

Contemporary Dance Theatre in Neurocognitive Perspective – Granhøj Dans Case

Tomasz Ciesielski

Introduction

Dance is experiencing a kind of rebirth in contemporary theatre. Even though its stage presence has always been undeniable, at least in the twentieth and twenty-first century much greater attention has been paid to its importance. Regardless of whether this is the result of the physical methods of laboratory theatre of the past century, empowerment of dance as an art form, and the revival of dance in the theatre demands specific attention to the body in motion. As a consequence, a space for action and reflection emerge, which is particularly interesting for the most dynamically developing branches of cognitive sciences like the experimental neurosciences.

This space is widely entered by dance practitioners and theorists such as Susan Leigh Foster in her monograph *Choreographing Empathy: Kinesthesia in Performance* (2011). Interest in the neuroaesthetics of dance seems to be naturally associated with the wider stream of cognitive sciences' applications in the study of art, which in the theatre are, among others, effectively represented by Steve De Benedetto – *The Provocation of the Senses in Contemporary Theatre* (2010) and in visual arts: Semir Zeki – *Inner Vision: An Exploration of Art and the Brain* (1999). Moreover, many volumes can be listed, where on equal terms; artists, neurologists, psychologists and even philosophers participate in the same type of research. For dance, the most recognised work of that kind is *Neurocognition of Dance, Mind, Movement and Motor Skills* edited by Bettina Bläsing, Martin Puttke and Thomas Shack. The authors draw on the extensive research available on human psychomotor skills. A number of such studies result from, among other factors, the discovery of mirror neurons. Thanks to this discovery, for the first time, human motor abilities were strongly linked with higher mental abilities (STAMENOV and GALLESE 2002). This may have also resulted in closer attention being paid to the body and movement in the theatre (SOFIA 2014: 315).

Despite the ever-wider field of research on the boundary between the art of dance and cognitive science, researchers still rarely undertake an analysis of particular exam-

ples of performances in this context. Some of the most important attempts to perform case research are those undertaken by Corinne Jola. Being both a choreographer and neurologist herself (JOLA 2010, 2012), she combines these competencies in her research. The same goes for Ivar Hagendoorn, who although trained as a philosopher, proposed a very practical application of cognitive science in dance practice, even developing an appropriate set of exercises (HAGENDOORN 2003, 2004). In my article, I attempt to follow a similar path. In ‘practice-led research’, I analyze my experiences of observing and working with the Granhøj Dans team. I try to characterize and describe the company’s method of work in the wider neurocognitive context as a valid example for contemporary dance in general.

Granhøj Dans and Contemporary Dance

Contemporary dance is characterized by a variety of styles and a wide range of inspiration used by artists. This makes defining it very difficult and also a frequent subject of dispute. In this article, I take Granhøj Dans as an example of the form of dance shaped under the influence of mainly American avant-garde, from the second half of the twentieth century. Its most prominent representatives were; Paul Taylor, Alvin Ailey, Anna Halprin, Sally Banes, Steve Paxton, Yvonne Rainer, Simon Forti, Trisha Brown and others (KLIMCZYK 2010). On the basis of this experience and inspiration drawn from other art forms, contemporary dance emerged, not so much as an evolutionary successor to the older movement traditions, but as a relatively independent form only linked to them. Today, its still-fuzzy autonomy was constituted by the turning to the everyday-body and challenging the definition of dance as a specific form of spatio-temporally ordered movement. Hence, the distinct aesthetics evolved, and are still evolving (KLIMCZYK 2010; SZYMAJDA 2013) together with the emancipation of the body itself.

These are the sources from which the practice of the Danish choreographer, Palle Granhøj, draws. As it will be argued further, the choreographer’s strategy of work allows for the evident exposition of the characteristics of contemporary dance, while also providing good source material for analysis from a neuro-cognitive perspective. At the same time however, this does not mean that such research is less legitimate or effective in other cases, nor it has any relation to the evaluation of aesthetic or the public success of Danish theatre.

