

**From:** Ben Goertzel <[REDACTED]>

**To:** "jeffrey E." <jeevacation@gmail.com>

**Subject:** Re: MUSIC and MIND ... Fwd: quick question -- AGI-16 snacks and reception sponsorship?

**Date:** Mon, 11 Jul 2016 13:55:23 +0000

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Formulating the norm is exactly what music theory is about, right?  
But the tricky thing is knowing which deviations from the norm are  
going to sound awesome and which are going to sound like screw-ups....

You know Schmidhuber's theory of beauty as increase in compressibility?

[REDACTED]

[REDACTED]

It's not quite right but it's insightful ... a deviation from the norm  
that sounds awesome usually is one that causes some meaningful but  
not-wholly-expected pattern to come about ... i.e. an increase in  
compressibility ...

Actually I think an **\*\*increase in the number of compressing patterns\*\***  
is perhaps more important than an increase in compressibility.

"Surprising fulfillment of expectations" means:

-- the previous expectation is fulfilled, i.e the previous compressing  
pattern continues

-- a new, surprising factor is found ... but probably one that also  
leads to a new pattern in the overall perceived music, hence a  
new/different compressing pattern

So surprising fulfillment of expectations is one route to get to  
"increase in the number of compressing patterns" ...

But music theory constrains the set of ways that one can get increase  
in the number of compressing patterns, without getting too complex  
(within the context of the 12-note scale... but if one used other  
scales one would find similar mathematical structures) ...

...

About your other question: So far the recurrent neural nets,  
convolutional neural nets etc. that have been used for language  
generation based on corpus-based-training, tend to generate gibberish  
that looks OK in the short run but nonsensical in the medium run.  
I.e. plausible looking phrases but meaningless/fucked-up long  
sentences or paragraphs...

A game like Go or Atari games is quite different from natural language

because it's a closed system, so the scope of patterns that can occur is much more limited than in the case of anything involved with real human life... In the case of stuff that's real-human-life-related, it's hard to hide from the need to understand particulars in a general context ... but in a game the context is always the game, which simplifies things a lot (unless the game were as complicated as the real world, but that's never the case in 2016 ...).

I can explain to you my specific plan for solving the "sensible, context-appropriate language generation" problem in an OpenCog context sometime if you're curious...

part 1 is here

[REDACTED]

and part 2 is here

[REDACTED]

... but those documents are kind of insular, they're hard to understand without a rich knowledge of how OpenCog NLP system currently works... we can discuss F2F or on Skype sometime perhaps...

-- Ben

On Mon, Jul 11, 2016 at 9:37 PM, jeffrey E. <jeevacation@gmail.com> wrote:

> surprise is the the breaking of the expectation. . first we have to  
> formularize the norm. why can a an adult immediatly here an obvious "  
> wrong note " in a mozart piece of thousands of notes. ? it is a spike on  
> the sphere .? . why are certain harmonics pleasing. i think it might  
> take a lower energy to deconstruct into their fundamentals? dissocnace  
> takes so much energy like a key on glass scratch that it elicits physical  
> signs of pain. noam thinks that the ability to recognize might be an  
> integral part of development, ie not merely learned. .  
>  
> can either deep mind , alpha go or any system like the ones set to play  
> video games on their own, be fed english language speakers and then be  
> able to construct simple sentences.? a deliverable that i have been  
> asking you guys for , for years now. is learning the video game  
> different ? thanks

>  
> On Mon, Jul 11, 2016 at 9:30 AM, Ben Goertzel <[REDACTED]> wrote:

>>  
>> Sure... Meyer's "surprising fulfillment of expectations" is all about  
>> time, right? But among the several questions is raises are

>>  
>> -- what kinds of expectations are elicited?

>>  
>> -- what constitutes surprise and why?

>>  
>> The music theory elaborated in those papers explains what kinds of  
>> expectations tend to be elicited in music ... which then conditions

>> what will be perceived as surprising and what will not...

>>

>> E.g. if a melodic line is operating with a certain scale for a while,  
>> there will be an expectation that the next note is within that same  
>> scale.... If the next note is not within that scale, but rather what  
>> happens is a chord that gives rise to a note in the original scale as  
>> a higher harmonic, then one may have a surprising fulfillment of  
>> expectations of a mathematically explicable sort. But it may be that  
>> playing this latter chord a little bit LATER than the beat that would  
>> be expected via assumption of periodicity, gives the whole thing a bit  
>> more oomph -- in this case one is fulfilling the expectation in a  
>> temporally slightly surprising way ... but there's also the "joke" of  
>> leaving the listener waiting a bit to see if the scale will be  
>> continued or not, and then after the wait fulfilling it in a way that  
>> is both more (more notes) and less (the expected scale is only there  
>> in a higher harmonic) than expected.... There is a physiological  
>> metaphor to how the "heart misses a beat" sometime... and an emotional  
>> resonance with the feeling of waiting with bated breath to see what  
>> will happen, and then finally something happens and it's richer than  
>> expected so a bit overwhelming...

