Synaesthesia. Discussing a Phenomenon in the Arts, Humanities & (Neuro-) Science

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The two-day conference “Synaesthesia. Discussing a Phenomenon in the Arts, Humanities and (Neuro-) Science” [1] offered different perspectives on the phenomenon of synaesthetic perception. By inviting art historians, literary scholars, neuroscientists and artists, the organizers of the conference, Regine Rapp and Christian de Lutz from Art Laboratory Berlin [2], created an interdisciplinary conference that focused on a single question: what is meant by the phenomenon of synaesthesia at the end of the 20th and early 21st century? During the two-days, each speaker presented a different viewpoint on synaesthesia, but in the end the definitions were quite similar.

The term “synaesthesia”, from the Greek “syn,” together and “aisthesis,” sensation, signifies a quite specific neural condition and perceptual phenomenon that is automatic, involuntary and stable over time, in which the stimulation of one sense activates other senses. In daily life synaesthetes experience multimodal sensations and a constant crossing of their sensory territories. 4% of the population is affected by this unique perceptual experience of their environment. Synaesthesia is caused by enhanced neural connections between specific sensory regions of the brain and is believed to have a genetic component. Each synaesthete has his particular way of perceiving and translating reality into multimodal experiences by binding and linking two or more senses together: sound and color, grapheme and space, touch and smell. Different forms of synaesthesia exist, but neuroscientists have mostly focused their studies on the most common one: grapheme--color synaesthesia. In this particular case, the inducer is a letter or a number, which is written, read or heard. It is an incoming stimulus which activates a specific color concurrent in the synaesthete’s brain: for instance, the letter A will generate the color blue. The neurological and perceptual phenomenon is thus very specific, subtle, and extraordinarily wide.

Neuroscientists Hinderk M. Emrich (Director of the Center for Psychological Medicine, Hannover) and Sina A. Trautmann-Lengsfeld (Department of Neurophysiology and Pathophysiology, University Medical Center Hamburg-Eppendorf) described how specific modes of perceptual experiences are triggered by a hyper-connectivity in the brains of synaesthetes. These experiences occur between specific areas of their cortex which are linked to perception and the different senses. Neuroscience studies this hyper-connectivity between different regions of the cortex by measuring the activity of the brain with fMRI (functional magnetic resonance imaging). When an area of

the cortex is in use, the blood flow increases. The study of the grapheme-color synaesthesia focuses on activity in the area of the brain that is used for visualizing. This area is located in the left hemisphere, more specifically in the region of letter/number recognition, as well as in the color area, named V4. In grapheme-color synaesthesia in particular, fMRI experiments have proven that for a specific concurrent, the area of the cortex responsible for letter/numeral recognition has enhanced neural connections with the V4 region. Emrich described how perception is linked to differences in the brain's "top-down" and "bottom-up" processing. The "top-down" processing is an active process in the creative part of the brain that is also responsible for our imagination. As an example, the interpretation of colors in dreams, is imagined. On the contrary, the "bottom-up" processing is passive. It is the basic form of sensual inputs that interact in our brain. The measurement of sugar concentration within the blood circulation of the brain is an example of "bottom-up" processing. Research has proved that synaesthesia is a "top-down" phenomenon. Similar to the way we imagine colors in a dream, synaesthetes create colors in their inner mind.