The Obstruction Technique

All performances of Granhøj Dans are prepared almost exclusively based on a method called ‘the obstruction technique’, which was started by American artist Nancy Spanier. As she recounts,¹ the inspiration came from her work with one of her mentors, Louis

1 Phone interview. February 2013.

Horst (who also taught Martha Graham), who taught her at the American Dance Festival at Connecticut College School and at the Julliard School of Music. During the course, Spanier suffered a spinal injury which, according to doctors, should have ended her dance career. She ignored these recommendations and continued to practice with Horst. He suggested that she perform all tasks on a chair, since she was otherwise unable to move. This was the starting point for working with restrictions and the beginning of the idea that eventually turned into the early obstruction technique, thanks to the influence of research on *Das Tradische Ballet* by Oskar Schlemmer as well as participation in the happenings of Alan Kaprow. It was then refined by Palle Granhøj, after they met in Denmark in Spanier's workshop.

The obstruction technique consists of two main phases: the first is the preparation of the material by a dancer, the second is the use of the methods of obstruction, indicated by the choreographer, which are technical directions for the work with the movement. This scheme can be supplemented by adding a third phase – a complementary one but related to the individual creative process of the choreographer – which is the selection and later use of selected materials as single scenes in the play. It is worth noting here that such working structure is characteristic for contemporary dance theatre in general. The choreographer plays more of a dramaturg/editor role whilst experimenting together with the performing artists, rather than only trying to be the director.

From the perspective of the performer's creative process, the first two phases of the method are the most important – which I have experienced as a performer at Granhøj Dans – and it is on these I would like to focus first. The first task of the dancer is to prepare precise choreographic material, usually short. This material should be fully repetitive, which includes not only the development of the rhythm and motorics, but also the use of space, interpretation of motion, therefore taking into account as many factors influencing the performance and perception of the movement as possible. This is necessary because the subsequent work on the material is based on its repetition in changing circumstances. If the dancers make a mistake performing their choreography, they should include this error in the material. The inspiration for the creation of a basic – as Granhøj called it – 'phrase', can be anything. The director rarely suggests any specific procedure, for example suggesting the artists refer to the movie watched by the entire team the day before.

In the first period of the rehearsals the dancers prepare a large number of phrases – one daily, six days a week for a month, even up to two months. Each time, after a double, looped presentation of the phrase, the crucial second phase of the obstruction process begins. In the basic technique the dancer is accompanied by one or two partners – 'obstructors' who gradually, by catching/blocking the movement of the hand to the elbows to shoulders to trunk etc., limit the movement of the dancer, almost to a complete stop. It is extremely important that this process (at least initially) is performed slowly. Its efficiency and effectiveness is to be ensured by working rules. The number of these, depending on the chosen method of obstruction, is virtually unlimited – they structure the action and facilitate the adaptation of the choreography to the obstruction. The most important of these are: 1. The dancer must dance, no mat-

ter what happens; 2. The dancer must find a way to continue the movement: this can be done through brute force, passing the motion/gesture to other parts of the body or directions or other alternations until the point where the characteristic elements of the phrases are recognizable; 3. The obstructor must proceed carefully so as not to hurt the dancer and allow them to gradually adjust to the new, 'limited' mobility. These three basic rules are developed during training into a series of specific and practical principles for movement and its restriction. They can be properly applied for each of the many variants of the obstruction. The presence of so many rules increases safety, and above all the precision and effectiveness of the actions taken.

Each presentation of the dance phrases and further work on them is recorded with a digital camera, creating a kind of a library for each artist involved in such production. After a few weeks of the first stage rehearsals, based on creating new phrases, a very significant break in the course follows, where the director selects the material to be used in the show. Performers acquaint themselves with it during the second session of the production. It is then that the transitions between phrases are created, followed by further refinement of the details that are important for the show's overall dramaturgy. This process takes two to three weeks. As pointed out by Palle Granhøj – this is no longer the creative phase for dancers: their only task now is to copy the scenes they have prepared, in which only minor changes have been introduced. The end result is a performance.

Regardless of the authorial details of this method of work, its three-cycle structure is the alternation of a montage tactic of creating a spectacle, widely used by choreographers. On the one hand, it offers a variety of source material and leaves space for artistic surprises, on the other hand it leaves the role of the theatre director/producer as the person responsible for the dramatic coherence of the whole. For Granhøj, serendipity is the major quality of such work, allowing him to discover what interests him the most: a human being.