>>

>> That's a trivial example but it illustrates how the timing and the  
>> static-music-theory and the emotion and body-references all play  
>> together in the context of surprising fulfillment of expectations...

>>

>>

>>

>>

>>

>> On Mon, Jul 11, 2016 at 8:41 PM, jeffrey E. <jeevacation@gmail.com> wrote:

>> > i think of it like points in space . the rythms are the distance

>> > between

>> > the points. and the melody is the projection on a plane. . music

>> > needs

>> > recapitulation . unless indian, your papers are more like work on

>> > soap

>> > bubbles . shapes , but little timing.

>> >

>> > On Sun, Jul 10, 2016 at 10:56 PM, Ben Goertzel <[REDACTED]> wrote:

>> >>

>> >> I agree that rhythm is important but the actual sequence (and

>> >> concurrent arrangement) of notes is important too... those papers

>> >> certainly don't tell the whole story but I think they tell part of the

>> >> story...

>> >>

>> >> I experimented a lot in the 90s with: taking series of notes evolved

>> >> by a GA (well the GA evolved the coefficients of a fractal-generating

>> >> iterated function system), and then playing the same evolved

>> >> note-series with different timings. I.e., I made up various timing

>> >> rules, and I also played the notes with timings that I made up myself.

>> >> Definitely it's true that the timing is critical, and the same

>> >> series of notes with different timing will sound totally different and

>> >> have a different feeling...

>> >>

>>> However, nevertheless, the mathematical structures noted in those  
>>> papers are important...  
>>>  
>>> How timing interacts with these mathematical structures is one of many  
>>> open questions, right?  
>>>  
>>> Put crudely, I think the algebra (as hinted in those papers) of a  
>>> series of notes identifies **\*\*what patterns are there\*\*** to be easily  
>>> recognized in the series of notes. But there are always gonna be too  
>>> many patterns there. The timing puts boundaries around some patterns  
>>> and not others, thus narrowing down the scope of possible patterns in  
>>> the note-series, and identifying some rather than others.... And the  
>>> timing also is what resonates with the dynamics of human emotions and  
>>> human body-rhythms ...  
>>>  
>>> so the subtlety of timing in music is partly that it has to serve  
>>> multiple functions  
>>>  
>>> -- emphasizing certain ones, among the many patterns implicit  
>>> mathematically in a series of notes  
>>>  
>>> -- resonating with human emotion and body rhythms  
>>>  
>>> ... ben  
>>>  
>>>  
>>>  
>>>  
>>> On Mon, Jul 11, 2016 at 10:40 AM, jeffrey E. <jeevacation@gmail.com>  
>>> wrote:  
>>> > third paper same problem, bach was to have said playing piano is  
>>> > easy  
>>> > just push the right note at the right TIME . one without the  
>>> > other ,  
>>> > is  
>>> > meaningless. imagine a minute wait between any of the group theory  
>>> > relevant notes. it would not be music  
>>> >  
>>> > On Sun, Jul 10, 2016 at 10:26 PM, Ben Goertzel <[REDACTED]>  
>>> > wrote:  
>>> >>  
>>> >> Just re-sending with a more appropriate subject line...  
>>> >>  
>>> >> \*\*\*\*  
>>> >>  
>>> >> Hmmm...  
>>> >>  
>>> >> I have been thinking a lot about music too, but from a different  
>>> >> perspective...  
>>> >>  
>>> >> Do you know this paper on Combinatorial Music Theory?  
>>> >>  
>>> >> paper:  
>>> >> [REDACTED]

>>>>

>>>> video:

>>>> [REDACTED]

>>>>

>>>> It's extremely good, it clarifies some basics of music theory in a  
>>>> mathematical way without the confusing archaic terminology of  
>>>> standard

>>>> music theory... and suggests various interesting new directions...

>>>>

>>>> This paper is also related and somewhat worthwhile

>>>>

>>>> [REDACTED]

>>>>

>>>> though neither as easy-to-read nor as interesting...

>>>>

>>>> What these papers are getting at are the hidden abstract-algebraic  
>>>> and

>>>> information-theoretic structures underlying melody and harmony...

