

IFCN and its Clinical Neurophysiology journals

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[Don't be afraid to think big]

Online interview with Dr. Bernhard A. SABEL, Institute of Medical Psychology, Otto-von-Guericke University of Magdeburg, Magdeburg, Germany.

The interviewer is Ms. Tuhfatul Tasnim, Wayne State University, Detroit, USA.

Title of the study: Vision modulation, plasticity and restoration using non-invasive brain stimulation - An IFCN-sponsored review. Authors: Sabel BA, Thut G, Hauelsen J, Henrich-Noack P, Herrmann CS, Hunold A, Kammer T, Matteo B, Sergeeva EG, Waleszczyk W, Antal A. Clin Neurophysiol 2020;131:887-911. (<https://doi.org/10.1016/j.clinph.2020.01.008>)

Tuhfatul: What sparked your initial interest in the field of neurology/neuroscience?

Dr. Sabel: Ever since my childhood, I was interested in animal behavior. In high school, I won a state science award for an experimental study on meditation in human subjects to find out how it affects their brain physiology and bodily parameters. This motivated me to study psychology and to apply for a stipend as an exchange student to the United States. I ended up at Clark University in Worcester, Massachusetts, and studied there with a Fulbright Scholarship. At that time I had the vague (and romantic) idea to do more research on meditation, but dropped the idea. But there I met a prominent neuroscientist who got me on the road of my today's career: Dr. Donald Stein, an inspiring teacher and mentor. He was, and still is, a pioneer who, back in the 1970s, proposed the concept of "neuroplasticity following brain damage". I thought this to be a cool and highly relevant topic for research, and a less risky topic than meditation, which is viewed by many (not me) as being esoteric.

Originally my stay in the USA was planned to last only one year, but it ended up being seven years. First, I received my PhD in the Stein-lab, and then I moved on to M.I.T. in Cambridge to work with Jerry Schneider on vision recovery and visual system plasticity (in 1984), an area of research which I have followed since then. Hard to believe that I am still working on it, after 35 years. And most recently, I even returned to my first "love" of meditation and did some research on it. The topic is no longer esoteric, but by now a widely researched and an accepted relaxation technique which is actually also good for the eyes (Dada et al., J Glaucoma 2018;27:1061-1067; Sabel et al., J Curr Glaucoma Pract 2018;12:1-9).

Tuhfatul: Seeing as there were many articles to review in order to extrapolate the important information, how was the work divided and the findings relating to vision modulation, plasticity and restoration using non-invasive brain stimulation put together?

Dr. Sabel: Here, I had a lot of help from my colleague Dr. Andrea Antal and several collaborators in the field who agreed to chip in. With my expertise in vision restoration and others' expertise in brain stimulation, this was a good team effort. The different scientists were assigned to cover topics of their specialty, and our task was to make a picture out of a bunch of puzzle stones. Because their writing style was quite different, the job ended up being a literary exercise as well. But in the end, I think it is a nice and complete

story about how neuromodulation with electric currents applied non-invasively to the eyes and brain can restore vision in persons with low vision and blindness, still considered by clinicians to be impossible.

Tuhfatul: What inspired you to study this specific topic?

Dr. Sabel: There was no current comprehensive review on the topic of vision restoration and neuromodulation. After having organized a conference on "Low vision and the Brain" (Berlin, 2018), I was invited by Prof. Ziemann to prepare such a review. There is such great pessimism in the field of vision loss that nothing can be done and that there is no plasticity at all. Many scientists besides myself have been active in the field of visual system plasticity, including such prominent scientists as Torsten Wiesel, Nobel Laureate, known for his research on how the eyes and brain process visual stimuli. Yet, the pessimistic view is that "blind stays blind" sticks relentlessly in the mind of eye doctors and the general public. It is ignoring the progress in neuroscience and is wrong and terrible for patients who suffer from (often partial) blindness. This condition is one of the two most feared diseases in the elderly (the other being cancer) and can be caused by different diseases such as glaucoma, macular degeneration, optic nerve damage, or brain stroke. Given my experimental results for over three decades, I feel strongly that it is time to push hard for a paradigm shift.... to show the world that more can be done and that there is more light at the end of the tunnel with vision recovery and restoration of vision by brain plasticity!

Tuhfatul: What advice would you give your 20-year-old self?

Dr. Sabel:

- Your early career success depends much on the right mentors. Spend time in finding the right teachers and then listen to them. No excuses that you were in the wrong environment. It is always your own choice.
- Don't be afraid to think big and find a mentor that agrees. If you are afraid to do new things that no one has done before, consider becoming a bookkeeper or lawyer. Science is the business of the unknown (that is, if you are working on the forefront).
- Be flexible and learn when you are young; experience different countries and labs to find your own identity.
- At some point in your education, focus on a topic that you love and which is relevant to science of the public. Become unique (specialized), and stay that way. Generalists can become teachers, but specialists know more than most others about a particular topic.
- If your career is science: publish - publish – publish, and think big.
- Learn to work in teams with others - do not become a loner. If you do things for others, they will also help you.
- If you do not love your job in science in the same way you love your hobbies, but rather look at it as a money-earning activity, or if you do it because of lack of alternatives, here is my advice: "Change your profession."
- for your health and well-being: drink at least 2 liters of water daily, stop or reduce worries, do sports, eat balanced foods, and have an active social life with lots of fun. No one asks you to suffer. For relaxation and serenity: practice daily meditation and yoga, to prevent becoming anxious and stressed out.

Tuhfatul: Were there times in your career where you questioned whether or not you were fit for this field? If so, how did you overcome that fear?

Dr. Sabel: No, there was no such moment beyond the occasional doubts that young people have, fearing to fail or not being sure if they do the right thing. I always wanted to become a scientist - I had a clear plan and followed my goal. This made things much easier. It is healthy to have doubts occasionally, for it can serve as a sanity check and opportunity to reflect your progress, but if you have too many doubts that keep creeping up, consult people with experience (like your mentor or older students) to make adjustments. This also is "brain plasticity".

Dr. Sabel's papers in Clinical Neurophysiology:

Sabel BA, Richard G. Retinal prosthesis and "bionic eyes" for vision restoration in the blind: From dawn to dusk. Clin Neurophysiol 2020;131:1375-1378. (<https://doi.org/10.1016/j.clinph.2020.02.018>)

Sabel BA, Thut G, Haueisen J, Henrich-Noack P, Herrmann CS, Hunold A, Kammer T, Matteo B, Sergeeva EG, Waleszczyk W, Antal A. Vision modulation, plasticity and restoration using non-invasive brain stimulation - An IFCN-sponsored review. Clin Neurophysiol 2020;131:887-911. (<https://doi.org/10.1016/j.clinph.2020.01.008>)

Sabel BA, Antal A. Reply to "The role of primary visual cortex after transorbital alternating current stimulation in low vision patients". Clin Neurophysiol (in press) (<https://doi.org/10.1016/j.clinph.2020.06.007>)