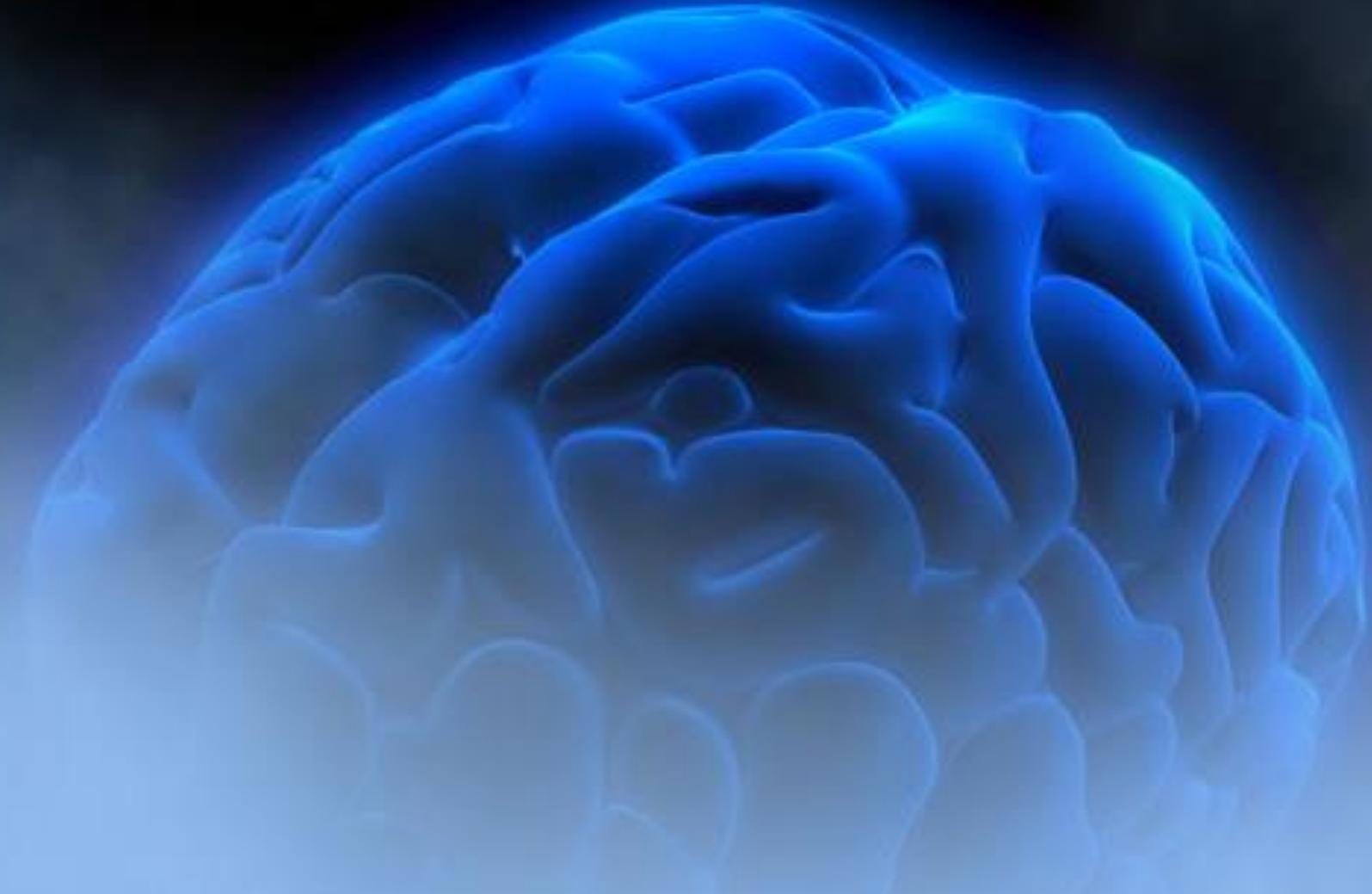


Visual Snow Syndrome and Its Relationship to Tinnitus

Matthew Renze

24th Annual International Conference
Management of the Tinnitus & Hyperacusis Patient

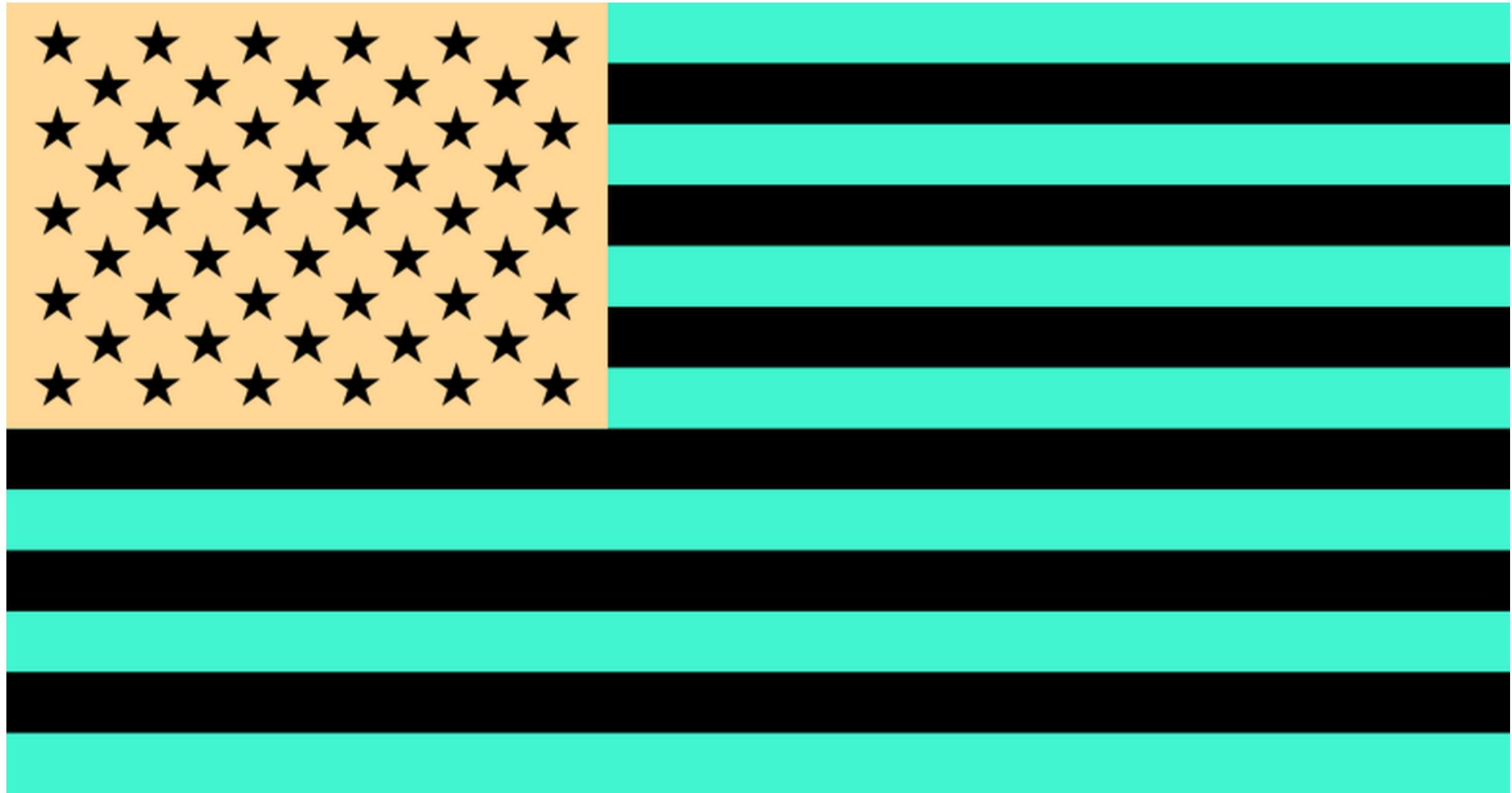
February 7, 2014











Other Visual Symptoms

- Vibration in text
- Trailing images
- Bright-light issues
- Night-vision issues
- Halos at night