Neurocognitive Contexts

Thanks to that you are more human, less dancers² – with these words Granhøj once summed up his technique and it can be complemented by an official note:

The obstruction technique is a way to find the core of the dance. What is dance and what is the dancer's role in the dance? To obstruct is at the same time to destroy and to reconstruct the movement. It is at the same time disintegrating and constructing and can be called deconstructive dance. The end is the beginning. The dance doesn't end. The dance continues ultimately.³

2 Discussion with the Author. Aarhus, March 2011.

3 Vide: <http://www.granhoj.dk/About-us/Obstruction-technique.aspx>. [Accessed on: 30. 10. 2012].

If we assume that such a declaration from a director can be considered a sufficient reason to start the analysis, and at the same time recognize it as a statement delineating the direction of research, we should reflect on what the ‘ontology’ is of this alleged, specific ‘humanistic’ effect – the presentation of the ‘core’ of man via stage movement. Modern neuroscience can be very helpful in finding the mechanism of this effect. Its assertions and hypotheses about the human brain and its perceptual processes correspond with the practice of contemporary dance in a surprising way.

At the end of the twentieth century Italian neuroscientists made a breakthrough discovery (RIZZOLATTI *et al.* 1988). They found neural networks – widely discussed today – which activate when a certain action is performed, e.g. opening doors, and at the time of observing an analogical action. Today, they are considered part of a broader system – the Action Observation Network (AON) (CROSS 2010: 179). This includes, anatomically, cells that encode only the movement, canonical neurons linking the action and its object, and the simulation cells. The uniqueness of simulation cells lies in their ability to abstractly encode complex activities directed towards a specific destination, irrespective of whether, for example: grabbing occurs by mouth or hand, and, most importantly, independently from the operating agent. As Stamenov writes, it is scandalous sharing of one’s own model of the body to anyone (STAMENOV 2002: 250). This is particularly interesting if used to undertake analysis of Contact-Improvisation, the tools of which are also used by Granhøj. For the dancers improvising in contact, distinction between individual bodies does not seem necessary. They rather try to create a kind of common intercorporeal experience. Such an extension of the individual body schemas allows them to use physical knowledge of all bodies in the process in order to perform demanding acrobatic stunts without prior rehearsal. Obstruction uses the same mechanism of ‘deep synchronization’ – the imposed rules train the cognitive competencies, not just the movement capabilities of the dancers. The AON is the area of the brain that allows a certain cognitive symmetry of the performers in action.

The activation of the cells belonging to the AON is a reflection of (potential, simulated) motor activity – a sort of motor representation (JEANNEROD 2006: 3). The AON constitutes, according to recent findings, a universal network for handling the motor processes in a very wide range of situations, irrespective of whether it is performed as computation or not⁴. The processes performed by the AON seem to always follow several rules. These rules are: related to the body model – isometric to the actual movement (JEANNEROD 2006: 25), unconscious or at least pre-reflective in phenomenological language (GALLAGHER and ZAHAVI 2012: 52–5) but we also rely on them in conscious mental operations (SHACK 2010: 15), they occur in different levels of detail/complexity determined by their functionality and individual characteristics of the subject (SHACK 2010: 17).

4 Contemporary radical enactivist cognitive theories reject the presence of any sort of representation which is then processed – computed in mind. Instead they propose 4Es approach seeing cognition as enacted, embodied, embedded, affective and extended and apply it in several discourses like AI development (GELDER 1995: 345; MENARY 2010: 460).

