Coding and the Mozart Effect

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Engine Yard™

- Cloud Application Management Platform
- Ruby, PHP
- High Performance
- Open Access
- Deep Technical Expertise
- Superior Support

About me

- Coding for the last 12 years, the last 7 as a Rubyist
- Musician/Producer
- Audiophile

So, I've been coding for the last 12 years, that's not a surprise or even a big deal as we are at a conference for programmers. Long before I started messing about with computers, I learned to play the drums. Shortly after that, I started playing in bands. A long while after that, people started asking me to help them record. That's a long time line. But before ALL of that, I became an audiophile. I was probably born that way. But yes...I obsess over music. Every part of it, every genre.

Follow the leader

What is Music?

- Music is a holy place, a cathedral so majestic that we can sense the magnificence of the universe, and also a hovel so simple and private that none of us can plumb its deepest secrets.

This is just one part of the definition of music laid out by Don Campbell in his book “The Mozart Effect”. Don started his research in an interesting way, and like a good scientist found that sometimes his conclusions didn’t match what he expected to be the results.

Music as a Healer

Don Campbell's idea was that music could heal, better than modern medicine. That's a bit out there, in my opinion. He, rather ambitiously, wanted to cure brain cancer. A noble goal. He started simpler though, as you do. When Don tried it out with Alzheimer's patient, he thought he was seeing what he expected, an increase in cognitive function. For Non-brain maladies though, Don was mistaken. So what did Don play his patients? Mozart.

A note on Homeopathy

The ideas in Don's work started with Homeopathic intentions, and, in fairness, there is a great deal written about how music can heal. The focus of this talk isn't on trying to heal, but more the scientific findings that prove conclusively that mental functioning can improve when listening to music.

We are not curing, as the musical Homeopaths believe, but measuring gains in cognition. This is legitimate, experiment supported, science.

What was Don thinking?

Don based his research on testing (see it's not just for devs) performed by Dr. F.H. Rauscher and his team in 1993 when they posited that mice, then chimps, then humans would perform better at tasks of spatial reasoning if they were listening to Mozart. In humans, the mean spatial IQ score rose 8 to 10 points higher after listening to Mozart compared to relaxing instructions or silence.

What is the Mozart Effect?

- A set of research results that indicate that listening to Mozart's music may induce a short-term improvement on the performance of certain kinds of mental tasks known as "spatial-temporal reasoning”

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So basically, the idea is that listening to Mozart will make you able to perform better due to a better ability to focus.

In English please

- YOUR BRAIN WORKS GOOD ON TUNEZ

Music is a stimulator. I think we all know it can evoke emotions or give you the feels, but it can also move your brain in a direction, get it out of a sluggish slump, and make you code better.

In 1993 Rauscher *and his colleagues*. made the surprising claim that, after listening to Mozart's sonata for two pianos (K448) for 10 minutes, normal subjects showed significantly better spatial reasoning skills than after periods of listening to relaxation instructions designed to lower blood pressure or silence. The mean spatial IQ scores were 8 and 9 points higher after listening to the music than in the other two conditions.

All of this is to say - different sounds effect the brain in different ways. Harmonic music reduces neural dissonance, calming the brain and allowing the listener to perform better.

What is Spatial Reasoning?

- reasoning based on qualitative abstractions of temporal and spatial aspects of the common-sense background knowledge on which our human perspective of physical reality is based.

Spatial reasoning is the abstraction we work in. We understand that the objects we interact with are not in fact real, but at the same time, we can rationalize these “things” as objects in real space in relation to each the other objects surrounding it.

Kinda Like…

So…if you've heard of Lumosity, or things like that, you know that they focus on mental elasticity as a cognitive improvement tool. Incorporating music is somewhat the same. It starts by seeing short term jumps but over time can increase to see more long lasting, even permanent results.

What's wrong with that?

Researchers at Harvard and Oxford tried to reproduce to see if the effect could be seen regardless of the source of the music. Their theory was that maybe Mozart isn't really the cause of the increased cognition

Maybe this would work with other forms of music...maybe anything?

...for example, if the subject was partial to say...

The Bieber Effect?