Other Auditory Symptoms

- Loud-noise issues
- Conversation issues
- Environmental-noise issues
- Ear noise with volume changes



Other Tactile Symptoms

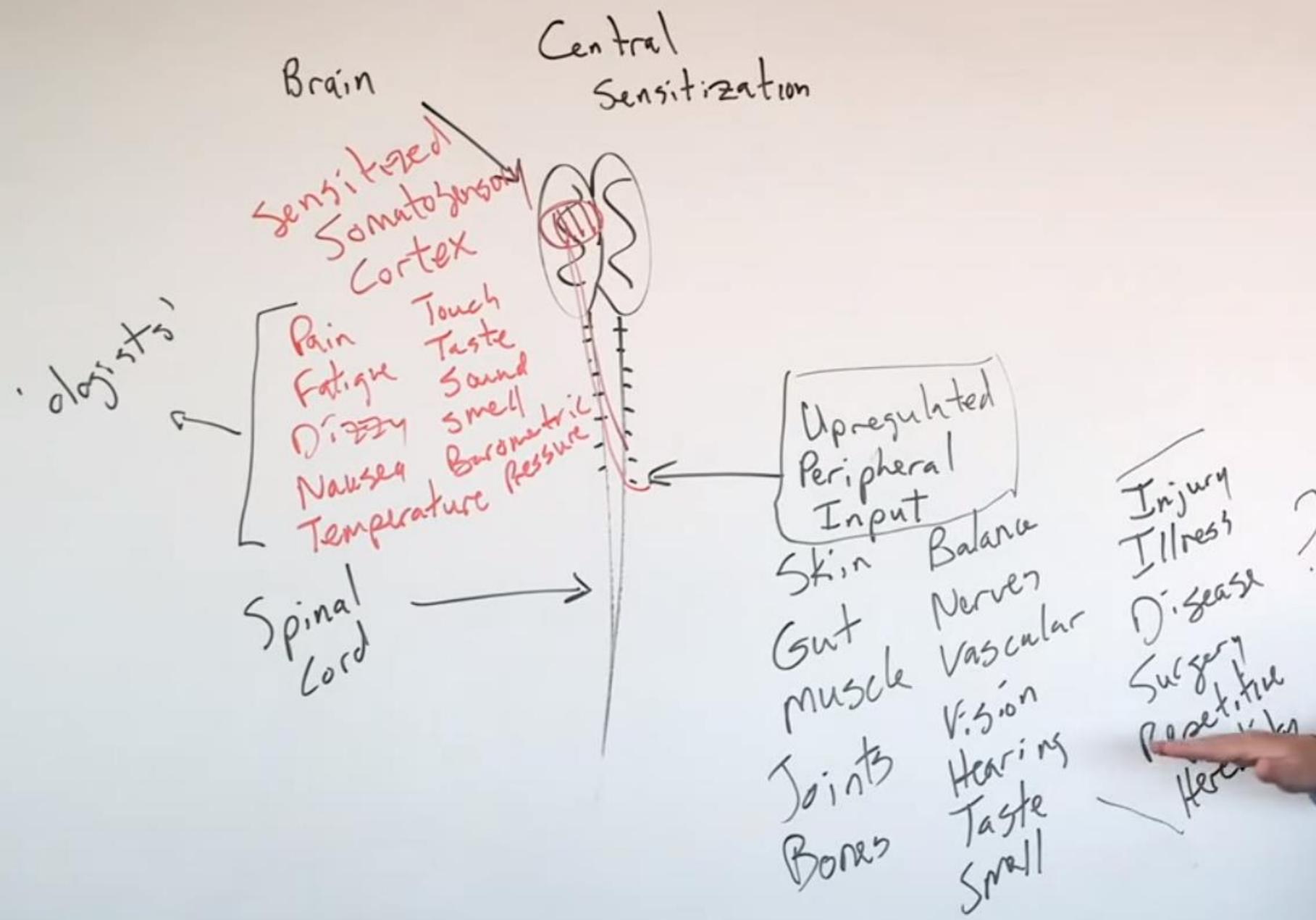
- Pulsating buzzing
- Fine tremors





A photograph of the Mayo Clinic building's entrance. The building features a curved glass facade with a grid pattern. Below the glass, a horizontal band of silver-colored metal with raised letters displays "MAYO" on the left and "CLINIC" on the right. A large, textured column is visible on the right side of the entrance.

MAYO CLINIC



Source: Dr. Sletten - Central Sensitization Syndrome
<https://youtu.be/8defN4ilbho>



Source: Rochester Convention
and Visitors Bureau

'Visual snow' – a disorder distinct from persistent migraine aura

Christoph J. Schankin,^{1,2,*} Farooq H. Maniyar,^{1,2} Kathleen B. Digre³ and Peter J. Goadsby^{1,2}

1 Headache Group, Department of Neurology, University of California, San Francisco, San Francisco, CA, USA

2 NIHR-Wellcome Trust Clinical Research Facility, King's College London, London, UK

3 Departments of Neurology, Ophthalmology, Moran Eye Centre, University of Utah, Salt Lake City, UT, USA

*Present address: Department of Neurology, University of Munich Hospital - Großhadern, Munich, Germany

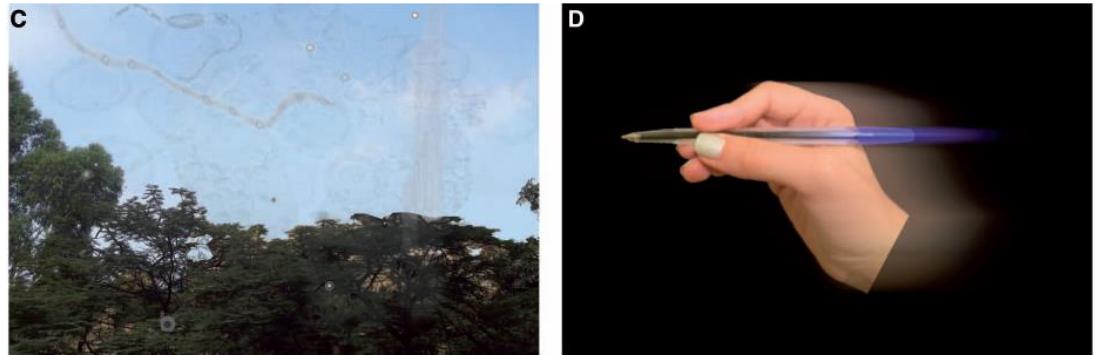
Visual Snow

“continuous tiny dots in the entire visual field similar to noise of an analog television”



Visual Snow Syndrome

- Palinopsia
- Floaters
- Blue-field entoptic phenomena
- Photophobia
- Nyctalopia
- Tinnitus