Thus, the AON's performance seems to confirm the accuracy of the Granhøj's intuition, who argues that the movement of the dancer never ends. It is in fact replicated in its simulation and/or representation in the minds of the audience and other dancers. Together with the performer, the spectators 'mentally' perform every action. The choreographer further facilitates the reception of such 'gestures', because thanks to the obstruction, the movement is instantiated – it becomes clearer or more intense from the perspective of embodied AON processes. Obstruction is ahead of the movement, it then highlights it and extracts from it, forcing the dancer to fill every free part of his/her body to their fullest with a clear and sound gesture. Then, even when the restriction covers almost the entire body of the dancer, the structure of the movement phrase is recognizable – 'executable' in the simulation. This is confirmed by the results of tests on monkeys, conducted by the discoverers of mirror neurons. In the first series of experiments they investigated the brain activity of monkeys, who were watching an action performed by someone else – reaching a hand out for a fruit. In the second round a key moment of the action was hidden from the monkeys' eyes, namely the acquisition of the fruit. In spite of this, the majority of neurons reacted in the same way as in previous tests. This allowed the researchers to conclude that in monkeys (and, presumably, similarly in humans), mirror neurons are involved not only in the process of understanding one's actions, but also in their predictions – intentional recognition based on one's own experience. A visual-auditory class of mirror neurons was also discovered, which discharge even if the subject only hears the sounds associated with a specific, known action (GALLESE 2005: 33).

Granhøj uses this mechanism to build specific aesthetic tension. For example, in the obstruction process – which coincides with a stage performance watched by the audience – the dancer first performs their full material, then their movement is gradually limited, and varies according to the set rule but maintains the action's accompanying sounds. In this way – paradoxically – the viewer will perform the full choreography (through simulation) of the performance in their own brain, which is stimulated by the remaining fragments of the movement phrase, and synchronized with its accompanying sounds created by the performer. This raises the dramatic conflict between the sensorimotor and purely visual experience of the recipient. The first is filled with physical activity, but only simulated, while visually, virtually nothing is happening on stage.

The temporal development of the ability of the neural simulation of the movement is confirmed by the studies of Corinne Jola *et al.* Using TMS induced MEPs (Motor Evoked Potentials), researchers demonstrated a link between greater activations in the motor cortex and higher experience in watching the dance itself, but with no practical competence (JOLA *et al.* 2012). They found that the response of the motor system to a visual stimulus with choreographic material increases not only with the physical practice, but also with the experience of watching. The performances developed using the obstruction technique often contain movement material that is frequently repeated by the dancer, before it gets fully 'deconstructed'. Therefore, the mind of the viewer can still recognize it and demonstrate increased excitability even when the remaining visible movement includes only the signals of the original choreography or when

a sudden and significant change occurs – unexpected surprise and fulfilment of the expected pattern are almost equally rewarding for human brain. Obstruction is the game of interplay between these two conditions. This is also important for the perception of dance theatre in general. It also allows for reflection on how dance techniques can take advantage of the relationship between motor simulation and physical movement (CIESIELSKI 2014: 23–70).

Contemporary dance techniques, in particular Contact Improvisation, which is similar to the obstruction technique, propose a new approach to the body. In particular, the body in motion that should simultaneously be the subject, object and instrument of its own cognition (SZYMAJDA 2013: 7–27). The recitals of the dancers in Granhøj Dans performances are not based on the technical precision of dance abstracted from reality. The choreographer encourages dancers to come to rehearsal (in the first period of the process) without dismissing emotions that they are feeling, and avoid any attempts to change their current attitude. The choreographer accepts the dancers' moods and physical weaknesses, as long as they carry out the task – to prepare and present the phrase twice and perform its deconstruction. This indicates a difference between dance that reproduces external form (e.g. a variety of classical ballet styles, ballroom dances etc.) and improvised dance which Granhøj utilizes – inspired by the state and energy of the dancers' bodies at the time of contact. Such categorization is analogous to the difference that exists between the mental simulation of a visual-motor imagination and automatic and unconscious sensorimotor simulation. The first is an event caused by a conscious act of choice: of recalling or imagining a specific movement. The second one is driven more by external stimuli and largely unvolitional (SHACK 2010). Appropriate motor responses are initiated in response to environmental needs, and dancer's body model, for example: when in CI, dancers dynamically perform complicated partnerings. Working with Granhøj, dancers also use this somatic mechanism when acting as obstructors. Before they catch their dancing colleague's hands, they often unconsciously, fragmentarily perform his or her choreography, in a way allowing for automatic perceptual simulation's reach, through the motor representation of the muscle reactors, which is usually stopped by the spinal inhibitory system (BALDISSERA *et al.* 2001: 190). In this way, by limiting the movements of the dancer, the obstructors are at the same time performing and creating the choreography themselves. Due to this, their actions are 'automatically' synchronized with other performers on the stage, and not artificially equalized by the dance structure. Therefore, they achieve a high level of synchronization, not only spatial and temporal, but also cognitive-intentional, to which I will return once again later in this article.