>>>>

>>>> What you're talking about regarding symphonies is sort of like

>>>> "narrative structure" in stories it seems like -- or "discourse

>>>> planning" in dialogue -- i.e. it's higher-level

>>>>

>>>> That level is important, for sure. But what the papers I've linked  
>>>> above are getting at is a bit lower-level --- more analogous to the  
>>>> syntax and phrase/sentence level semantics of language, I would say.

>>>> The algebra and information theory of melody and harmony have to

>>>> work

>>>> out at the level of individual chords and melodic passages, for the

>>>> higher-level development of a symphony or other complex work to make

>>>> sense...

>>>>

>>>> About

>>>>

>>>> > I mashed all of the four symphonies together ,

>>>> > playing recordings of the 3rd 5th 6th 7th all overlaid on

>>>> > each

>>>> > other,

>>>>

>>>> I have done stuff like that before, but not with classical music...

>>>> with my own recordings ;) .... Do you have a sound file of your

>>>> experiment? I'd be curious to hear...

>>>>

>>>> Interestingly, the "plumbing" work we've been doing to connect

>>>> OpenCog

>>>> to the Hanson robots would also enable us to use OpenCog for music

>>>> composition / improvisation experimentation ... (i.e. we've been

>>>> dealing with real-time input and output, which we hadn't been doing

>>>> before)

>>>>

>>>> But at the moment (this opinion is of course subject to revision) I

>>>> somewhat feel that the basic problem of "what makes a melody

>>>> /harmony

>>>> / rhythm pattern sound emotionally and cognitively appealing" has to

>>>> be solved before one moves on to issues of symphonic structure....  
>>>> I.e., we probably gotta solve folk music before we can solve  
>>>> Beethoven  
>>>> or Bartok ...

>>>> Meyer's old theory of "surprising fulfillment of expectations"

>>>>

>>>>

>>>>

>>>>

>>>>

>>>>

>>>> is basically correct IMO (if you don't know that book check it out,

>>>> you'll love his classical music examples) ... but the subtle point

>>>> is

>>>> that the expectations and the surprise we experience are a subtle

>>>> mix

>>>> of

>>>>

>>>> -- basic mathematical music-structure factors, as in the vein of the

>>>> two papers I linked above

>>>>

>>>> -- human psychology factors as modeled e.g. in Joscha's work and in

>>>> the Component Process Model (

>>>>

>>>>

>>>>

>>>>

>>>> which we have introduced into the OpenCog / Hanson Robot codebase to

>>>> fill in certain gaps in Psi

>>>>

>>>> -- human body-rhythm patterns, to do with the way the rhythms of

>>>> different subsystems of our physical bodies overlay on each other,

>>>> which we perceive all the time sub and semi consciously and which

>>>> influence our perception of music; obviously even classical music

>>>> without a drumbeat is highly rhythmic...

>>>>

>>>> -- more abstract cognitive pattern recognition

>>>>

>>>> So a good melody packs up "surprising fulfillment of expectations"

>>>> where the expectation and fulfillment are assessed according to a

>>>> combination of the above 4 factors ... and if you leave any of the

>>>> above 4 factors out you're going to get lots of "false positives"

>>>> ...

>>>>

>>>> All of the above factors are there in Chinese, African etc. music as

>>>> well as Western music, but manifested in different ways...

>>>>

>>>> I can pretty clearly see how to seriously investigate the above but

>>>> I

>>>> can't at the moment see a "quick and dirty" way to make huge

>>>> progress

>>>> quickly ... while seemingly simple, the question of "what makes a  
>>>> melody appealing" actually wraps up a lot of issues ... BODY,  
>>>> EMOTION, COGNITION ... plus MATH-OF-MUSIC ...

>>>>

>>>> Fascinating stuff though ;)

>>>>

>>>> If you want to design a research programme in this direction I'd be  
>>>> game to participate; I don't want to drop my other OpenCog R&D  
>>>> obviously but music just fascinates me at a heart as well as head  
>>>> level, so I'd be willing to put some time into this in parallel with  
>>>> making the Hanson robots work... I do have a feeling that to really  
>>>> crack the problem of what makes a melody sound good, one has to  
>>>> crack

>>>> the problem of how feeling and body and cognition work together,  
>>>> which

>>>> is a key problem for AGI generally speaking...

>>>>

>>>> -- Ben

>>>>

>>>> P. S.

>>>> Of course, complex development of themes and counter and sub themes  
>>>> and so forth is not exclusive to Western classical music.... For  
>>>> instance this 30 minute instrumental-rock song composed by  
>>>> Buckethead

>>>> in memoriam for his mother has incredible subtlety of development

>>>>

>>>>

>>>>

>>>> ... so many themes introduced in the first half and then complexly,  
>>>> genetically crossed over and synergized in the second half.. It is  
>>>> my

>>>> firm conviction that Buckethead will be remembered as the Beethoven  
>>>> of

>>>> the early 21st century ;) ...