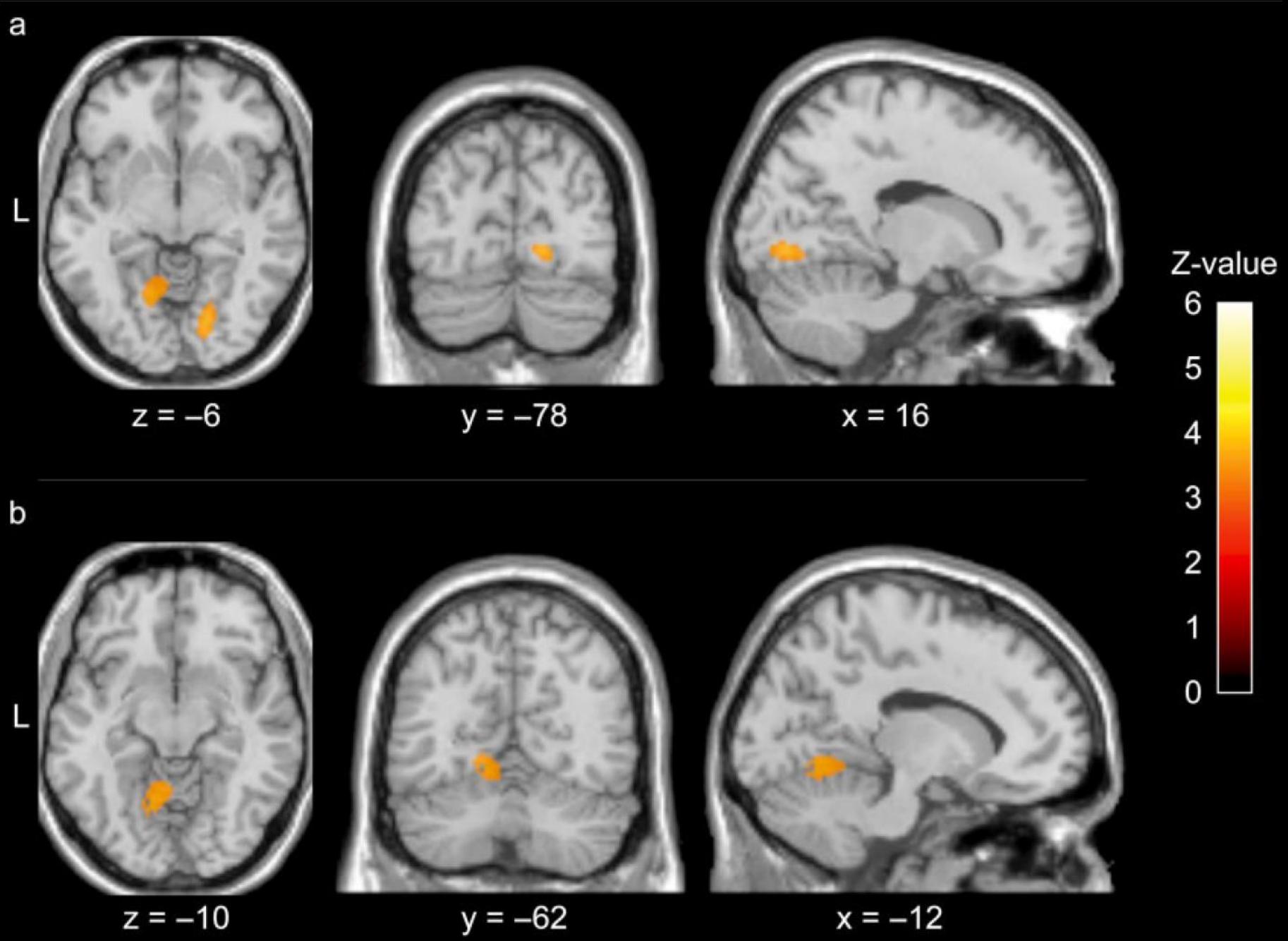


2014 Wolff Award Paper

The Relation Between Migraine, Typical Migraine Aura and “Visual Snow”

Christoph J. Schankin, MD; Farooq H. Maniyar, MD; Till Sprenger, MD; Denise E. Chou, MD;
Michael Eller, MD; Peter J. Goadsby, MD, PhD

Objective.—To assess the relationship between the phenotype of the “visual snow” syndrome, comorbid migraine, and typical migraine aura on a clinical basis and using functional brain imaging.



What does this have to do with tinnitus?

Associated Visual Snow Symptoms

Symptom	Study 1	Study 2
Palinopsia (Afterimages)	86%	84%
Floaters	81%	58%
Blue-field Entoptic Phenomena	79%	76%
Photophobia	74%	72%
Nyctalopia	68%	63%
Spontaneous Photopsia	63%	53%
Tinnitus	62%	64%



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Clinical Study

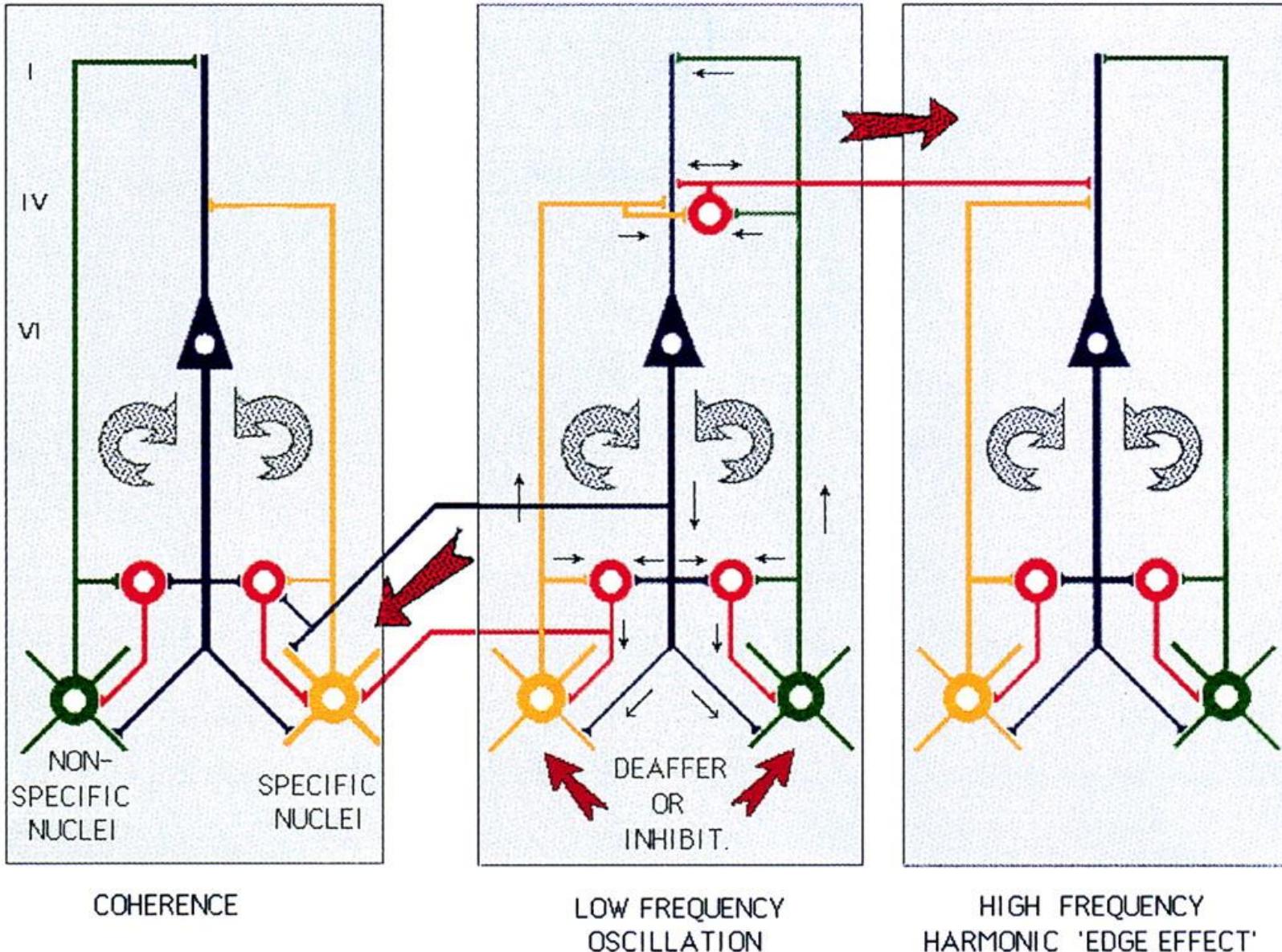
Visual snow: A thalamocortical dysrhythmia of the visual pathway?

