Cysf~ Logbook + Research

Music- Big Questions

- -Why does music appeal to us?
  - Why do we have certain music tastes?
  - Does culture impact the way we think about certain music types?
    - Ex: Indian people prefer Bollywood music
- -Why does certain music induce certain emotions?
  - Why do people emotionally react differently to music?
    - Are certain people of different collective identities/groups differently affected? Why?
  - Is the emotion inducing element of music related to prehistoric times?

Question		
Why do we have certain music tastes?		
Does culture impact the way we think about certain music types?		
~~Why do people emotionally react differently to music?~~		
Is the emotion inducing element of music related to prehistoric times?	Sounds more complex (we need to sound professional)	

Sort of subdivision of question 1

We were going to do a pros and cons thing but we didn't.. We just discussed and were able to narrow it down to 2 questions.

Sounds?

Sounds like a worldview question, not very scientific?

1. Why do we have certain music tastes?
   - May be connected to specific socio-demographic and personality variables of people who like the same genre

Danika: "This is a first step in getting a maybe bronze"
Crystal: "sure...."

This sounds scientific

2. Is the emotion inducing element of music related to prehistoric times?

Crystal:
x_X

Time to decide question: 60 hrs
Deadline: Sunday: 12:00am

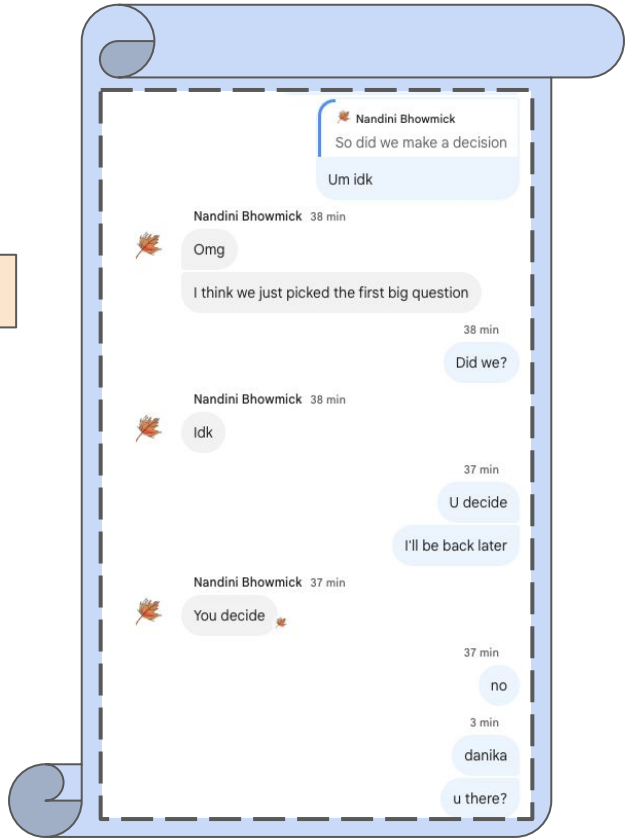
1027

new thought: Use question 1 from big questions

Update: The two questions are now-
Why does music appeal to us?
Is the emotion inducing element of music related to prehistoric times?

We were edging towards question 1... but we still don't know

FINAL QUESTION- WHY DOES MUSIC APPEAL TO US



Deadline to decide question: Sunday- 12:00 am

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Scientific Method

Problem/Question: Why does certain music appeal to us?

Hypothesis: We hypothesize that the human brain is naturally inclined to perceive certain sounds as pleasing while others are perceived as unpleasant. This phenomenon is thought to have originated from our prehistoric ancestors, as they associated specific sounds with danger and others with safety or peace. Consequently, this may have resulted in our current preferences for certain types of music.

Scientific Method: Part 2

Background info:

- Ancestors had instinct to survive though certain sounds being associated with danger
- Personality variables for people who like certain musical artists
- Notes harmonically related or not
- Amygdala (part in brain to process emotions (i think)) adjusts the auditory cortex (thing in brain to process sound)

Problem

The two of us want to learn why is it that certain people enjoy certain music and listen to certain musicians. We also want to find out why people like music at all, and how it connects to human history and our prehistoric ancestors, as well as its relationship to human sociology.

