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NEUROSPACE

Markus Miessen in conversation with Alexander Abbushi

Alexander, you are the founding member and CEO of the Association of Neuroaesthetics (AoN). When and why did you decide to start this operation?

When I was a medical student, my interest in contemporary art and neuroscience was rapidly growing. I was fascinated by the way in which some artists are able to externalise their subjective experience and knowledge into works of art and how art communicates with its recipients. My impression was that some of the artists had developed a unique language with which they investigated human nature, society and aesthetic communication. At the same time, I was learning about the knowledge and methods that modern neuroscientists have acquired, allowing them to investigate the neurobiological processes underlying subjective experiences and artistic communication from a natural sciences point of view. I continued following the developments in both fields, while concentrating on becoming a neurosurgeon. The more knowledge I gained, the more I felt a lack in communication between these disciplines. Of course there were, and are, great artists using neuroscientific knowledge in their work; and there were also great scientists analysing the biological foundation of subjective mental states. But the communication between the disciplines did not seem adequately developed.

How did the association come into being?

Believing that a platform for artists and neuroscientists, which equally respects the expertise and knowledge of both disciplines, and dedicates itself to the development of productive communica-

tion between them, would help, I started to look for allies. I found them in the wonderful scientists and pioneers of this field, such as Semir Zeki, Ernst Pöppel and Eva Ruhnau, in the open-minded curator Christine Macel, the architect Tammo Prinz, and the neurosurgeon Ulrich Thomale. This would not have been possible without the support of the leading personalities of the Charité University Hospital, such as Peter Vajkoczy, Karl Einhäupl and Detlev Ganten.

What are the central questions of the association?

We have often discussed this in our team. The field and opportunities are so vast that we are in a continual process of redefining key questions and aims of the association. You might say that exploring effective ways to engage art and neuroscience is our primary challenge. We strive to raise awareness of the value of this interdisciplinary approach for the future, primarily through developing and implementing new formats for public events combining artistic and scientific presentations in a common language. We further support and develop interdisciplinary research and artworks, acting as a platform for dialogue and linking artists, scientists and scholars. Through our specialised library, public talks and resources, we want to provide education about how the arts and cognitive sciences can complement each other.

Who is involved in the association, which disciplines are present?

Apart from the founding members I mentioned, a lot of younger neuroscientists, artists, architects, art historians, psychiatrists and psychologists build the team at the core of our activities. Specifically, the in neuroscience trained artist from London, Anton Burdakov, and the Berlin-based neuroscientist Daniel Margulies, the psychologist Dada Held, the art historian Katharina Krawczyk and Jutta Gräfin von Büdingen have all been integral to the development of the AoN. Other scholars like Elena Agudio and Ana Gómez-Carrillo De Castro joined us after the inauguration. We already had the opportunity to work with artists and architects such as Olafur Eliasson, Florian Hecker and Philippe Rahm, as well as with institutions like the School of Mind and Brain in Berlin, the Institute of Neuroaesthetics in London, and the Human Science Centre in Munich.

To which extent does your research and other work through the association differ from existing working groups or studies, such as those of the pioneer Ernst Pöppel?

AoN is a European non-profit association funded through sponsorship. We are very happy and privileged to be able to collaborate with established research groups, like that of Ernst Pöppel in Munich, and are equally interested in providing education to the public by developing novel formats for public events. I would say Ernst Pöppel is a founding member of AoN, because he is also interested in these other activities, and is himself a pioneer of interdisciplinary approach. Within our team in Berlin, people are working on a range of diverse projects. There is no central laboratory or pre-established hierarchy in place.

Valerie Stahl von Stromberg, "Brainroom", C-print, 2008 (below);
"Brainoperation", C-print, 2008 (page 50)
© Courtesy Valerie Stahl von Stromberg / Collection Prof Dr Peter Vajkoczy
Produced by the Association of Neuroaesthetics





Could you please describe how you foster the dialogue between the sciences and the art world?