Agnieszka Janik (Department of Psychology, Goldsmiths, University of London) revealed in her talk on "Synaesthesia for Colour is Linked to Reduced Motion Perception" that synaesthetic color experiences are linked to improve color perception and the ability to bind them to visual memory. Despite this advantage, it can also impair motion perception - the ability to perceive speed and direction. This neurological and perceptive phenomenon is currently being studied by neuroscientists internationally and most of the results are yet to be published. This increased communication between two sensory regions of the brain has mostly been observed in creative people such as poets, musicians and artists. This hyper-connectivity of the neural activity is thus believed to enhance creativity by enabling multimodal sensual experiences of reality. The translation of these very intimate and particular perception of the world in poetry, music, painting have helped create some famous art works. Charles Baudelaire, Richard Wagner, Wassily Kandinsky, to name a few, all talented creative minds at the turn of the 20th century, were probably synaesthetes. In his essay "Und" [3] Kandinsky expresses how the 19th century was strictly categorized in "Either/ Or" and separates the inside (content) from the outside (form). A synaesthete himself Kandinsky envisioned a revolution in the 20th century which would combine inside and outside in the sense of "Und" instead of the previous "Either/ Or". He believed that the new era would leave the outside and reach the inside. This future era would also combine the outer with the inner experience and break through to a synthesis of different media, leading to monumental art.

In her talk on "Synaesthesia at the Fin-de-Siècle: Art and Science", Polina Dimova (Institute for Russian and Comparative Literature, Oberlin College, Ohio) referred to synthesis at the Fin-de-Siècle. She talked about how Richard Wagner privileged the "logic of feeling over the logic of thought". Synaesthesia is believed to trigger a transfiguration of reality in Charles Baudelaire's "Correspondences". This idea is explored in Richard Wagner's concept of the "Gesamtkunstwerk" or "total work of art". Through this work he believed that this transfiguration could be conveyed and experienced by his audience. His romantic aesthetical concept inextricably merges music, song, dance, poetry, theatre and visual arts. In his compositions, the use of the "Leitmotiv" stimulates the different senses simultaneously. The experience is similar to synaesthesia. In his work "Prometheus" the Russian composer Alexander Scriabin, also a synaesthete, was the first to combine music and painting, and thus he also sought the transfiguration of reality. Being able to see a color by listening to a sound, he developed the color wheel, which links musical notes to the specific colors he saw in them. Artists and scientists throughout history have developed similar ideas, among them

Alexander Wallace Rimington, Thomas Wilfried and Bainbridge Bishop.
The definition of synaesthesia is broadened by Emrich who described the “coordination of mental, emotional, inner, external and atmospheric worlds”. Cross-modal experiences by non-synaesthetes can also be experienced in their everyday life since the five senses do not work in isolation from each other. Additionally, he stated that “we exist within a situation”, which means that every action is linked to a specific time and space, and therefore a specific sensory environment, which becomes an interactive situation. He explained how we experience our surroundings with our sense organs, our knowledge and our memory, and then translate this perception through communication, expression and feelings.

Synaesthestic modes of perception are also interesting subject matter for contemporary artistic research. The invited artists Ditte Lyngkaer Pedersen (Aarhus), Eva-Maria Bolz (Berlin), David Strang (Plymouth) and Madi Boyd (London) base their practice on transmitting unusual sensory experiences to the public [4]. Following the paths of art history and more specifically of kinesthetic arts, Strang and Boyd use light, video and sound to create multimedia installations. The public’s interaction and integration is the focus of their artistic work. Being a synaesthete herself, Madi Boyd uses her art to explore the view on her own synaesthesia, which connects form, color, texture and sound. In collaboration with neuroscientists, her work combines film, sculpture and installation. Her video “Point of Perception” was developed through the use of color and sound to explore relationships between audio and visual. It explores how much information the human brain needs in order to know what it is looking at. Art becomes a laboratory to understand how an individual, in his own intimate and specific way, understands and experiences his surroundings.

The conference also highlighted a major innovative direction in the arts and in technology: the increase of digital media. Katharina Gsöllpointner (Media Arts/ Art History, University of Applied Arts, Vienna) presented her transdisciplinary research project “Digital Synaesthesia”, which brings together artists, theorists and scientists to focus on the possibilities offered by new digital technologies to provide synaesthetic transmodal sensory experiences for non-synaesthetes.