Crystal

Catchy Titles- Brainstorm

Musical Melodies

Making Music

The Magic of Music

Harmonious Hits

Trendy Tunes

Why music appeals to us

Why we like music

1112

Crystal

Harmony in Music: What Sounds Good and What Doesn't

- Aside from what kind of sound, the notes played or heard definitely make a difference. Certain notes sound good or bad together
  - For example, two notes a semitone away (ex. The pitches B and C) generally sound "bad" or "messy", while two notes two whole tones (ex. The pitches C and E) away sound musical

The Equal Temperament system is a musical system that involves dividing an octave into 12 semitones, each an equal distance away from each other. All music you hear and know today was composed and played using this system. It has been the most popular system since the 18th century and was invented before then. What makes this the go to musical system?

The tonal system is a musical framework based on major and minor scales - the most common way to organize pitch in music. It consists of twelve notes, grouped into major and minor scales. The major scale determines the key of a piece and the minor scale creates tension in music. It's widely used in classical, jazz, and rock music. Today, we almost always think of pieces composed in a major key as "happy" and pieces in a minor key as "sad". Why?

1102

Crystal

History of Music | The Middle Ages- The Renaissance

The Middle Ages-

At this time, music was just basic singing, used for religious purposes, the text was generally biblical and was sung in church. One of earliest types of music was the *Gregorian Chant*. An example of this is the **Haec dies chant**. Music sung for church was usually written in Latin. The first music was **monophonic.**

Haec dies (Easter Sunday) | Canto Gregoriano | Gregorian Chant

Monophonic Texture: Music consisting of a single line of melody, with no harmony or accompaniment

The *organum* and *motet* followed the chant, with adding more voices (**polyphony**). An example of an organum is the **Haec Dies organum**. The signing was generally very **melismatic.**

Haec Dies (Organum)

Polyphonic Texture: Two or more independent melodic lines heard simultaneously; referred to as contrapuntal texture

Melismatic Text Setting: Many notes for each syllable of text

During the Renaissance, more secular types of music were added into the mix, as well as more harmony and polyphony. New forms of music were introduced such as the mass (a piece written to be sung in church), the motet, and the secular madrigal.

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Crystal

History of Music | The Middle Ages- The Renaissance

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motet: vocal composition with or without instrumental accompaniment, usually anonymous and often polytextual in the 13th century

polytextuality: two or more texts heard simultaneously; as a result, the words can sometimes be hard to distinguish

Mass: the most important ceremony in the liturgy of the Roman Catholic Church; consists of prayers that do not change from day to day (Ordinary), and prayers that change depending on the calendar (Proper)

Madrigal: a popular secular vocal genre that flourished in the 16th century; based on an intimate relationship between poetry and music

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History of Music | The Renaissance- Baroque

Crystal

Do we enjoy music because of the lyrics or the tunes? How much of both?

Carlo Gesualdo - Sesto libro di madrigali: XVII. Moro, lasso, al mio duolo - an example of a madrigal

One of the shifts between music in the Renaissance and music in the Middle Ages is the text. Music went from purely religious in the Middle Ages to having a lot of secular lyrics in the Renaissance. This can be tied in to the idea of humanism- an idea started during the Renaissance about centering thoughts on humans and their capacities and emotions- a focus on the current life instead of the afterlife- a focus on us instead of on God. This paradigm shift asks the question: how much of the music we listen to is about the lyrics and how much of it is about the tune?

Renaissance music contained steady beats, balanced phrases, and polyphony. It also focused on the relationship between text and tune using word painting- a method where poetic images were depicted musically. Music was used to worship in churches, entertain the wealthy, as well as many other utilizations.

Another musical shift that happened during the Renaissance was that more instruments were introduced such as early brass instruments, string instruments, and the harpsichord

The next period in history and art- and ultimately music- the Baroque era. One of the important trends that changed during this era is that music gradually became more popular in purely instrumental styles, instead of the song-based Middle Ages and Renaissance.

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Crystal

History of Music | Baroque Era

The Baroque Era included many intense changes in music. It introduced a new form of music which became wildly popular- the opera. This is a genre many of us enjoy even today! The opera was a musical work that mixed visual arts and acting with music. A stage, props, actors, music, and singing were used to portray a story. The stories were both sacred and secular- operas were enjoyed by many people. Back then, you didn't watch TV or listen to the radio. Operas and live music were the next best things.

Here is one of the most famous examples of Baroque music. I'm SURE you've heard it before.

Hallelujah Chorus, from Messiah | The Tabernacle Choir

By now, music was rarely a capella (sung without instrumental accompaniment). Keyboard instruments grew in popularity day by day. This lead to the invention of the Equal Temperament system that we discussed earlier. See Harmony in Music: What Sounds Good and What Doesn't <- Click to go to this slide

The Baroque Era is now the stage where music starts to sound like what we consider as "normal". Today we listen to it and enjoy it.