I think the key to a real dialogue is a true respect for the expertise and knowledge of each discipline. That means that in a common project, the neuroscientist must be open to the language and knowledge that emerges through the arts, and the same should be the case for the artist. But that first step is only the prerequisite for everyone to come together at the table. In order for real interaction to take place, genuine curiosity, flexibility, and the desire to create upon novel foundations must be ever present.

How exactly do you involve artists and which additional scientists do you bring on board?

On the one hand we scout for artists and neuroscientists who could be of interest as speakers for one of our events or congresses, or as a partner in a specific project. On the other hand, a lot of people approach us directly. We then consider how collaboration might be possible. We are most interested in artists, who qualify through their artwork and approach to questions of neuroscience rather than those who are simply interested in neuroscience. For example, during the experiment marathon in Reykjavik organised by Hans Ulrich Obrist and Olafur Eliasson, I met the sound artist Florian Hecker. We were talking about the value of sound for human coordination in space in comparison to the value of vision. It was our common opinion that the knowledge about the role of sound in this context is very limited and that it would be fascinating to achieve an upside-down impression on sound in an installation based on the latest knowledge in neuroscience. We since had a meeting at Manifesta in Rovereto with the sound Professor Alberto de Campo as well as with one of my close partners of the AoN, the American neuroscientist Daniel Margulies.

From your personal point of view, why should a neuroscientist attempt to engage in questions of aesthetics?

Since I believe that reality is constructed in each of our individual brains, reality must be a subjectively experienced element. Entities like pain, love, desire, hate, colour or time are not physical but constructed in our brains. With modern imaging techniques, neuroscience has been enabled to show a representation of these abstract entities in the brain. Some studies show that the strength of activity in specific brain areas is directly related to the declared intensity of a subjective experience, such as love or hate. According to such studies, we can show and measure neural correlates of subjective experiences in our brain with objective neuro-scientific methods. These findings contribute to our understanding of human subjectivity, including the nature of aesthetic experience. We believe such results are also relevant to the arts and humanities.

How?

Neuroscience can contribute to aesthetic debates by measuring, defining and quantifying responses to artworks. One can investigate patterns of brain or body activity elicited by artworks and how they relate to reported subjective experience; as a way to describe and differentiate between subjective experiences, other than using words such as beautiful, ugly, and so on. One can also ask if there are any common features in the works that elicit a similar response in the brain, and what objects in "real life" may also elicit such a response. Investigations such as these can also contribute to debates about representation and realism. For example, what are the differences in response to a real object, its image, and the word designating it? These scientific approaches only go so far as to contribute to the debate. They do not resolve it, but become a part of the discussion. There is a general trend in the humanities and social sciences to

appropriate the newest findings in neuroscience, such as mirror neurons, as evidence for specific theories within their disciplines. The arrows of knowledge production are bidirectional. I believe that it is vital to allow all forms of knowledge to engage each other on even ground, without one having any greater epistemological weight than the others. The artist Richard Serra has noted that success of a work often lies in its ability to avoid closure. It is possible to make theories about what this means in neural terms, as Semir Zeki has done by considering ambiguity in artworks from a neurobiological point of view. Both art and science – though coming from different epistemologies and methodologies – are contemporary answers to the question of how to learn about ourselves.

How do you evaluate your research? How can results be judged if one's sense of reality is essentially subjective?

It depends on the project. If the project is scientific, the only proper way to access the results is by rigorous scientific criteria. It is very important that research in this field does not become soft science, or is being read this way. It is perfectly possible to construct valid scientific experiments relevant to art. Similarly, if the project is more artistic, it is not sufficient for its scientific context or inspiration to be sound, it has to have an artistic merit, which will be judged by the public and curators.

Do you envision the role and potential challenge of the association as purely research-based or could you also imagine a situation in which speculative scenarios would be spatially applied and tested?

Indeed, we are already working on a concept to create a room in which physical parameters such as light, sound or smell will be based on neurobiological tests. We also think about using neuro-feedback, whereby the room could interact with users in real time, driven by changes in their brain or body states. There is so much that can be done in principle. We are still discussing possibilities for the intended use of the constructed space. The next step would be to decide, which physiological and neurological measurements are of relevance and how they should be implemented. In line with the philosophy of the association, the challenge for us will be to combine artistic production and relevance with the latest neuroscientific insights.