Jenny L. Lauschke ^{a,b}, Gordon T. Plant ^c, Clare L. Fraser ^{a,*}

^a Save Sight Institute, University of Sydney, 8 Macquarie Street, Sydney, NSW 2000, Australia

^b Department of Ophthalmology, Prince of Wales Hospital, High Street, Randwick, NSW, Australia

^c Department of Neuro-Ophthalmology, Moorfields Eye Hospital, London, United Kingdom



Thalamocortical dysrhythmia: A neurological and neuropsychiatric syndrome characterized by magnetoencephalography

Rodolfo R. Llinás^{*†}, Urs Ribary^{*}, Daniel Jeanmonod[‡], Eugene Kronberg^{*}, and Partha P. Mitra[§]

^{*}Department of Physiology and Neuroscience, New York University School of Medicine, 550 First Avenue, New York, NY 10016; [‡]Universitätsspital Zurich, Neurochirurgische Klinik, Sternwartstrasse 6, CH-8091 Zurich, Switzerland; and [§]Bell Laboratories, Lucent Technologies, 600 Mountain Avenue, Murray Hill, NJ 07974

Contributed by Rodolfo R. Llinás, October 21, 1999

Spontaneous magnetoencephalographic activity was recorded in awake, healthy human controls and in patients suffering from neurogenic pain, tinnitus, Parkinson's disease, or depression. Compared with controls, patients showed increased low-frequency θ rhythmicity, in conjunction with a widespread and marked increase of coherence among high- and low-frequency oscillations. These data indicate the presence of a thalamocortical dysrhythmia, which we propose is responsible for all the above mentioned conditions. This coherent θ activity, the result of a resonant interaction between thalamus and cortex, is due to the generation of low-threshold calcium spike bursts by thalamic cells. The presence of

Patients were carefully selected by using standard neurological/psychiatric diagnostic procedures.

Magnetoencephalography (MEG) Recordings and Analysis. Magnetic recordings were obtained at our laboratory with a whole-head, 148-channel MEG system Magnes 2500 WH (Biomagnetic Technologies, San Diego). During the recording sessions, the subject was placed on a bed with the MEG recording port (Fig. 1A) surrounding the subject's head to record the magnetic fields from different angles over the head surface. Spontaneous brain activity was continuously recorded for 10 min while the subject

Thalamocortical dysrhythmia: a theoretical update in tinnitus

Dirk De Ridder^{1}, Sven Vanneste², Berthold Langguth³ and Rodolfo Llinas⁴*

¹BRAfN, Section of Neurosurgery, Department of Surgical Sciences, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand, ²School of Behavioral and Brain Sciences, University of Texas at Dallas, Richardson, TX, USA,

³Department of Psychiatry and Psychotherapy, University of Regensburg, Regensburg, Germany, ⁴Department of Neuroscience and Physiology, New York University School of Medicine, New York, NY, USA

Tinnitus is the perception of a sound in the absence of a corresponding external sound source. Pathophysiological it has been attributed to bottom-up deafferentation and/or top-down noise-cancelling deficit. Both mechanisms are proposed to alter auditory thalamocortical signal transmission, resulting in thalamocortical dysrhythmia (TCD). In deafferentation, TCD is characterized by a slowing down of resting state alpha to theta activity associated with an increase in surrounding gamma activity, resulting in persisting cross-frequency coupling between theta and gamma activity. Theta burst-firing increases network synchrony and recruitment, a mechanism, which might enable long-range synchrony, which in turn could represent a means for finding the missing thalamocortical information and for gaining access to consciousness. Theta oscillations could function as a carrier wave to integrate the tinnitus-related focal auditory gamma activity in a consciousness enabling network, as

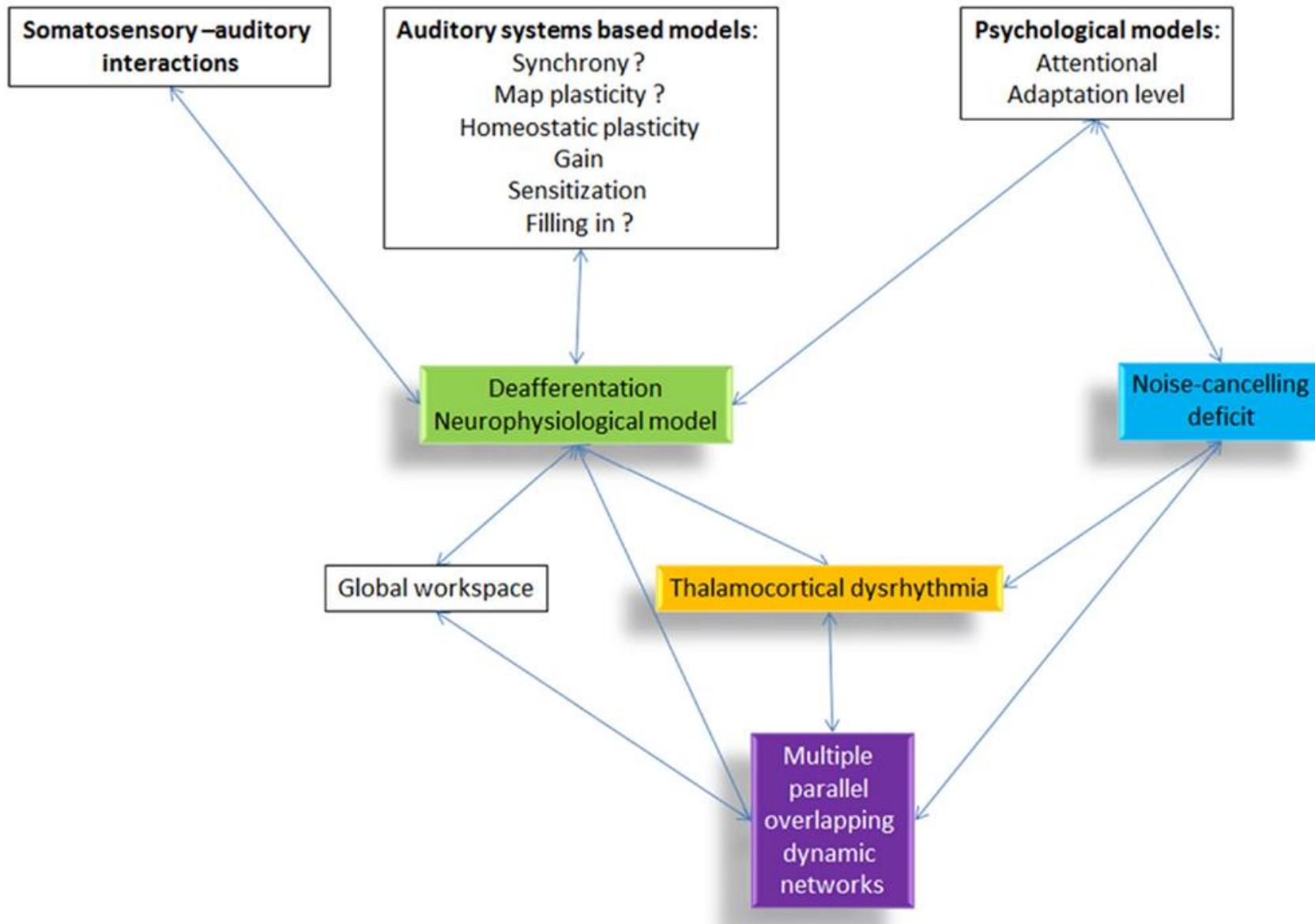
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Université de Provence, France

Reviewed by:

Martin Meyer,
University of Zurich, Switzerland
Peyman Adjamian,
MRC Institute of Hearing Research,







Symptom Aggravators

- Stress
- Lack of sleep
- Cold/flu
- Alcohol
- Caffeine
- Too much sodium
- Too much sugar