Baroque- From the Portuguese word *barroco*, meaning irregularly shaped pearl, now applied to art, architecture, and music of the 17th and 18th centuries

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Crystal

History of Music | Baroque Era-Classical Era

A very important part of the music of the Baroque Era is that the idea of major and minor tonalities became key in music. From the Baroque to the Classical Era (1730-1820), music became more and more popular in instrumental formats. Other musical style elements however did not have a dramatic change.

After the Classical Era, the idea of dissonance increased in popularity. Dissonance included things that sometimes didn't sound perfectly musically "right". Notes outside of the tonal/key centre were used and new chords and scales were invented and used in music. Some tones and intervals sounded "clashing" and some melodies sounded "incorrect". However, music was still structured- even if it seemed ambiguous.

That brings us to pretty much today. Music today includes a huge range of different styles and types. Popular forms of music include both songs and instrumental music. You can see that music trends have come a long way and likely will keep changing until the end of humanity.

1227
0106

Why Do Certain Sounds Appeal to you?

- Sounds stimulates the brain (changes or activates the brain's frequencies)
  - Chemicals in the brian are released that cause you to feel good or bad
- Pleasant sounds come from how we fell or the meaning behind if for the subject
  - Often has to be with cultural or biological factors
  - Live harmonies and hate loud noises

Thank you cousin for this information. It is very helpful.

Danika

Why Certain Sounds make us feel happy?

Hydrotherapy (water sounds) - a sort of rhythm is created (primal rhythm) that can calm down our hyper minds, control our breathing, recall memories of peaceful times that were usually spent in nature. It reminds us of more peaceful times as nature is a big part of our lives from the second we are born

Crackling fire - people feel calm and sometime drowsy from this because of our interest in fire from prehistoric times (one of the first tools humankind ever had). The crackling of fire reawakens a primitive sort of response.

1226

Danika

Why Certain Sounds make us feel happy?

Repetitive sounds (ex: crunching leaves) - they usually have more of a staccato type of rhythm which can wake our brains up and give them energy, rather than put us to sleep.

Vehicles rolling up gravel drive - fills us with excitement because it is associated with people like family members or friends coming home or to your house.

Laughter - they are born from joy and can be classified as happiness. It can spread from one person to another so when hear someone else laugh you feel happy because you can tell that they are happy.

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101

Danika

Why Certain Sounds make us happy?

White noise - this helps us calms us down. It "absorbs" background noise and creates a steady background noise.

0101

Danika

What each of these sounds have in common

- They create a sense of calm
- Can be associated with happy memories and good feelings
- A lot of them are related with nature
  - Our ancestors used nature to survive

Danika

How does the brain react to music?

- Increases blood flow to limbic system (part of the part that regulates and controls emotions)
- The sort of "chills" are because of dopamines that are released from the brain
  - The more we listen to a song and became familiar with that song, your body will release more dopamine
- Music has always been apart of human culture
- We see music as pleasure because our prefrontal cortex (our thinking and rational part of brain) will activate and you realize that there is nothing threatening happening

0106

Danika

Limbic System

What is it?

It appears to border/ be between the cerebral cortex and the diencephalon. Its job is to process and regulate emotions and deals with sexual simulation and learning. It is most commonly known for emotions.

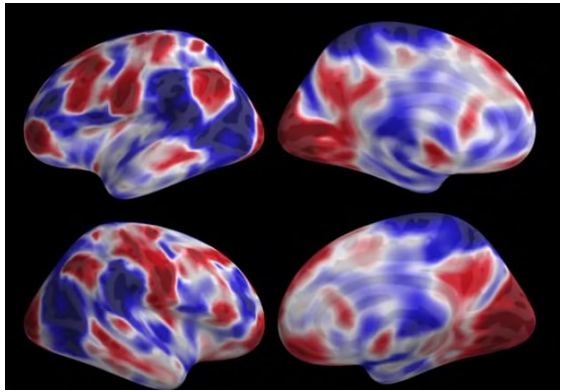
Structures

There is no really amount of structure this system and some experts think that we should not be classifying something as complex as emotions into one system, but structure that are commonly associated with this system are the amygdala (fear and anxious)(this is the part that deals with music sometimes) hippocampus (memory), parahippocampal gyrus (memory), cingulate cortex (emotion and memory), septal nuclei (connected to other structures in limbic system and important for pleasure, reward and reinforcement), mammillary body (two nuclei involved with memory and connect to amygdala and hippocampus), fornix (carries info from hippocampus, mamillary body, thalamus), hypothalamus (controls hormone release),