By shifting the modes of perception, i.e., instead of looking at art we try to smell it, we experience art in a completely different way. Caro Verbeek (Royal Academy of Arts, Amsterdam, Rijksmuseum Amsterdam) is taking that direction by analyzing the avant-garde from an olfactory perspective. In 1938, at the Galerie des Beaux-Arts in Paris, the International Surrealist Exhibition smelled of coffee, which in an art history context refers to the café culture of the Surrealists. Considering this, smell can have a greater influence on us then one might expect. Similar to the way in which the perception of paintings affects us, smell can also induce nostalgic events, moods and emotions. Human beings also assign certain odors to colors. Verbeek explores this by collaborating with a perfumer to create a fragrance. They then asked a test group to assign a color to the odor and the overwhelming answer was green. This simple experiment demonstrates how non-synaesthetes are able to create a link in their mind, associating the freshness of green with a certain smell. Furthermore, it reminds us that synaesthesia is a natural phenomenon that can be experienced by anyone on different levels, thereby reinforces Kandinsky`s belief. As Kandinsky pointed out, we cannot see our reality as a separation of “Either/Or”, but need to see it as an interaction between several perceptual realities-a synthesis.

Multisensory perception can also be experienced through film. Filmmakers use this media to tran-

sport their public in a different time-space. The talks of James Rosenow (Cinema and Media Studies, University of Chicago) and Gertrud Koch (Film Studies, Free University Berlin) elaborated on this notion. Rosenow described how films inspired by Edgar Allen Poe's writings, such as "The Fall of the House of Usher", privilege sensation over narration to inspire intimate sensory experience in the viewer. By entering this imaginary world, the viewer becomes detached from his actual location and disconnected from his reality. Film can thus be considered a media for synaesthetic experiences, where image, motion, and sound are merged to create an interactive world, which includes and transports the viewer.

Romi Mikulinsky (Macquarie University, Sidney/ Bezalel Academy for Arts and Design, Jerusalem) explained in her talk "From Page to Screen–The Presence and Future of Reading" how our contemporary ways of experiencing everyday activities such as reading on an e-tablet changes the way we are involved with the world. By associating the sense of touch to the sense of sight through reading, new technologies renew our primary experiences.

Summarizing all these different views, the conference participants got a sense of the overall applications of synaesthesia in different fields. The multisensory processing of synaesthesia represents both a perceptual reality and a phenomenon that in general is just discovered and understood. Contemporary transdisciplinary artistic projects aim to reveal new sensory, cognitive and emotional realities. Through synaesthetes, the superhuman ability of "crossmodal sensing" is unearthed. Maurice Merleau-Ponty called synaesthesia a standard form of perception [5] that is naturally rooted in every one of us. In this sense, we need to rethink Descartes' "I think, therefore I am" and see ourselves, or rather our senses in a constant dialogue with each other and the world.

[1] This report does not follow the actual order of the conference talks, see complete program here: http://www.artlaboratory-berlin.org/assets/pdf/Synaesthesia_Conference_%20program.pdf

[2] Art Laboratory Berlin was founded in 2006 by Regine Rapp and Christian de Lutz. As a non-commercial art space. Art Laboratory Berlin was established as a platform for interdisciplinary exhibition projects in an international context. See http://www.artlaboratory-berlin.org/home.htm for more information.

[3] Kandinsky, Wassily: Und. in: Essays über Kunst und Künstler. Bern: Benteli 1963.
p. 97-108.

[4] Parallel to the conference Synaesthesia/4: Translating, Correcting, Archiving, the last part of the exhibition series "Synaesthesia" was shown, including Eva-Maria Bolz, Ditte Lyngkaer Pedersen and Andy Holtin. See http://artlaboratory-berlin.org/html/eng-exh-31.htm. The exhibition series includes four exhibitions in total and started with an open call in 2010. Art Laboratory Berlin announced this open call on Synaesthesia in contemporary art and received a big response. Out of the best proposals they created a series, which presented artists who were dealing with manifold connections to sensory perception.

[5] Merleau-Ponty, Maurice: Phenomenology of Perception, translated from French by Colin Smith, London: Routledge 1962. p. 229.

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