The proposed opposition between the characteristics of dance (formal and improvised), is used here only to present a certain scale of diversity in solutions, out of which the majority would fall in the middle of the scale created by these oppositions. Drafting such a polarity is also confirmed by the intuition of one of the creators of contemporary dance, who however places it at a critical level:

Our being aroused emotionally as well as physically and intellectually is the result of organic choreography. Whereas representational choreography may please the eye alone, or tickle the mind, or bore the senses. This is the result of using substitutes for creative intuition such as external imagery, contrived symbolism and imitative ideas. Representational is the word I choose to describe this choreography because the dancer uses movement gesture that ‘represents’ the idea the way Saturday Evening Post cover design depicts life. This is often the case of Ballet choreography whereas Modern Dance choreography will just as often suffer from representationalism as on emotional level. (HALPRIN 1955: 10–1)

Nevertheless, ‘auto-somatic’ work with movement is natural for any person dealing with movement – each dance is somewhat organic. Respectively, it is hard to think of dance as completely non-representational. Granhøj however, is clearly exposing the organic, non-representational processes and further builds a corporal paradox on it – a performer who is restricting the dance is subjected to increasingly intense movement themselves. The existence of these cognitive paradoxes may be a partial reason for the emergence of the aforementioned, special humanistic value in Danish theatre performances.

The analysis of obstruction technique through the concept of neural simulation should be complemented by research on sensorimotor perception in general. In 1992, Melvin A. Goodale and David Milner proposed a separation of work into the bands of the visual cortex of primates between the dorsal stream (responsible for the acts of movement – i.e. the ‘where?’ system) and the ventral stream, allowing the recognition and identification of fragments of reality (the ‘what?’ system) (GOODALE and WESTWOOD 2004: 204). Both have different functions and characteristics of activity: the first is primarily responsible for fast reflex actions and works in a pre-reflective way – it is not conscious, but contains sense of agency and ownership of the body (GALLAGHER and ZAHAVI 2012: 235–8). While the second provides detailed qualitative information on the objects and acts within the sphere of the (verbalized) consciousness of the subject. One of the easiest experiences that allowed this dichotomy to be demonstrated behaviourally was the study of people’s perceptual reaction to optical illusions. It turned out that, in spite of illusions experienced by the subjects – affecting the size of the object or its location relative to other things – their hand-positioning while reaching for the item was always properly adjusted. It has also been shown that the peak opening of the gripping hand is resistant to the illusion, even if the hand and the target are obscured during the action. Therefore, direct visual feedback is not necessary to adjust the pre-bias in perception caused by the illusion⁵ (GOODALE and WESTWOOD 2004: 206–7). In other words, the movement correction is executed by the unconscious dorsal stream, which does not get misled by the illusion so easily.

5 The presented description of the study is simplified. Researchers have achieved different results depending on the time given for the reaction and illusion used. Most research shows, however, that the immediate reactions were motorically correct, while those analyzed (the extended planning phase) gave only partial effectiveness. The probable cause of the reduced efficacy was the launching of the ventral stream, which uses a different, ‘non-Euclidean’ geometry.

In dance practice, such distinction may mean that, among dancers, the use of the dorsal stream dominates, or as it is called by Jeannerod – the pragmatic stream (JEANNEROD 2006: 7). As a result, they gain appropriate speed and adequacy of interaction with the environment. Their movement is not created by the analytical work of the brain, but arises – at least to a certain extent – in their neurologically ‘animal’ identity. In other words, when dancers perform a complex jump, their pragmatic stream, rooted in the motor networks, takes into account the gravity, rotation etc. If, however, the dancer was asked to assess when and how the jump should be timed, supported and/or caught, they would not be able to answer accurately.⁶ As Mirka Zago and Francesco Lacquaniti propose (JEANNEROD 2006: 66), it is due to the fact that our knowledge (supplied by the semantic – ventral stream) is based mainly on the sense of sight, which sees objects without their masses, while the ‘hand feels gravity and the force of inertia’. The pragmatic brain system solves most problems by itself – beyond our consciousness, but always in the body.