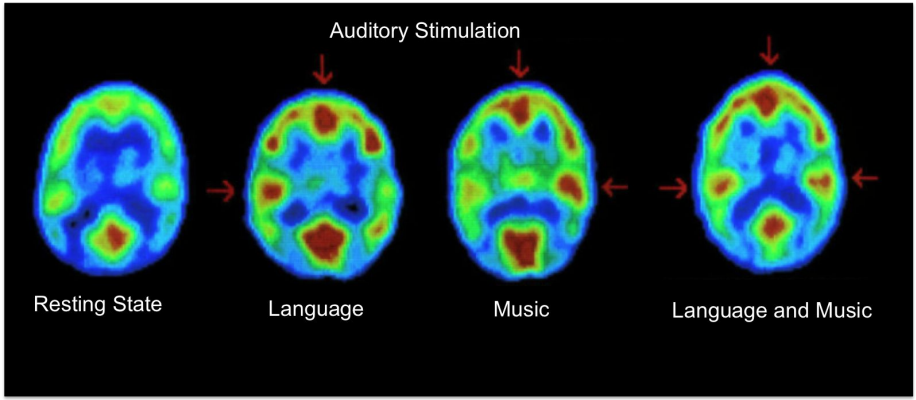
0106

Danika

How Music affects our brain?



This shows that not music is not just on the right side of the brain but rather all over.



This is a brain scan of a guy listening to music. The red parts are when his brain activities are above average. The blue parts are when it is below average.

Music going to different areas of the brain

- Auditory cortex - tracks loudness, pitch, rhythm, tambor
- Visual cortex - reading or watching music
- Motor cortex - when you are physically reacting to the music (clapping or tapping your feet)
- Cerebellum - controls the emotional responses
- Hippocampus - memory

0106

Danika

Listening to Music - Emotional and Physical

When listening to certain songs are brain will connect the auditory region to the emotional region. Certain songs will connect to people's more than others. When singers sing high pitch notes are brains can sometime think that it's a scream so we will jump and feel chills all across our bodies.

Crystal

Music Induces Emotion- Nostalgia

Another key theme- music induces emotion. How and why?

Nostalgia- I'm sure we've all experienced this. Listening to a movie soundtrack or an epic song that really hits hard because of all the memories can really put emotions of happiness and yearning into our heads. When we listen to music, it has the ability to bring so many memories that were dormant for years.

"When a song taps into our brain and stirs up some nostalgic emotion, it often triggers memories we have of childhood, happiness, friendship, being a teenager, self-discovery, love, college, homesickness, regret and forgiveness, to name a few."
-DB Damage is a freelance content writer passionate about creative subjects like music, film, and video games. He studied I.T. and music technology at college and has a background in managing and promoting local bands.

Listening to music causes our brain to light up and connect with all our senses, creating a "snapshot" in our memory that we can relive when we listen to the music again. When listening to nostalgic music we are filled with emotions of warm and fuzzy yearning.

Crystal

Music Induces Emotion- Music makes us dance

Have you ever turned on some music and just started moving to the beat without really thinking? Why is it that this happens? People are attracted to move in time to the pulse-like beat of the music. Music heavily compels us to dance or just tap or bob along. A study done by scientists in Australia showed that people's brain activity seemed to sync with the beat while they listened to music. The heavier the bass, the more inclined people were to move along with the music. Lower frequency tones are more likely to get people to move with the music.

The type of music that just makes you start dancing unconsciously can be pretty appealing to most people. The beat also determines the energy of the piece- slow and calm or fast and furious.

Crystal

Music Induces Emotion- Major and Minor

Most of us know that in basic terms, major key music is "happy" and minor key music is "sad". However this is only true to a limited extent. There are many examples of music that break this rule.

According to BBC's *Science Focus*, this major-minor phenomenon is somehow reflected in natural language. Interestingly, sad speech follows the patterns of a minor chord while happy speech follows the patterns of a major chord. Studies have shown that each chord stimulates distinctly different brain activity trends in the emotional region of the brain.

However, this seems to be mostly caused by cultural conditioning. The tunes we listen to are heavily affected by the memory of music we have heard in this past. This causes a lot of our musical thoughts to be based upon stereotypes.