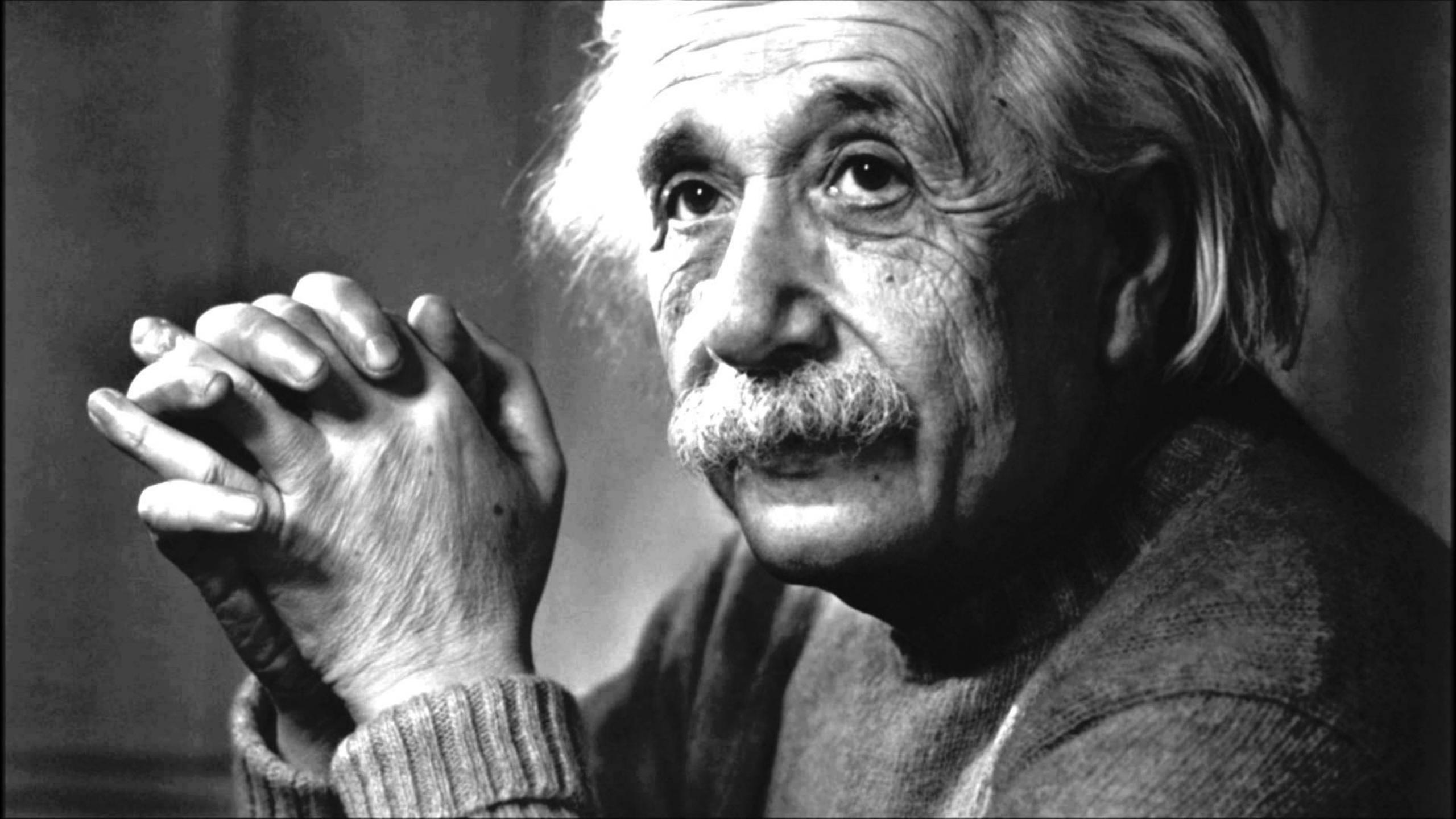


SAMUEL
ADAMS

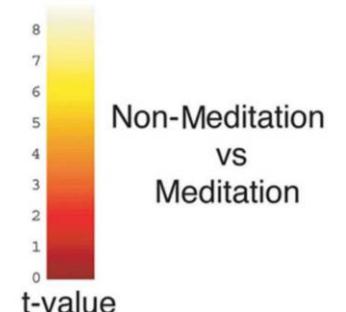
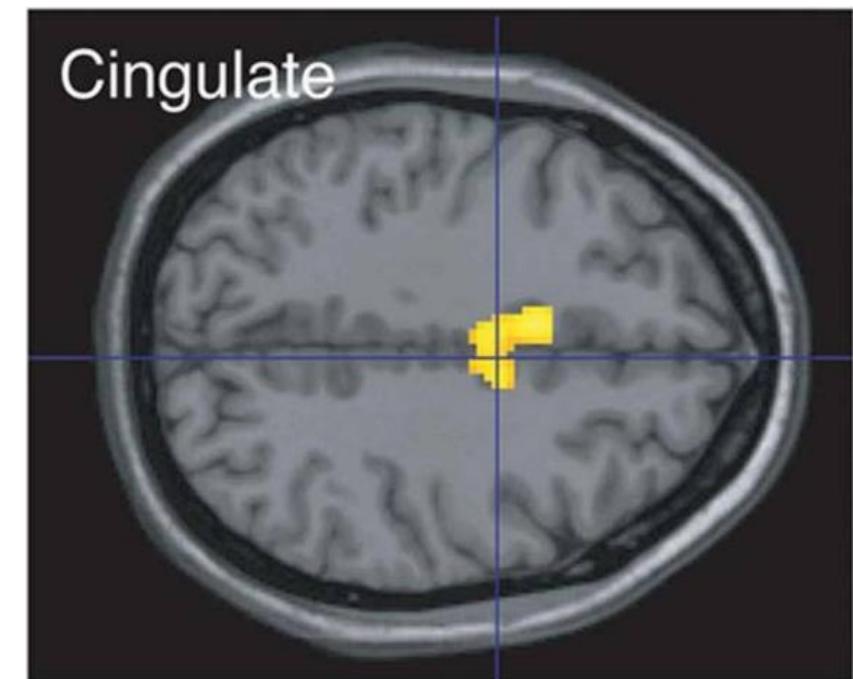
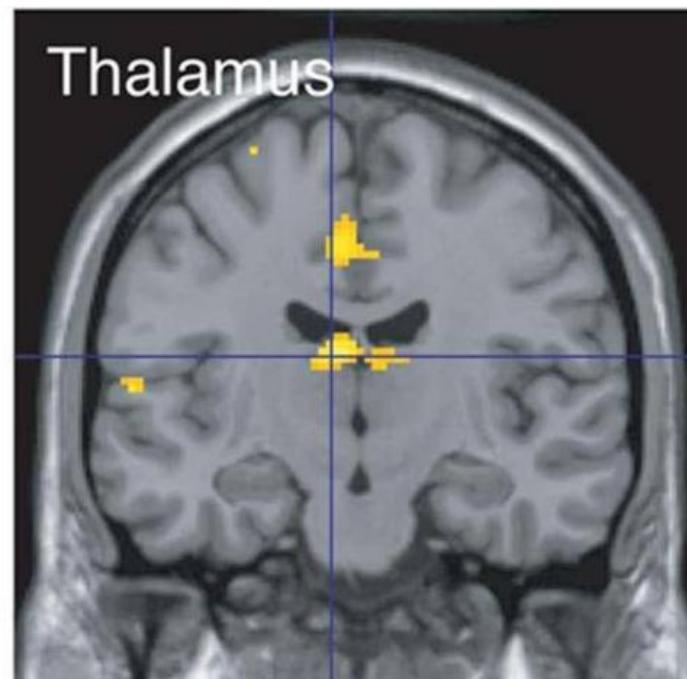
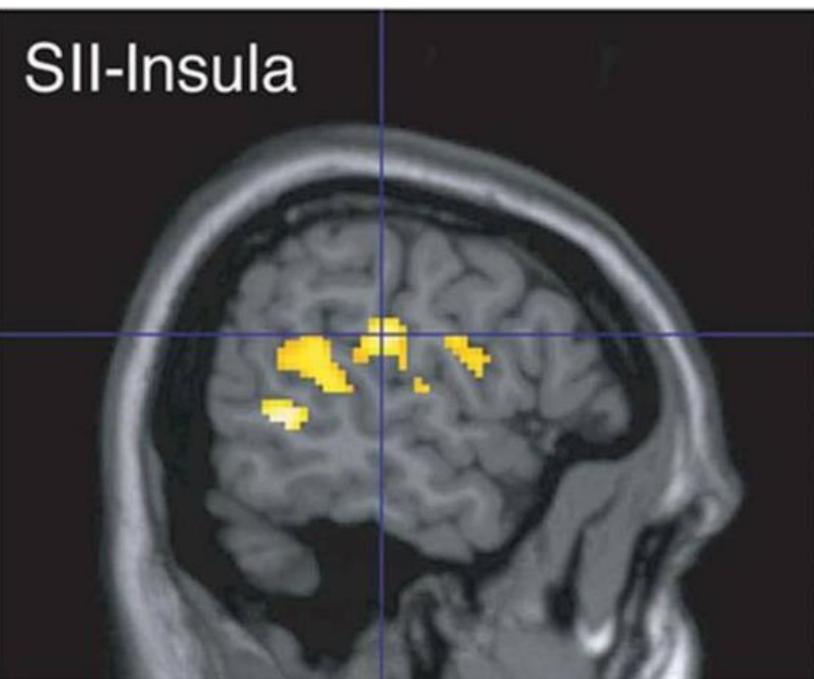