>>>>

>>>> For me the ultimate is Prometheus, by Scriabin, though...

>>>>

>>>>

>>>>

>>>> do you know it? Wow.... This is cognitive and emotional  
>>>> development

>>>> beyond the ordinary human level, such as only a true genius madman  
>>>> could produce. I had an amazing mental experience in San Francisco  
>>>> in 2012 listening to Prometheus 10 times in succession ... try it  
>>>> sometime...

>>>>

>>>>

>>>>

>>>> On Mon, Jul 11, 2016 at 9:39 AM, jeffrey E. <jeevacation@gmail.com>  
>>>> wrote:

>>>> > looking for AI and music. . a melody is a strange object, it

>>>> > is

>>>> > an

>>>> > inter

>>>>> as well as intra relation with notes and time. . there are  
>>>>> inherent  
>>>>> harmonies. and dissonance. . what i wrote to chonsky this  
>>>>> moring  
>>>>>  
>>>>> today I conducted an experiment encouraged by Noam's wholly  
>>>>> justified  
>>>>> aggressive and detailed directives to joscha. . joshcha focused  
>>>>> on  
>>>>> layers  
>>>>> being developed in the brain . the timing for the development of  
>>>>> each  
>>>>> layer  
>>>>> being different per species .  
>>>>> I postulate that music might be a frosted window into that  
>>>>> structure.  
>>>>> symphonies begin with their first " layer " a theme. in fact ,  
>>>>> there  
>>>>> might be more than one theme in the first layer , , the second  
>>>>> part  
>>>>> of  
>>>>> symphonic form is the complex development stage. where those  
>>>>> themes  
>>>>> are inverted, deconstructed , reconstructed etc ,and the  
>>>>> development  
>>>>> stage  
>>>>> takes the most time . in the conclusion of the symphonic form  
>>>>> the  
>>>>> recapitulation of all that has come before it forms a " phenenoma  
>>>>> of  
>>>>> the  
>>>>> piece " a whole ,made up of its smaller concepts . As opposed  
>>>>> to  
>>>>> listening to music to record which neuron is firing, as most  
>>>>> musciolgists  
>>>>> attempt . I propose that the music may be the audible result of  
>>>>> those  
>>>>> neurons firing, made possible by a select few who would attempt  
>>>>> to  
>>>>> notate  
>>>>> those neuronal firings. Beethoven for example.  
>>>>>  
>>>>> The experiment . I mashed all of the four symphonies together  
>>>>> ,  
>>>>> playing recordings of the 3rd 5th 6th 7th all overlayed on  
>>>>> each  
>>>>> other,  
>>>>> playing at the same time. - the way a brain might develop. I  
>>>>> expected  
>>>>> an  
>>>>> ordered noise but to the surprising contrary , IT WAS  
>>>>> AMAZING.  
>>>>> .  
>>>>> you can hear new "concepts " forming,

>>>>>>  
>>>>>> il wonder whether in the mind of a blind child , the " music"  
>>>>>> would  
>>>>>> be  
>>>>>> created even without the visual referencial. but created none  
>>>>>> the  
>>>>>> less.  
>>>>>> later when the visual can be tied to concepts , the anatomy may  
>>>>>> be  
>>>>>> hijacked  
>>>>>> to produce sounds . that somehow relate to the concepts. .  
>>>>>>  
>>>>>> I tried to mix music from different cultures- it didn't work.  
>>>>>> African  
>>>>>> does not work with western europe,- chinese works with neither of  
>>>>>> the  
>>>>>> other  
>>>>>> two. but within the same cultural music ( the brain of the  
>>>>>> local  
>>>>>> species  
>>>>>> ) the mash ups are beautiful.

>>>>>>  
>>>>>> I would note that computers engage in "parallel processing" only  
>>>>>> in  
>>>>>> order  
>>>>>> to take a hard problem and break it into its component parts ,  
>>>>>> working  
>>>>>> on  
>>>>>> each component separately, , here each problem Interacts and  
>>>>>> the  
>>>>>> their  
>>>>>> resolutions interact in remarkable ways.

>>>>>> --  
>>>>>>  
>>>>>> On Sun, Jul 10, 2016 at 9:37 PM, Ben Goertzel <[REDACTED]>  
>>>>>> wrote:  
>>>>>>>>  
>>>>>>>> (i.e. being a "fiscal sponsor" for the HLAI/AGI conference is  
>>>>>>>> within  
>>>>>>>> Humanity+'s mandate as a 501(c)3, so there's no problem here...)