The pragmatic approach reveals its consistency with the intuitive creative process of Granhøj. The artist leading the obstruction process pays great attention to its proper rhythm and continuity. At the same time, he tries to extract from the dancers a fast, ‘natural’ reaction, by obstructing their critical movement to the extreme, or by physical fatigue – a phenomenon known by many choreographers. His remarks during the last phase of the rehearsals – in which ready materials are combined – are consistently limited to giving concrete, technical tasks. Granhøj suggests, for example, to further extend the leg, do something faster or slower, while never referring to the aesthetic quality of the movement. He does not suggest any relational themes for the movement (emotions, history, intentions etc.), which should or could be associated with a specific choreography – he rather allows them to appear.

The recognition of two perceptual systems – combined with the knowledge of mirror neuron activity – also allows us to draw surprising conclusions on creating a semantic and emotional layer in performances of Granhøj Dans. As has been proven:

[...] the integrity of the sensory-motor system appears to be critical for the recognition of emotions displayed by others, because the sensory-motor system appears to support the reconstruction of what it would feel like to be in a particular emotion, by means of simulation of the related body state. (GALLESE 2005: 37)

Significantly, a more ambitious theory is proposed by Jesse Prinz, who recognizes emotions as embodied perceptions (PRINZ 2004). The starting point for his hypothesis is the phenomenology of emotions that seem to be fulfilled by physical sensations. This is highlighted by the language we use to describe the emotions that often relate to the feelings of the body: to shudder, to be shocked, agitated, feverish, etc. It turns out that if we remove the physical signs of affection in its experience, then not much remains. Prinz argues that emotions are registrations of bodily states, or simply perceptual states.

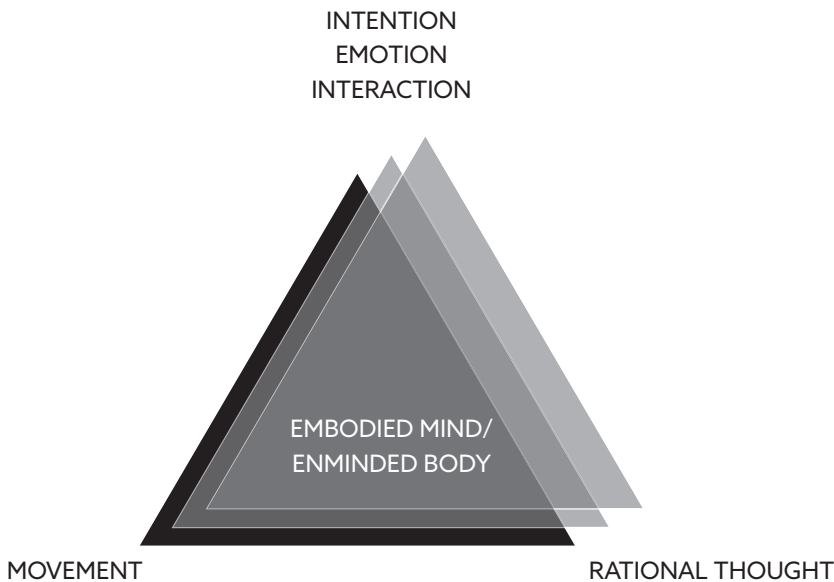
⁶ Such an answer is of course virtually impossible exactly because the solution is always found *ad hoc*, or ‘intuitively’.

These are based on interception – the perception of internal states of the organism (PRINZ 2006: 145). However, it is hard to imagine that, for example: fear is caused only by a rapid heartbeat, because then there would be hardly any difference between deep infatuation, which also speeds up the heart rate, and horror. Such a hypothesis would therefore be contrary to the behavioural function of emotions informing social interaction. Intuition tells us that emotions are stimulated by external factors. Explaining the relationship between emotion and its cause, Prinz introduces (after Richard Lazarus) the term ‘native relational themes’ or the relational properties of wellbeing of the subject (PRINZ 2004: 54). He breaks down the meaning of emotions by specific and formal subject. The first corresponds to e.g. a stolen wallet, while the second represents loss, which corresponds to the feeling of sadness. In other words, he differs the event itself and its quality. Therefore, Prinz proposes an alternative scheme of the emotional reaction: first is the perceptive (cognitive) state arising in response to an external stimulus – e.g. the observation of a snake – correlated with the corresponding native relational theme. Such a cognitive state itself results in a characteristic pattern of changes in the body. This in turn, becomes the subject of pre-reflective interception – a recorded change in body position, heart rate and breathing, increased sweating, etc. Based on such perception, the mind can consciously conclude about the emotion, or rather the feeling, as Prinz would call it. This applies of course also to emotions resulting from contact with another person.

