

From: MARK TRAMO <[REDACTED]>

To: Dan Wilson <[REDACTED]>

Bcc: jeevacation@gmail.com

Subject: Re: Re Soho House and Dan participating in UCLA course (one afternoon in May)

Date: Thu, 18 Jan 2018 06:24:53 +0000

Thx for your email, Dan -

Yes the exchange of ideas was so rapid-fire and exhilarating! Very cool. Like Harvard Yard at Soho House...I'm VERY appreciative to have a grammy-winning lyricist's thoughts on the book title...your affirmation of the neologism/clang association phenomenon links creativity during songwriting with the vocal output of people in the throes of acute, severe mania and hebephrenic schizophrenia. The psychiatrists have come up with those terms and "flight of ideas" to describe the behavior...maybe someday we can play "Neo Clang" together - I intentionally left the lyrics unfinished so as to invite clanging and neologisms with each iteration (though interestingly some words and quasi-meaningful phrases tend to stick unintentionally!)

re your question: Where is this cellular filtering structure? In the inner ear? Or in the brain itself?

- Both: it starts in the inner ear, in the organ of Corti (no pun intended). Imagine a guitar string that varies in mass/thickness/elasticity along a graded continuum from one end to the other. A sine tone that is low in frequency will cause the thick part of the string to vibrate more (ie, at a higher amplitude) than the thin part of the string. The opposite is true for high-frequency tones. So the frequency of the tone is represented in the "place" of maximal string vibration. The basilar membrane in the organ of Corti has these properties. (Much of this research was done on human cadavers at our alma mater by Georg Bekeasy in the late 1940s/early 50s.) So the initial filtering (or "tuning") is mechanical! There are neurons sitting on top of the basilar membrane. The neuron that sits on top of place X will be excited by frequencies that maximally displace the basilar membrane at place X. This is called "place coding": now what the frequency is is represented by where the neural activity is happening. Then the frequency info is carried along from station to station: organ of Corti/hair cell in inner ear -> spiral ganglion cell in temporal bone of skull -> brain. The brain stations from bottom to top are: cochlear nucleus -> superior olivary complex -> nuclei of the lateral lemniscus -> inferior colliculus -> medial geniculate complex -> primary auditory cortex -> auditory association cortex -> and on to many areas in and "below" the cortex. What happens at each station is a major topic in auditory neuroscience research. I recorded signals from single neurons and small groups of neurons in primary auditory cortex and from the axons that connect spiral ganglion cells to the brain. The stimuli were pure tones, selected musical (harmonic) intervals, and species-specific vocalizations.

re: MP3 compression - there tend to be more neurons carrying frequency information in the middle of our audible range than at the extremes, but no information is lost the way it is in compression - there is loss of some high-frequency information due to "down-sampling" for the sake of file size.

Hoping you can make the class as guest professor! It's comprised of about 20 undergrads, a mix of neuroscience, psychology, and music students. During the first hour, students present mind-brain experiments to us on improvisation and creativity that are published in professional neuroscience journal; you as guest professor critique the methods of how scientists study creativity. Can neuroscientists study creativity or is it beyond the reach of our methods? Are the experiments testing anything close to what you actually do when you create a song? Are the authors making false assumptions about creativity? Does the necessary reductionism render the expt meaningless? The second hour is a Q&A with students, wherein you describe the process you go through - just like your talk at our Arts & Neuroscience "show" at UCLA.

Cheers,
Mark

On Fri, Jan 12, 2018 at 10:28 AM, Dan Wilson <[REDACTED]> wrote:

Hey Mark, that was fun and informative. I reached my "mental limit" just when things got the nerdiest! But it was super cool to hear about the cellular filters and also to discuss both how music is created (and reproduced) and processed in the brain.

I told my friend about the processing of the filters (if less than 1/3 of an octave, signal is sent as the difference and the average of the two signals) and he said two things:

1. it's compression, like an mp3!

2. does the brain then “uncompress” the two processed waves by doing the math backwards (centering the difference of the frequencies on the average frequency sent and re-constituting the two original frequencies?)

my third question:

3. Where is this cellular filtering structure? In the inner ear? Or in the brain itself?

Yikes!

The book is going to be really great.

Now I'm going to be spinning my wheels on your book title.

I do really like “The Music Instinct.”

The Music Animal

(Auditory Peacock Feathers and Pattern-recognition Cheesecake in the Human Brain)

(just fooling around with that one)

Music and Mind

Music in the Brain

Why We Love Music

Why We Make Music

How the Brain Processes Music

You'll figure it out, I'm just having fun.

I'll look at the dates and syllabus for the Intelligence, Talent & Creativity course.

Peace

Dan

On Jan 11, 2018, at 11:55 AM, MARK TRAMO <[REDACTED]> wrote:

Dear Dan,

Had a great time last night! Thanks for your thoughts and comments on "auditory cheesecake" and my book ideas and, of course, for sharing your insights as one of the world's creative geniuses.

I've attached a syllabus from my Music, Mind & Brain course last Spring - hoping you might be willing to guest professor the Intelligence, Talent & Creativity this coming May.

Best wishes for your daughter - if there's ever a way I could help, please let me know.

All the best for the New Year.

Mark

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Mark Jude Tramo, MD PhD
Dept of Neurology, David Geffen School of Medicine at UCLA
Dept of Musicology, UCLA Herb Alpert School of Music
Director, The Institute for Music & Brain Science
Co-Director, University of California Multi-Campus Music Research Initiative (UC MERCI)



<http://www.BrainMusic.org>
<http://merci.ucsd.edu>
<DrTramo.MusicMindAndBrain.Syllabus20170409a.pdf>

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Mark Jude Tramo, MD PhD
Dept of Neurology, David Geffen School of Medicine at UCLA
Dept of Musicology, UCLA Herb Alpert School of Music
Director, The Institute for Music & Brain Science
Co-Director, University of California Multi-Campus Music Research Initiative (UC MERCI)



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