In conclusion, biological and mathematical elements do contribute to the way are brains are biased towards major key music conveying happiness and minor key music conveying sadness.

0106-
0108

Music Induces Emotion- The Connection to Speech

The emotion in music can be connected to natural patterns of human language. Speech includes elements of music such as pitch, tone, tempo, and dynamics. These variables could connect emotions in one's voice to emotions in music.

Enjoying Music- Making Predictions

A surprising reason we enjoy music is that we are always predicting what will happen next in the music- whether we realize it or not. Our brains are always calculating what will happen next. If we guess correctly, the brain releases dopamine, a chemical which makes us feel good. Our brains love patterns, which is why unfamiliar or new types of music might sound strange and we might not like them as much.

Listening to music give us the same reward feeling as eating or receiving money. Many people enjoy the rush of dopamine they get while listening to music.

Interestingly enough, we also enjoy music that has unexpected elements in it. If we listen to the same thing over and over again, sometimes it doesn't sound as good. Sudden dynamic changes or changes in tempo can give people a strong emotional response.

Conclusion - Restating the Problem

Through looking at different forms of media we wanted to determine why music appeals to us. We wanted to learn why certain music naturally sounds good to us and why other seem to quote on quote "hurt our ears". Both of us wanted to better understand the brain and music's relationship to one another. We annually believed that this was due to our prehistoric instincts. That we had a survival instinct which associated certain sounds with being dangerous and other with being safe.

Conclusion - Restating Hypothesis

Our hearing is one of the most powerful senses. It was the third sense developed 250 million years ago. It was developed before taste and touch. Humans have used it to determine whether or not danger was approaching and where it was coming from. Through our ears we have determined whether or not something is friendly or hostile. We believe that there are still traces of this phenomenon still appears in humans today. That we determine whether or not music sounds good through this sense.

Conclusion

Through our research we learned that we associate music with memories. That the music we like often has a good memory associated with it. This can also apply for sounds, like for example we associate the sound of a car coming up the driveway as someone coming to visit or coming home. Nastoga also plays a part in this. Our brain naturally takes a snapshot of an event. The event might sometimes have music associated with it. When we listened to the music that snapshot is apart of then we can sometimes relive it.

Conclusion

Our natural survival instinct is also connected to this. When we hear a high note we can often get a chill or get startled by it. This is because we can associate a high note with a scream which would mean danger during prehistoric days and even now.

Log Entries

October 27

Danika and Crystal worked on coming up with there science fair project. Our two big questions were that we could pick from were, why does music appeal to us and what does certain music.

October 28

We continued to try and come up with our question for our project. In the end we chose why do certain musics appeal to us as our topic. From there we created our hypothesis and started a little bit of research

Log Entries

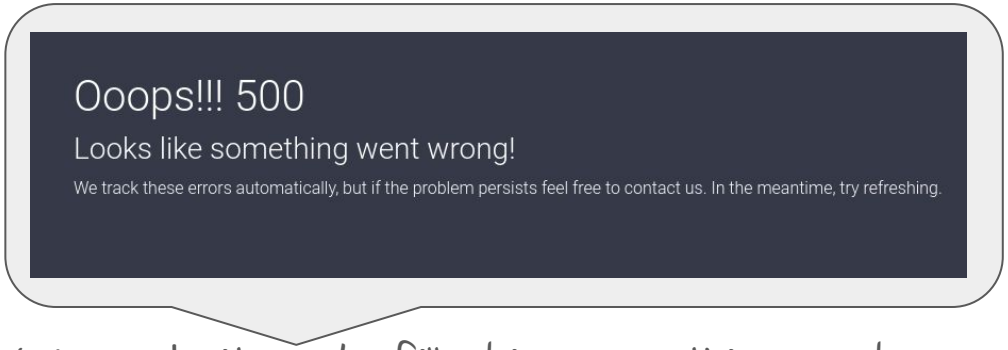
November 2

Crystal worked on summing up the history of music.

November 12

Danika and Crystal worked on coming up with catchy titles for the project. Crystal continued to work on the history of music.

Log Entry



December 3

Danika and Crystal signed into the CYSF website. We filled in our ethics and due care form. We also starting writing our problem in the CYSF website, but then the website kicked us out.

Log Entry

December 21

After procrastinating for a whole month Crystal worked on the History of Music.

Log Entry

December 26

Danika worked on researching why sounds sound good or bad to us. She also began to look at certain sounds that make us happy and why they make us happy.