From this perspective, it does not seem accidental that Granhøj has a tendency to expose the dancers’ bodies. This is particularly evident in the productions *2men2mahler* and *Men&Mahler*, where lighting design – using only a few working lights carried by dancers – exposes shadow physiognomy and the body mechanics of the performers. The physical expressiveness and diversity of the dancers (ranges: 19–51 years old, 50–100 kg in the show *Men&Mahler*), and the camouflaging of their true individuality (e.g. by obscuring the face or taking actions with their back to the audience), allows spectators to find the experience relevant to themselves – identification by similarity. In this way, without working with the actors on expressing the intentions during the dance, the choreographer can still create the recipient’s experience in the realm of emotions felt by them. Such an effect helps the choreographer to build a specific contrast between the statements of some the actors, and the contrasting physical activity of the others. Words and the body stimulate different motor/emotional responses in the same areas of the brain (e.g. words – laughter, and the body – pain), and this contrast reveals a perceptual character. Choreography is therefore, concurrently movement and emotional material (HAGEDOORN 2004: 104). In an even more provocative and unconventional way, Granhøj undertakes a similar strategy in the performance *WUNDERTOW*, placing spectators on the floor, lying under glass on which dancers perform. An unusual perspective and physical proximity creates a unique game, of both recognition and lack of recognition of the body and its shapes – it is hard for the mind to reconstruct the observed body, and thus also to determine the possible meaning.

At the same time, *WUNDERTOW* draws attention to the ecological character of the creative, and even aesthetic, process in dance theatre: Dancers generate – with

a partially improvised method – a unique symmetry of emotions and intentions, which is reached on the basis of primary space-time synchronization. Their movement materials in the perspective of the above scientific findings can be seen as a kind of external representation of complex thought processes (JOLA 2010: 210). Perhaps it would be even more accurate to talk not about the representation, but a type of (perhaps primal) visible reflection occurring on many levels, in which – to some extent – the movement is thought and vice versa. This thought occurs in conjunction with the whole ‘ecosystem’ of the show – props, set design and sound, which is possible through the largely shared visuo- and audiomotor areas of the brain involved in the perception of visual and audial stimuli. Perhaps, if following George Lakoff and Mark Johnson’s proposal of understanding the metaphor, a whole abstract and symbolic intertextual reality can be created, constituting a conscious level of audiences’ experience. Finally, in autopoietic feedback loop mode, the audience is also a part of the ecosystem on each level of reflection. Through mechanisms of so-called kinaesthetic empathy (JOLA 2010: 219) spectators ‘experience’ rather than ‘watch’ the show; then they share emotions and intentions with the performers and each other, which may even reach the rational thought level.



The above diagram presents these levels as a triangulation of experience qualities, potentially establishing a full theatrical experience of the spectator as well as performer. None of the peaks of the triangle exist exclusively without the others, and all of them rely upon embodied mind or enminded body. From this perspective, the discussed ‘humanistic effect’ of Granhøj’s performances is in fact, a significant strengthening of multimodal links between the various elements of the show’s ecosystem, with the body as the main medium of these connections. Thanks to the precise system of working

with movement from the cognitive perspective, the Danish choreographer achieves a strong basis for the development of a mutual symmetry of intentions, and emotions between dancers and most probably also spectators. Finally, through the interplay of showing known and unknown movements of the dancers, appealing to recognised and unrecognised dances and gestures, together with a minimalistic setting, the choreographer may even achieve the level of rational, symbolic thinking in audiences only with bottom up connections. In other words, through simplification, the three phases of the obstruction technique may be seen as differently structured stages of developing cognitively fully established performance. In the first phase, the dancers focus exclusively on movement, then the obstruction supplies it with not only motor intentions, but also emotional and interactional motivation. The director's third phase allows the emergence of meaning in the performance.