...Beiber Effect, a similar effect could be tracked. Let's all try to control ourselves as we gaze at what could be the future of improved mental performance. In reality, however, Beiber is not the answer. While being partial to pieces of music is important, another important part is the content. Not any song will get you moving. It must have the right components. Often dance music or pop music is lacking in substance enough for you to get what your brain needs.

What's in the music?

it's not really what's in the music so much as what's in our brains. The brain responds to the senses. Sight, taste, feel, smell. Sound is one of the most powerful for us, or at least for those of us who can hear.

While working with deaf students, it has been found that a similar effect has been achieved using the sense of smell and sight. Pleasant smells (baking bread or pastries) and visual stimulation (great works of art, brilliant video montages) caused the non-hearing students to respond similarly in cognitive tests.

Were They Thinking of Us?

Developers, mathematicians, scientists of every shape and size...weren't even an after thought for these researchers. Their initial focus was on patients with epilepsy, alzheimers, ALS or Lou Gehrig's disease, and other maladies of the brain. The fact is, once they started testing on a control group of people without brain issues, they found music to be just as, if not more stimulating.

What they found out was it worked for just about everyone - not just people affected by direct brain issues, but also the people not suffering in a conventional physical way. In other words, regular people (for lack of a better term).

What about the coding?

Being a coder is less about the physical than it is about the mental. While the visible portion of what we do every day is about pounding a keyboard, being stimulated visually by whats on the screen, all that jazz... the majority of what we do is actually cerebral. Our brain is our most important tool. When you really get down to it, the code is coming from the brain. Unless you are copying and pasting (which still takes some memory retrieval, just Google's not yours), you are pulling from a filesystem that is much larger than the databases we commonly work with.

Keeping it at maximum functionality is key. Our attempts to distill exactly that which we need from our brains isn't always easy, but there are ways to make it easier. Music is one of those ways.

But why?

- Coding == Math == Music

At heart, we as coders are really doing things with words that translate to mathematics. Music is essentially an artistic representation of mathematics using sound. So the jump is not so monstrously large.

It’s all Ephemeral

It’s important to note this cognitive boost is not permanent. If that was the case, I’ve listened to enough music in my life to be the most intelligent being on the planet. Possibly the universe. Hell, most of us have.

The effect of music on your performance as a coder will be short lived. Not in the sense that you will become like Charlie from Flowers for Algernon after the fact, but more that there will be a steady decrease after you stop listening. Additionally, the efficacy of the same music repeatedly will mean the increase in quality code output will diminish over time.

Is this all bullshit?

There are many people who detract saying that, because the so-called Mozart effect is temporary, it is not a significant indicator of improved cognitive ability. While there have not been retractions, these detractors seek to say that because the effects are not permanent or extremely long-term, it's all bunk. Luckily, we do have many studies where the improvement to spatial-reasoning has been repeatedly proven, in adults and children. At this point, while there are scores of haters across the inter webs, the science still holds true.

What's the right music?

This is were it gets a bit complicated. It starts with preference. You were raised in a certain culture (even if it was in the United States). Your parents or caretakers listened to certain music. There was a type of music at other relatives houses. This all influenced what you listen to today.

What does *this* mean?

The ability to “unlock” that better cognitive function starts with being able to identify with certain music. This means you need to be able to find what music inspires you to move forward. Finding the right music can be difficult, even if...actually, especially if you’ve been in a particular musical groove for so long. Start with what floats your boat.

What floats my boat?

The first instinct is to stay in the immediate comfort zone and cruise. The best way to break out of this trough is to is to find something similar to the genre you are most comfortable in. Like hardcore and metal? Try Caspian, an instrumental metal band from Massachusettes. Into jam bands like Phish or the Dead? Try the instrumentals from Tea Leaf Green. And you can never go wrong with Charlie Parker. For anything.

More boats?

If you want to break out of the rock motif - BeBop, jazz, classical, old blues. There is no end to the number of instrumental pieces you can find that will help to make you a better coder. The most important thing is to keep an open mind.

A personal example: my brother, a former hip-hop artist, has it right. His opinion is that everyone has at least one song in every genre that they like. I argue that I hate country, he counters with “oh yeah...Kenny Rogers “The gambler””. Damn...he’s right.

The point of this is to say that, while striving to find the music that will help you be a better coder, don’t shut the door on any possibilities.