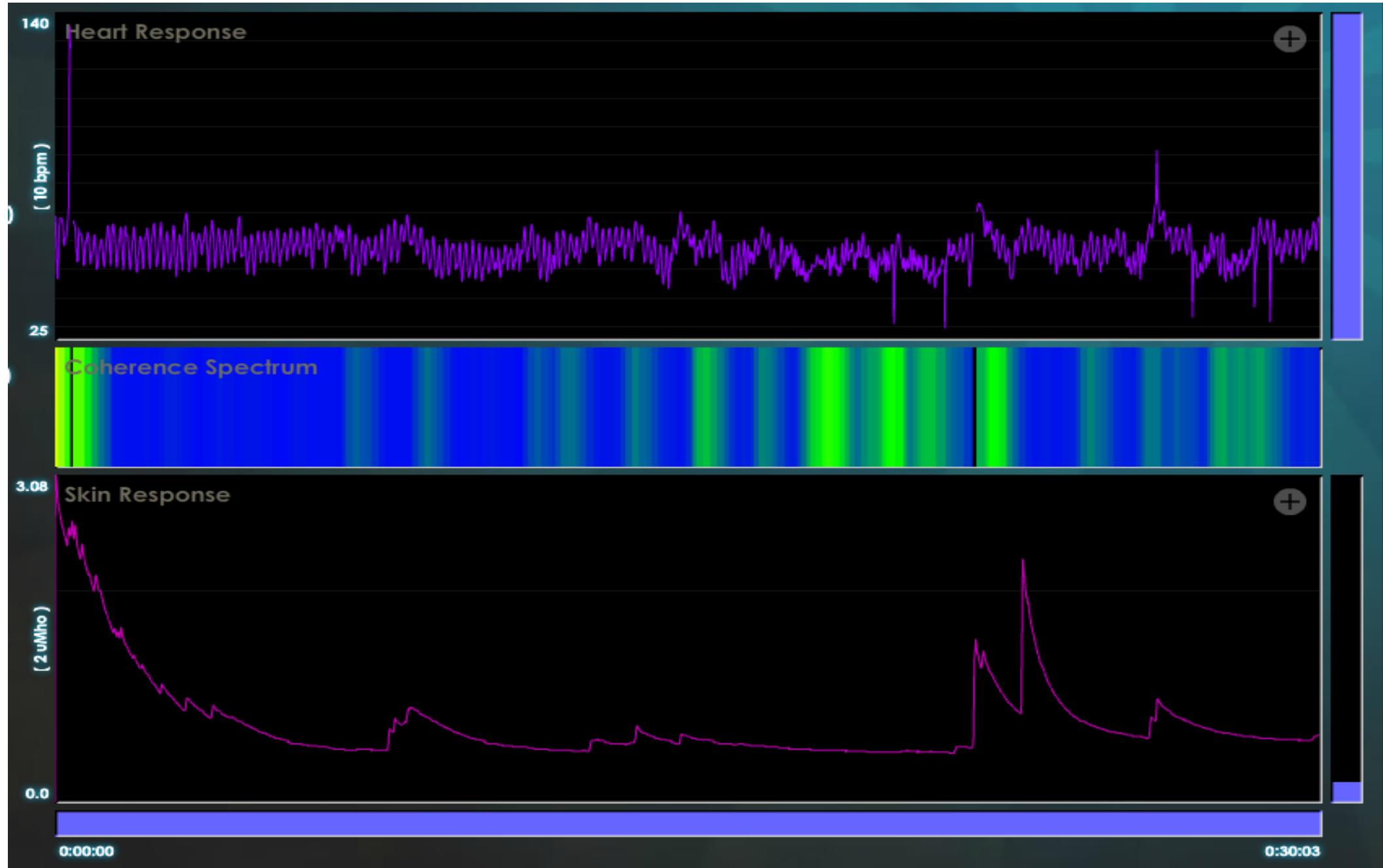




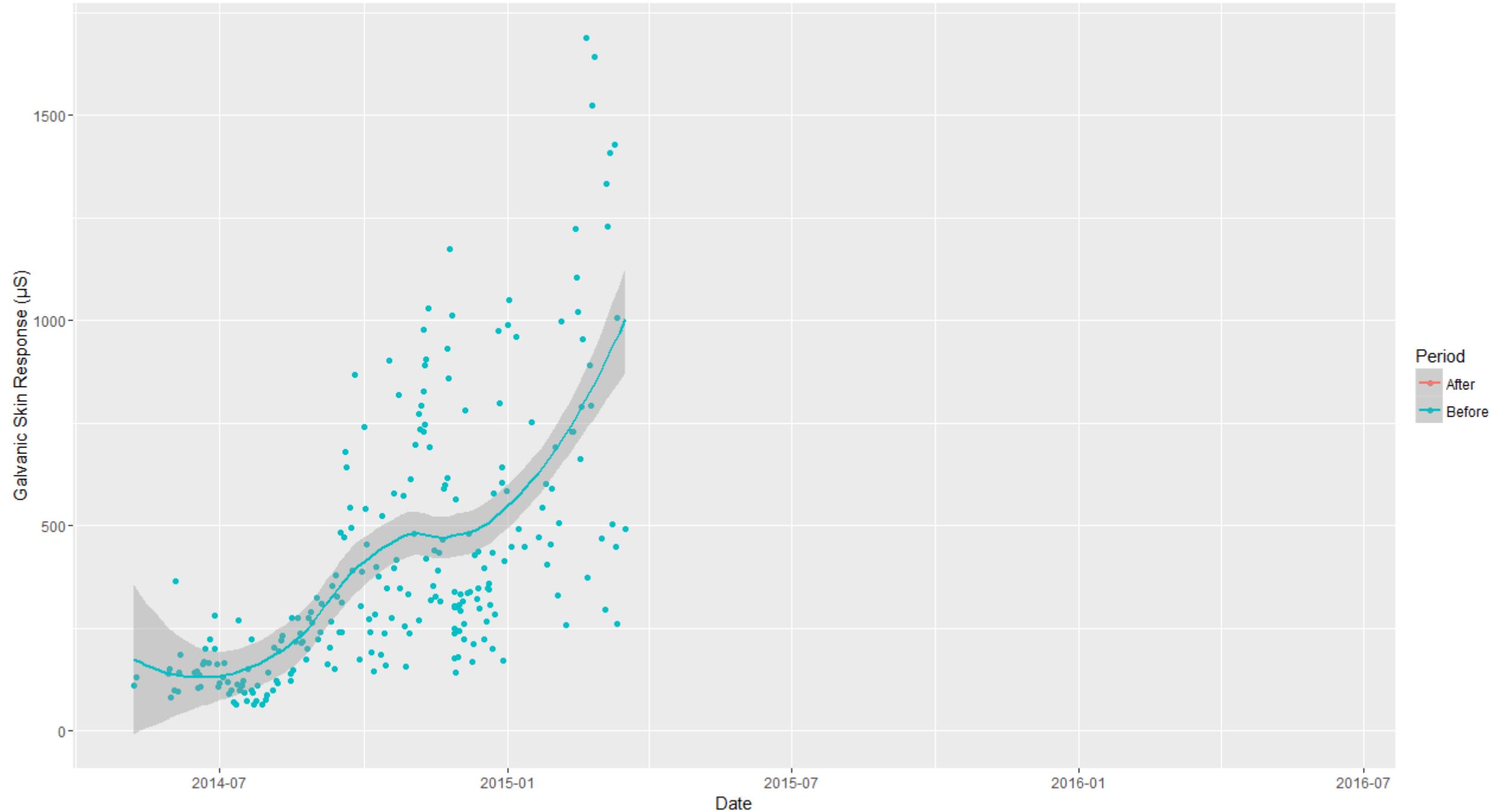


Meditation reduces pain-related neural activity in the anterior cingulate cortex, insula, secondary somatosensory cortex, and thalamus

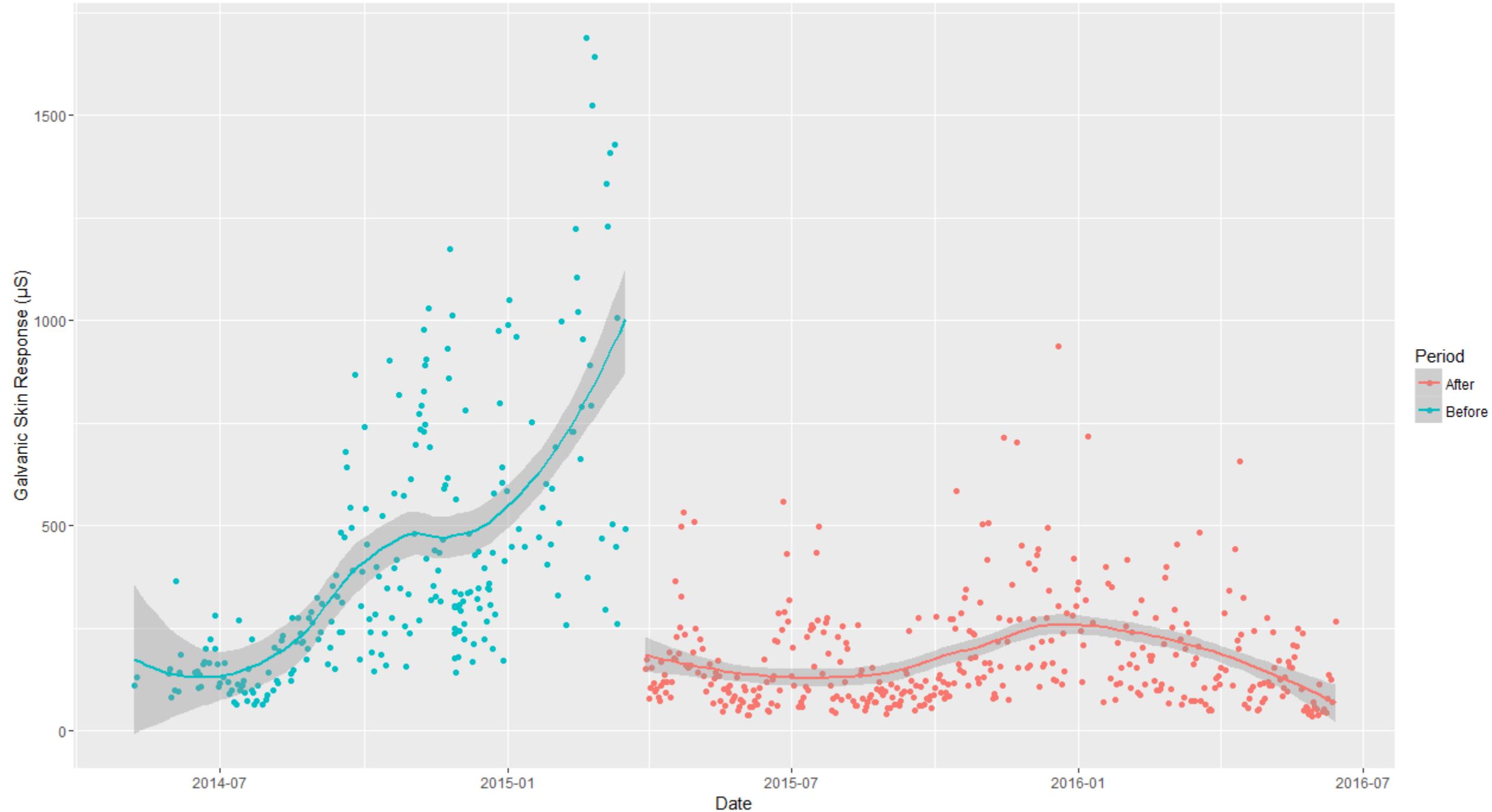


