, 2002), accessed April 27, 2013, http://www.scribd.com/doc/51703258/Alva-Noe-Art-as-enaction.

20 Dewey, Art as Experience, 350.

21 George Lakoff and Mark Johnson, Philosophy in the Flesh (New York: Basic Books, 1999), 13.

22 Eleanor Rosch, "Natural Categories," Cognitive Psychology 4 (1973): 328–350.

23 George Lakoff and Mark Johnson, Metaphors We Live By (Chicago: University of Chicago Press, 1981), 235.

24 Lakoff and Johnson, Metaphors We Live By, 234.

25 Julian Kiverstein, "The Meaning of Embodiment," Topics in Cognitive Science 4, no. 4 (2012): 741.

26 For meta-analysis, see Frank Van Overwalle, and Kris Baetens, "Understanding Others' Actions and Goals by Mirror and Mentalizing Systems: A Meta-Analysis," Neuroimage 48, no. 3 (2009): 564–584.

27 Chris D. Frith and Uta Frith, "The Neural Basis of Mentalizing," Neuron 50, no. 4 (2006): 531–534.

28 For reviews, see Giacomo Rizzolatti and Laila Craighero, "The Mirror Neuron System," Annual Review of Neuroscience 27 (2004): 169–192; Riitta Hari and Miiamaaria V. Kujala, "Brain Basis of Human Social Interaction: From Concepts to Brain Imaging," Physiological Reviews 89, no. 2 (2009): 453–479.

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31 Vittorio Gallese and George Lakoff, "The Brain's Concepts: The Role of the Sensory- motor System in Conceptual Knowledge," Cognitive Neuropsychology 22 (2005): 456.

32 Jeffrey M. Zacks and Joseph P. Magliano, "Film, Narrative, and Cognitive Neuroscience," in Art and the Senses, eds. David P. Melcher and Francesca Bacci (New York: Oxford University Press, 2011), 448.

33 The concept is coined by Uri Hasson, Ohad Landesman, Barbara Knappmeyer, Ignacio Vallines, Nava Rubin, and David J. Heeger in "Neurocinematics: The Neuroscience of Film," Projections 2, no. 1 (2008): 1–26.

34 Uri Hasson, Yuval Nir, Ifat Levy, Galit Fuhrmann, and Rafael Malach. "Intersubject Synchronization of Cortical Activity during Natural Vision." Science 303, no. 5664 (2004): 1634–1640.

35 Hasson et al., "Neurocinematics," 14.

36 For example, Andreas Bartels and Semir Zeki, "Functional Brain Mapping during Free Viewing of Natural Scenes," Human Brain Mapping 21, no. 2 (2004): 75–83; Iiro P. Jääskeläinen, Katri Koskentalo, Marja H. Balk et al., "Inter-Subject Synchronization of Prefrontal Cortex Hemodynamic Activity during Natural Viewing," Open Neuroimaging Journal 2, no. 1 (2008): 14–19; Juha M. Lahnakoski, Pia Tikka, Juha Salmi, et al., "Stimulus-Related Independent Component and Voxel-Wise Analysis of Human Brain Activity during Free Viewing of a Feature Film," PLoS One 7, no. 4 (2012): e35215. doi: 10.1371/journal.pone.0035215.

37 The protagonist is deliberately referred to as "Maya," to distinguish her from the filmmaker "Deren." Deren herself used a girl to refer to the protagonist in At Land; see, for example, Deren, An Anagram, 51.
38 Siina Pamilo, Sanna Malinen, Yevhen Hlushchuk, Mika Seppä, Pia Tikka, and Riitta Hari, "Functional Subdivision of Group-ICA Results of fMRI Data Collected during Cinema Viewing," PLoS One 7 (2012): e42000. doi:10.1371/journal.pone.0042000.
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40 See, for example, Daniel J. Simons and Daniel T. Levin, "Change blindness," Trends in Cognitive Sciences 7 (1997): 261–267.
41 For review, see Zacks and Magliano, "Film, Narrative, and Cognitive Neuroscience" 435–454.
42 Hasson et al. "Neurocinematics." 1–26.
43 The initial results from fMRI experiments by Janne Kauttonen, Yevhen Hlushcuk, and Pia Tikka reveal that the viewers of At Land showed stronger long-distance intersubject functional connectivity in the anterior higher cognitive areas than did the viewers of story-driven films. (See "Comparing Functional Connectivity and Synchronization in Free-Viewing of Feature Films—An fMRI Study," poster published at the International Convention of Psychological Science [ICPS], Amsterdam, March 13 2015).
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45 Maureen Turim, "The Ethics of Form," in Maya Deren and the American Avant- Garde, ed. Bill Nichols (Berkeley: University of California Press, 2001), 93.
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47 Maya Deren, An Anagram of Ideas on Art, Form and Film (The Alicat Book Shop Press: Yonkers, New York, 1946), reprinted in Maya Deren and the American Avant- Garde, ed. Bill Nichols, 267–322 (Berkeley: University of California Press, 2001), 13. Note that the page number refers to the original page numbering of An Anagram.

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