"We should embrace everything that sounds right to our ears…"

In his South by Southwest keynote, Bruce Springsteen, the boss, specifically addressed the issue of genre. Sometimes, this a problem, he opined. We get too caught up in what's "right" that we stop paying attention to what sounds good and makes us feel good. And I'd add that when we feel good, we work better. So don't get too stuck on this.

WARNING!

It's important, while seeing what floats that proverbial boat, to be careful of a placebo type effect. It works kinda like this: you like the music you are listening to, so it seems effective, so you are reluctant to branch out.

Finding new music is a key part to all this. Just like only working on one project overtime can cause stagnation and mental constipation, listening to the same music all the time can mean you aren't expanding your mental capabilities as efficiently as possible.

Consider Getting in a Different Boat

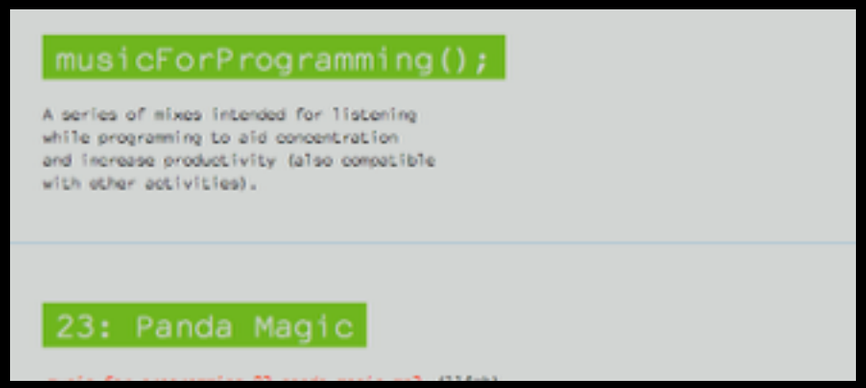
Take time when working on less time sensitive projects to explore other forms of musics, branch out the other genres. The key to unlocking cognitive abilities is being able to find the right combination of tunes that works for you. Pandora can be great for taking music you know you like and finding music that is tangentally related but you never knew about.

Finding New Music

There are plenty of resources for finding good music. Pitchfork was at one point a leading source for new music. They've gotten a bit uppity recently but there are still some gems. Pandora as previously mentioned is great. turntable.fm was a great place to go and find out what other people like but sadly, it is gone… Reddit is also some great subs for catching burgeoning artists, but it can be hit or miss.

There are also things like SoundCloud and BandCamp for new music. If you ask nicely, I might share my embarrassing experiments up on SoundCloud.

musicforprogramming.com



Music for programming dot com is a site dedicated to providing a mix of tunes that help aid in focus and concentration when developing. Thanks to William Clifford who saw a previous version of this talk and shared this with me.

Safety First(ish)

Safety, and to a lesser degree comfort, are important. This is a small PSA about how important it is to protect your hearing through all of this. Generally, the best way to listen to music is NOT via earbuds. They are usually hard plastic, “one size fits all”, and not very comfortable over time. The safety issue comes in when you see the volume go up and the high tones start blasting against your ear drums.

Over the ear headphones at a moderate and non-invasive volume are the best way to go. Studio quality headphones (not Skull Candy or Beats by Dre) often give the compression and sound quality to enjoy the music without hurting your ears.

But isn't that isolating?

Some folks will worry about sitting and coding with headphones on or with the music blasting is something that will put you off interacting with other folks. While this might be partially true, it's also true that when we are most productive in a non-pairing situation we are heads down and not interacting much in the first place.

When we are pairing, it is still possible to have music. Perhaps not headphones and it has to be low-level enough to not disturb anyone else, but it is possible.

Share

While the RIAA isn't cool with it, it's important to share. I am not advocating piracy here. It would just be cool if you found something that noticeably motivates you to write better code, why not share that INFORMATION with someone who has similar musical interests. Essentially, being an open source software engineer often means sharing what you are doing, so why not share the success we have in making ourselves better at what we do?

Make a “Mix-Tape”

I’m going to slightly disagree with something Matthew said this morning. For the love of of all that you hold dear, MAKE A MIX-TAPE. Not literally, you’ll have trouble finding tapes. But make playlists and share them with people. It isn’t just something you do in an attempt to gain the attention of that certain someone or someones. It’s a way to give a piece of your personality to someone else so they understand what you are all about

Take a break

Occasionally, it's also important to turn away from your keyboard and do other things. So why not a music break? Note: Some people make this face as they code.