>>>>>>>> On Mon, Jul 11, 2016 at 9:36 AM, Ben Goertzel <[REDACTED]>  
>>>>>>>> wrote:  
>>>>>>>>> We can route the donation through Humanity+, which is a 501(c)3  
>>>>>>>>> ...  
>>>>>>>>> as  
>>>>>>>>> we have done with some of your previous donations for my  
>>>>>>>>> research...

>>>>>>>>>  
>>>>>>>>> On Mon, Jul 11, 2016 at 9:33 AM, jeffrey E.  
>>>>>>>>> <jeevacation@gmail.com>  
>>>>>>>>> wrote:  
>>>>>>>>>> is it a 501 c 3

>>>>>>>> On Sun, Jul 10, 2016 at 9:30 PM, Ben Goertzel

>>>>>>>> <[REDACTED]>

>>>>>>>> wrote:

>>>>>>>>

>>>>>>>> Hey there,

>>>>>>>>

>>>>>>>> Hope you're well...

>>>>>>>>

>>>>>>>> I'll send you another email about connecting this summer

>>>>>>>> while

>>>>>>>> I'm

>>>>>>>> in

>>>>>>>> the US if you'll be around...

>>>>>>>>

>>>>>>>> This email pertains to the AGI-16 / Human-Level AI conference

>>>>>>>> which

>>>>>>>> occurs upcoming week in New York (July 16-19).... at the New

>>>>>>>> School.

>>>>>>>>

>>>>>>>> We are doing the last-minute nitty-gritty conference planning

>>>>>>>> and

>>>>>>>> find

>>>>>>>> ourselves short on cash for snacks and for drinks at the

>>>>>>>> conference

>>>>>>>> reception / poster-session ... (the New School venue proved

>>>>>>>> more

>>>>>>>> costly than planned... we chose New School as an old college

>>>>>>>> friend

>>>>>>>> of

>>>>>>>> mine is a prof and administrator there...)

>>>>>>>>

>>>>>>>> So I'm wondering if you might be willing to do a US\$3000

>>>>>>>> sponsorship

>>>>>>>> (we have two other sponsors at the US\$3000 level: Vicarious

>>>>>>>> Systems,

>>>>>>>> and Demiurge Technologies).... (We don't actually need the

>>>>>>>> \$\$

>>>>>>>> wired

>>>>>>>> immediately, a commitment is enough)...

>>>>>>>>

>>>>>>>> We can then serve everyone "drinks and snacks courtesy of

>>>>>>>> Jeffrey

>>>>>>>> Epstein Foundation", or whatever foundation name you prefer

>>>>>>>> (or

>>>>>>>> just

>>>>>>>> keep it quiet if you prefer)

>>>>>>>>

>>>>>>>> This is not insanely critical, but it would be a help... I

>>>>>>>> believe

>>>>>>>> these conferences are still quite valuable in terms of

>>>>>>>> keeping

>>>>>>>> free

>>>>>>>> and open dialogue about AGI going in the research community,

>>>>>>>> as

>>>>>>> opposed to having AGI work entirely sucked into the  
>>>>>>> proprietary  
>>>>>>> halls  
>>>>>>> of big companies...  
>>>>>>>  
>>>>>>> thanks  
>>>>>>> Ben  
>>>>>>>  
>>>>>>>  
>>>>>>> --  
>>>>>>> Ben Goertzel, PhD  
>>>>>>> [REDACTED]  
>>>>>>>  
>>>>>>> Super-benevolent super-intelligence is the thought the Global  
>>>>>>> Brain  
>>>>>>> is  
>>>>>>> currently struggling to form...  
>>>>>>>  
>>>>>>>  
>>>>>>>  
>>>>>>> --  
>>>>>>> please note  
>>>>>>> The information contained in this communication is  
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>>>>>>> constitute inside information, and is intended only for  
>>>>>>> the use of the addressee. It is the property of  
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>>>>>>> return e-mail or by e-mail to jeevacation@gmail.com, and  
>>>>>>> destroy this communication and all copies thereof,  
>>>>>>> including all attachments. copyright -all rights reserved  
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>>>>>> Ben Goertzel, PhD

>>>>>> [REDACTED]

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>>>>>> Ben Goertzel, PhD

>>>>>> [REDACTED]

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>>>> --

>>>> Ben Goertzel, PhD

>>>> [REDACTED]

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>>>> currently struggling to form...

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>>>> --

>>>> Ben Goertzel, PhD

>>>> [REDACTED]

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Ben Goertzel, PhD



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