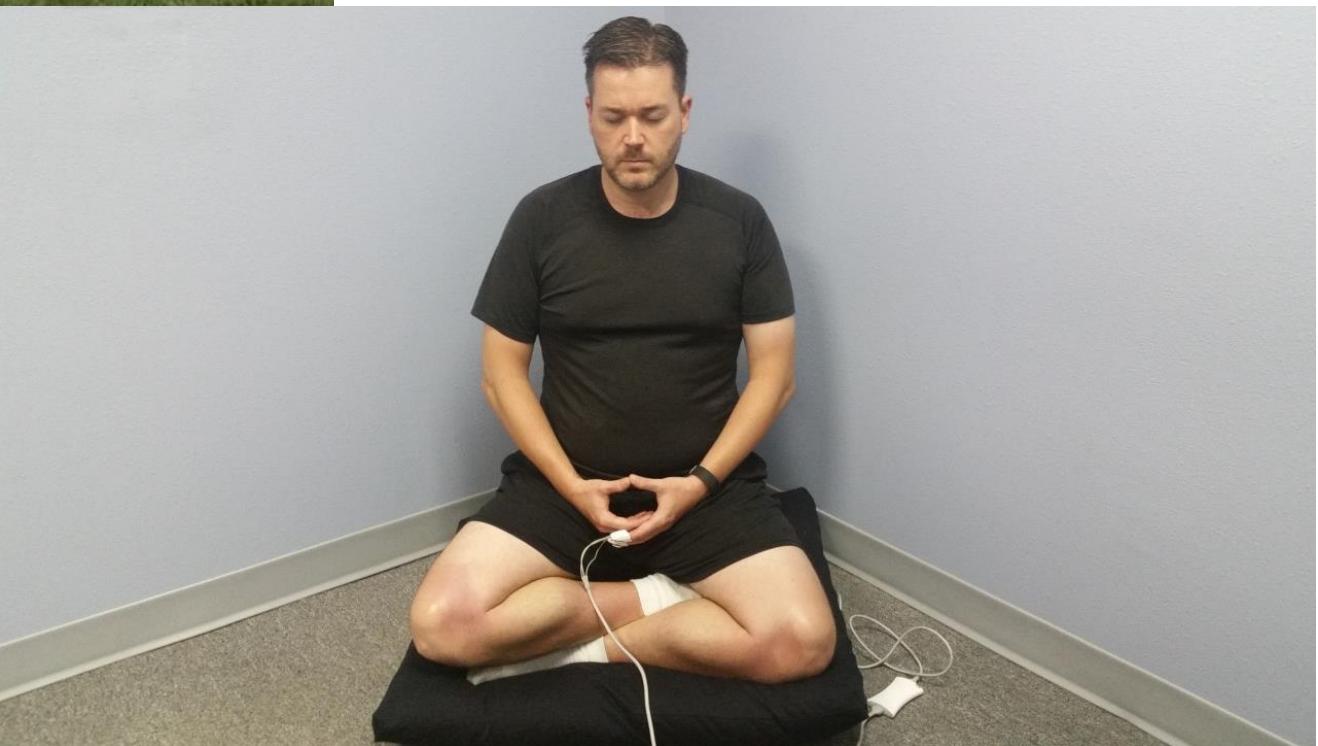


Average GSR Before and After Meditation Retreat



Average GSR Before and After Meditation Retreat





Current Research

Visual Snow – a disorder distinct from persistent migraine aura
<http://brain.oxfordjournals.org/content/137/5/1419.long>