We talked about the spatial potentials before. How can this be of interest to architects and spatial practitioners?

The idea of a test room is particularly exciting. In a way it is more important than constructing a specific space for a specific purpose. Especially since the perception of space is comparatively little studied, in part due to practical limitations: it is much easier to change variables such as light in a test situation, than, say, dimensions of a room. More than that, perception of space and – what is for me a very interesting question – human embodiment of space are essentially undefined concepts, which make them all the more interesting to explore. Much is already known about basic mechanisms of depth perception: the role of monocular cues, of disparity, and where in the brain disparity might be processed. Eventually, we will learn about all the elements in the chain. But the perception of space that would be of interest to an architect would include much more than that. It would include the perception of different volumes and surfaces in relation to each other, quality of light and air, acoustics, humidity or smell.

How does the concept and reality of light and colour change the perception of space?

The perception of space, light and colour cannot be easily separated from each other. There is a long philosophical tradition regarding space as an a priori basis of perception of reality for Kant. Leibniz agreed with that, but then Newton contradicted it. The question of

space has a long precedent of debates between the humanities and sciences. A neuroscientist would argue that space is also perceived through light given out or reflected by our material surroundings. And colour is constructed in the brain based on distribution of different wavelengths of light in our visual field. The perception of space is not only under-explored, but also under-defined. More experiments in situations approximating real life will be needed to investigate how light, colour and space interact. Exciting results can be expected, given that more and more is beginning to be known about effects of light and colour. One relatively new field of research concerns non-visual effects of light. These include melatonin suppression and papillary constriction acting via the skin for the synthesis of vitamin D, circadian phase-shifting entraining and phase-shifting capacity of light on human circadian rhythms, sleep latency, elevation of heart rate and core body temperature. The alerting properties of light in particular – its effects on subjective alertness, performance or mood – have been intensively studied since the discovery of a third type of photoreceptor in mammals, an intrinsically photosensitive retinal ganglion cell. The alerting properties of bright light compared to dim light seem to be mainly, but not exclusively, due to capacity of light to suppress melatonin.

Can space be strategically affected in such way that the human brain interprets its objective reality differently and therefore experiences the space as physically distinct?

Most certainly. More and more precise ways are being developed to measure physiological and psychological variables that could be connected to the perception of space. If data is collected and correlated to specific spaces, then, in principle, we have a way for designing spaces strategically to achieve certain effects. Architect Philippe Rahm has already designed several spaces based on how specific variables – such as yellow light or humidity – affect the human body. But it will never be possible to have complete control over the effect on people, since we are all to an extent different, and there will always be factors which were not accounted for, that will influence perception of a given space.

What is the association working on at the moment?

In the same spirit as the test room mentioned, we are also working on an artwork dealing with acoustic phenomena. Additionally, we are very excited to be organising a series of monthly public talks on topics relevant to art and neuroscience at the Charité, in collaboration with the Berlin School of Mind and Brain and a school recently founded by Olafur Eliasson, "Das Institut für räumliche Experimente". The invited speakers will include artists as well as scientists, who will speak on topics relevant to neuroaesthetics. Thanks in part to the success of the inaugural event of the Association on May 8, 2008, we expect a very interesting audience from both the art and neuroscience scenes, ranging from students to established experts. To make the most out of this opportunity, we intend to publish interviews we conduct with the speakers on neuroscience and art.

How does one get excited about open skulls?

How can someone not get excited by a vision of the brain!
www.association-of-neuroaesthetics.org

Alexander Abbushi is a Medical Doctor at the Department of Neurosurgery at the Charité University Hospital in Berlin, where he completed his doctoral thesis in 2006. Currently he is specialising in functional neurosurgery as well as developing the field of cognitive neurosurgery at Charité. In March 2008, he co-founded the Association of Neuroaesthetics.