December 27

Crystal worked on History of Music. We need to take a look at the guidelines and fill out more project information on the CYSF website.

Log Entry

January 1

Danika continued to work on why certain sounds (mostly in nature) make us feel calm or happy. She also drew some basic conclusions and points from that information. She found out what each of the different noises had in common.

Log Entry

January 6

Danika started looking deeper into how the brain reacts to music, while Crystal started working on the elements of emotions in music after finishing off History of Music.

January 8

Danika and Crystal are currently panicking because we have procrastinate this so much that we only have a 2 months to finish this whole thing. Thank you Sarah (an experience science fair do-er). Danika is looking at a video to help her better understand how the brain connect stuff. Crystal is working more stuff about music and emotion.

Log Entry

January 9

We started trying to create conclusion based on our research. We also decided to look through the Calgary Public Library website to find books that will help us better understand this topic. We also started filling in the CYSF website with more information.

January 10

Danika and Crystal started working on a good copy of our presentation that we will share with the judge via video. Danika also finished working on citations, limbic system and other assets of how the brain connects music.

Log Entry

January 16

Danika began to work on the conclusion. She worked on trying to restate the problem.

January 17

Crystal patched up the method to make it more scientific. Crystal and Danika are trying to figure out if musical trends are relevant and if so, how they can be analyzed and predicted.

Log Entry

January 21

Crystal and Danika worked on the conclusion.

January 24

Danika worked on restating the hypothesis

Log Entries

January 31

Danika bought the tri-fold and black paint to cover the tri-fold.

February 3

Danika went to Crystals house to work on the tri-fold. We started the meeting session by measuring Crystal's upright piano to understand the scaling between that and the tri-fold. After struggles and valiant efforts, Danika and Crystal were able to find the scale factors. They also on cutting cardboard that would later become a piano.

Log Entry

February 7

Crystal worked on making slides and condensing the information for the tri-fold. She put rewrote the problem, hypothesis, harmony in music and a brief history of music.

February 8

Crystal continued to work on the same thing.

Log Entry

February 11

Crystal worked on again on rewriting the information to fit the tri-fold. She worked on nostalgia connection to why music appeals to us and why music makes us dance. Crystal also came to Danika's house where they worked on building the cardboard piano. We listened to Disney songs as we did this. The power of Disney managed to get us to finish 90% of the piano.

Log Entry

February 18

Crystal worked on making the info in the website look more "presentable"

February 24

Crystal created a google doc to put our condensed information onto which would then be printed out and placed onto the tri-fold. Danika worked on condensing her information. She also bought some more supplies for the tri-fold.

Log Entry

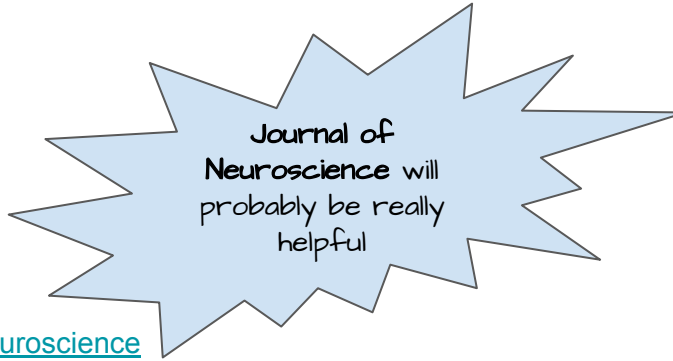
February 25

Today Crystal came to Danika's home to work on the tri-fold. They worked on finishing constructing the keyboard and finished about 90% of all the painting. The food that supplied them and motivated them to greater heights were wow chicken chilli fries.

February 27

Crystal worked on patching up info to put on the trifold and website, and edited to make sure it was engaging and grammatically correct

Sources



Science shows why our taste in music can't be siloed into catch-all genres.
Why We Cringe at Unpleasant Sounds
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The Music of Silence: Part II: Music Listening Induces Imagery Responses | Journal of Neuroscience
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Sounds that Make Us Smile ;)
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Ever Wondered Why Music Is So Nostalgic? Here's the Science Behind It | Sound of Life
Why — and How — Music Moves Us | Pfizer
Neural tracking of the musical beat is enhanced by low-frequency sounds | PNAS
The Science Of Music - Why Do Songs In A Minor Key Sound Sad?
Why are minor chords sad and major chords happy? - BBC Science Focus Magazine

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Playlist https://www.youtube.com/playlist?list=PLUctYzsfgbCSTsRtHls-MopmSKMRRPoEt