In a somewhat reductionist, but 'mechanically' more precise way it can be said that creative processes occur in obstruction technique via motor areas of the brain embedded in the active body. From a personal perspective this is described all over again by the words of Anna Harplin:

I collaborate with my environments because I have a strong attitude about the body not being an object. It is part of a total environment in space. [...] I also believe philosophically that humans are not the center of the universe. [...] My physical body is what I relate to on one level. But then what I am most concerned about is related beyond to the environment, and that is my holistic body. One reason I'm attached to the natural environment is it emphasizes for me my whole environment. That's also one reason I like doing *Still Dance*, because that brings me into direct contact with my personal body in relation to my collective body. I don't focus just on my personal body. In our culture we tend to think of our body as the center. Our social body is our body in relation to others. The body in the environment, that's the collective body. (ROSS 2007: 340-1)

Conclusion

The latest findings on the functioning of the human brain shed new light on other areas of human life, including the arts. Contemporary dance theatre that obviously develops corporeality 'as such', not treating it merely as an artistic medium in particular, can be the object of theatre research, assimilating the methods of neuropsychology. An example of the obstruction technique by Palle Granhøj seems significant in this context. This technique allows one to highlight the exceptional quality of contemporary dance, which reduces the dichotomy between aesthetic experience rationalized in the (post)spectating process, and its psychophysiological aspect in relation to the empirical data representing the sensorimotor base of every human experience. Also, the mere scientific experiments on the embodied mental reconstruction of reality and the senses in the 'process of representation' undermine the distinctness of the research agendas of semantic and pragmatic cognitive domains. Social meaning appears to be primarily

a subject of practical, often unconscious actions, and to a lesser extent, rationalized speculation (CIESIELSKI 2014: 103–5). To explain exactly how these processes run, it will surely (though certainly not finally) be helped by the ongoing research on mirror neurons, which has already shown the existence of such mechanisms in the sphere of feeling pain, communication and language comprehension, and – what is most promising for theatre – imitative actions (STAMENOV and GALLESE 2002).

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Summary

Contemporary Dance Theatre in Neurocognitive Perspective – Granhøj Dans Case

The article ‘Contemporary Dance Theatre in Neurocognitive Perspective – Granhøj Dans Case’ concerns the description and interpretation of contemporary dance techniques using the example of the method created by Nancy Spanier (USA) and developed by Palle Granhøj (Denmark). The precise description of the performance’s creation is presented from the perspective of a dancer taking part in a Granhøj Dans production. The neurocognitive context is then used to prove the director’s statement, that the method ‘allows the dancers to be more human, less dancers’, thus creating a specific ‘humanistic’ effect in the aesthetics of the performance, which, as it is argued, exists in contemporary dance in general. Therefore, the obstruction technique serves as a valid example for applying cognitive sciences and neurosciences in the field of dance studies.

Keywords

dance, neuroaesthetics, cognitive science, practice-led research

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Mgr. Tomasz Ciesielski

Institute of Contemporary Culture, University of Łódź

E-mail: ciesielski_t@uni.lodz.pl

Tomasz Ciesielski is a performer, dancer and theatre researcher. As a member of the Theatre Association Chorea (Łódź) he worked on *Antic/Dance in Re-Construction* (2010), *Koguty, Borsuki i inne Kozły* (2011) and *Oratorium Dance Project* (2011). In 2011, he began working with Granhøj Dans (Aarhus, Denmark) which culminated in the international productions of *Men&Mahler* and *Rite of Spring Extended*, both of which were winners of the prestigious Årets Reumert award in Denmark. He is a PhD student at the University of Łódź concentrating on the anthropology of theatre, and the possibility of applying neuroscience and cognitive science to dance and theatre studies. He is the author of *The Dancing Mind. Dance and Movement Theatre in Neurocognitive Perspective* which is the first Polish monograph to present advances in dance neuroaesthetics. He also leads workshops on the same topic in Poland. Tomasz is secretary of the editorial board of the Polish *Dictionary of Dance in 20th and 21st century*.