The Relationship Between Migraine, Typical Migraine Aura and Visual Snow
<http://brain.oxfordjournals.org/content/137/5/1419.long>

Visual snow: A thalamocortical dysrhythmia of the visual pathway?
[http://www.jocn-journal.com/article/S0967-5868\(15\)00653-0/fulltext](http://www.jocn-journal.com/article/S0967-5868(15)00653-0/fulltext)

Current Research

Thalamocortical dysrhythmia: A neurological and neuropsychiatric syndrome characterized by magnetoencephalography

<http://www.pnas.org/content/96/26/15222>

Thalamocortical dysrhythmia: a theoretical update in tinnitus

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4460809/>

Future Research

- Third study completed
- Fourth study in the works
- Research is crowd funded

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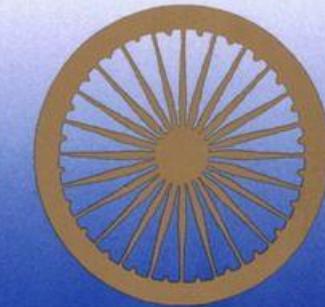


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Conclusion

- 1.
- 2.
- 3.

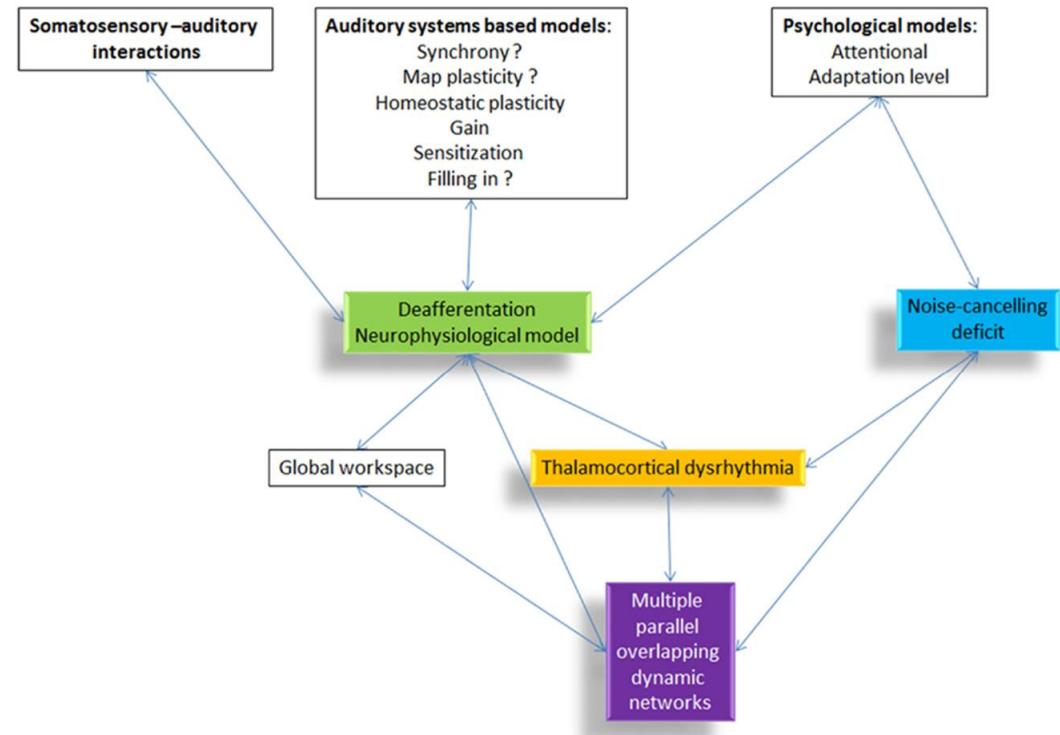
Conclusion

1. Tinnitus is associated with VSS
- 2.
- 3.

Symptom	Study 1	Study 2
Palinopsia (Afterimages)	86%	84%
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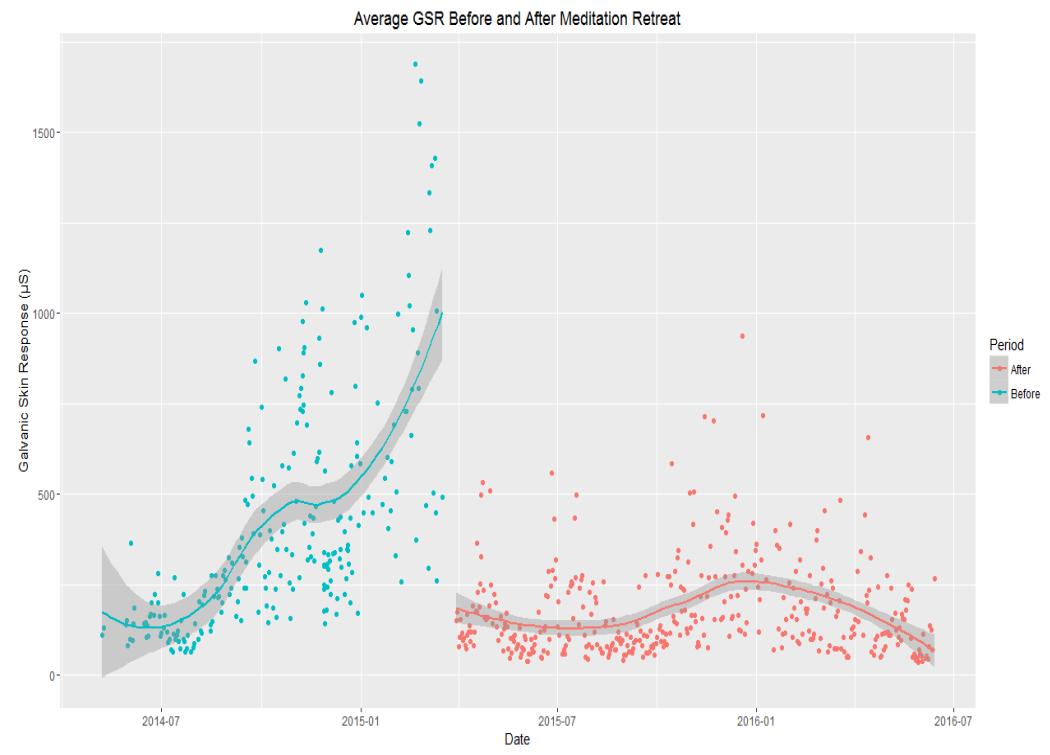
Conclusion

1. Tinnitus is associated with VSS
2. VSS provides insight into tinnitus
- 3.



Conclusion

1. Tinnitus is associated with VSS
2. VSS provides insight into tinnitus
3. Symptoms can be managed



It is possible to be in physical, mental or emotional pain, but to not be suffering from it.

Suffering is how we respond to pain.

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Thank You! :)