Beyond the inherent benefit of taking breaks in general (burnout being kind of a big deal in out industry). Taking some time out during the day to practice an instrument or explore new music is a great way to kill off a pomodoro break.

Also, take a lesson - learning to play something will help you take your mind off coding and bring back an interesting perspective from the music world. Instrument lessons also tend to be in standard forms of music, many of which we may not be familiar with.

Do it yourself

If all else fails, make your own music. It will be easily more familiar. Also, it is well known that performing music helps with math and coding skills. They go hand in hand, as music is essentially a different mathematical language. Or you can find mp3s somewhere of Chad Fowler playing his mad sax.

Do it with code

Why not use this newly expanded cognitive ability to mix the 2 worlds? This is a picture taken by THE Konstantin Hasse. It shows the band Moz-Shadow, which consists of Boris, an Accordion player and programmer and Jan, who has developed a JavaScript program that allows you to create music in a browser. They are the standing band at Rails Israel and Jan's live-coding is projected, so everyone can see what he's doing to drop the fat beats.

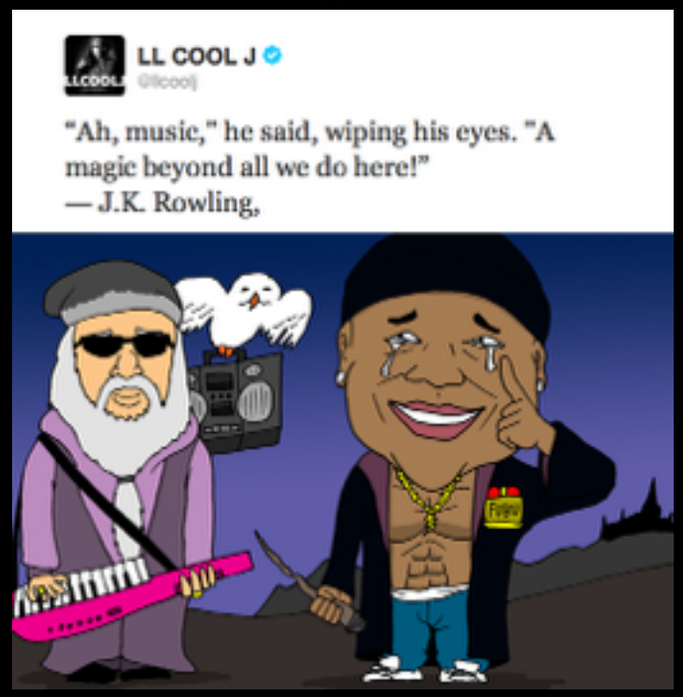
Go to conferences!!

One of the coolest things about last night was the organizers bringing in traditional, Portuguese band. I like when conferences bring in local flavor so we all get to see new things we might never have experienced otherwise.

#rubykaraoke!!!

And there is always Ruby Karaoke…

Unlocking is the Key



This will not happen overnight. Not every piece of music is perfect for everyone. There is no catch-all answer. You will need to explore some things to come to the best music to unlock your ability to code better. Once you find the right groove, it will be possible to stay wih it and explore the music more and expand your cognitive abilities further.

Resources

- Don Campbell (1997). The Mozart Effect: Tapping the Power of Music to Heal the Body, Strengthen the Mind, and Unlock the Creative Spirit. ISBN 0-380-97418-5.
- F.H. Rauscher et. al. (1993) Music and Spatial Task Performance. PubMed PMID 8413624
- B.E. Rideout et. al. (1998) Effect of music on spatial performance: a test of generality. PubMed PMID 8724912
- William Pryse-Phillips (2003). Companion to Clinical Neurology. Oxford University Press. ISBN 0-19-515938-1
- http://www.univforum.org/pdf/the_mozart_effect.pdf
- http://www.jrsm.rsmjournals.com/content/94/4/170.full

While I'm giving this presentation and I've just scratched the surface, there are people much smarter than me that figured this all out. Please feel free to hit up some of these resources if you are interested in learning more. This is just a handful, there are plenty more out there.

Thanks

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http://j.mp/101010theband
http://j.mp/1servingfriends

Thanks, I’m PJ