Where Microbes meet Music

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"Aux Champs-Élysées, Aux Champs-Élysées
Au soleil sous la pluie, À midi ou à minuit
Il y a tout ce que vous voulez
Aux Champs-Élysées"
(Pomplamoose, 2020)

I turned down the volume of *Pomplamoose's* voices on Spotify as I racked my brain, attempting to come up with a topic for my course assignment.

What would someone never associate with microbes? What would blow the minds of prospective readers?

The Google document stared at me, empty as ever.

I sighed as I returned to Spotify, scrolling through *Pomplamoose's* discography. If only this musical duo could sing a novel assignment topic straight into my eardrums.

This was when it clicked. Immediately, my sudden epiphany was plagued by doubt - some might even say *Bubonic-plagued*.

Microbes? And Music? How can it be? Has this even been researched on?

A quick Google search revealed research that was mainly focused on how music could affect our gut microbiota. Although interesting, it did not quench my innate curiosity on this topic. Through lectures and group presentations, I learnt about how microbes can have a significant effect on who we are as people- our IQ, attractiveness and what not. Likewise, I was determined to take a deep dive into how our microbes can be our inner radio DJs and be the ones in control of the music we tend to gravitate to.

How does our gut microbiome influence our personality?

French gastronome Jean Anthelme Brillat-Savarin once wrote, "Tell me what you eat and I will tell you who you are." (Brighton, 2018; Brillat-Savarin, 2009)

To tackle this rather niche topic, I started by exploring how our gut and brain are connected. The mechanism which links our gut and our central nervous system (CNS) is the Gut-Brain Axis (Chaudhry et al., 2023). The role of microbes in facilitating communication between these two systems include producing metabolites which affect our normal body functions and affecting serotonin levels in our body (Heiss & Olofsson, 2019).

Recent research shows that our gut microbiome could affect our behaviour and even our intrinsic motivations (Komaroff, 2023). It was interesting to read about the different experiments involving Faecal Microbiota Transplantation. In one of these experiments, scientists separated a group of mice based on those that naturally started exercising when given a running wheel, and those that did not (Dohnalová et al., 2022). Across these two groups, they had identical genes, which eliminates the possibility that this innate difference between the mice's behaviour was simply due to genetic variability. The mice's microbiomes however were different. Among the mice that exercised, they had more bacteria in their gut which produced fatty acid amides, which then promoted the release of chemicals, and these

chemicals were found to be responsible for the mice experiencing “runner’s high”, referring to the transient burst of feel-good hormones during exercise (Komaroff, 2023; Dohnalová et al., 2022; John Hopkins Medicine, 2024). This explained why these mice were more likely to exercise. The mice that did not exercise did not experience this, so they stayed sedentary. To strengthen the correlation between gut microbiome and our motivation to exercise, the scientists transplanted the microbiome of ‘exerciser’ mice into the ‘non-exerciser’ mice and true enough, these previously sedentary mice became newly-converted exercisers (Dohnalová et al., 2022).

A similar experiment was conducted, but this time the scientists measured the personalities of different mice - mice that were more timid and those that were bolder. Results showed that after switching gut microbiomes, the timid mice were bolder and vice versa (Collins et al., 2013). Here, I really saw how the microorganisms in our gut can have a significant impact on our personality.

Some might argue, these experiments were done on mice, so it may not always mean that the findings above are true in humans. I decided to continue down this train of thought, curious to find out if just by looking at a human’s gut microbiome, I could predict the person’s personality accurately.

I stumbled across a cross-sectional study which mapped out the personality traits associated with certain gut bacteria. Personality traits were categorised according to the ‘Big Five’: extraversion, agreeableness, conscientiousness, neuroticism and openness (Digman, 1990). The study found that certain bacteria (*Akkermansia, Lactococcus, Oscillospira)* increased Sociability in adults, while other bacteria (*Desulfovibrio, Sutterella*) decreased the same trait (Johnson, 2019). Certain bacteria (*Corynebacterium, Streptococcus)* decreased Neurotic tendencies in adults as well (Johnson, 2019).

Although the study mentioned that its inherent design does not allow for it to definitely conclude that having Bacteria A automatically means that one will have Personality Trait A, it is worth appreciating that this study by Johnson is one of its first few to delve into this topic and more research in this field may confirm the validity of Johnson’s findings (Johnson, 2019).

Adding on to the ‘Big Five’ and closer to home as a university student, it was found that students who were infected by the *Toxoplasma gondii* parasite which has been thought to alter the behaviour of its host, were slightly more likely to major in Business and strive towards being an entrepreneur (Johnson et al., 2018).

Equipped with this understanding of how microbes affect our personality, I was one step closer in my pursuit of answering how microbes influence our music taste.

How does one’s personality influence her music taste?

On first glance, one’s music taste seems almost random with not much reasoning behind it (Klein, 2021). For me, I listen to certain music because these songs are simply ‘nice’ and naturally appeal to me.

However, several researchers were curious and set out to distillate a plausible correlation between one’s personality and music taste. To adequately categorise different personalities, it is common for these studies to reference the ‘Big Five, as did the studies previously mentioned (Gelitz, 2011). In Gosling and Rentfrow’s 2003 study, 3500 university students’ music tastes were surveyed and charted against their ‘Big Five’ personality.

As a result, it was found that many people with a specific personality type generally tend to

listen to the same genres of music (Rentfrow & Gosling, 2003). Students who scored relatively higher in Openness were more likely to listen to rock and punk music which were characterised to be rebellious. Those who were extroverted tend to listen to rhythmic music. It was fascinating to see that the correlation between the two was quite complex, such that having Personality A did not automatically mean I am more inclined to listen to Genre A. One genre of music could attract students from different 'Big Five' categories. For example, extroverted students listened to conventional music just as much as agreeable and conscientious students. Interestingly, it has been said that in this context, judging the book reader by its book cover would not be so terrible as we once thought (Gelitz, 2011). Impressed by these results, I thought of trying this out for myself, but to my dismay, after completing 20 pages of questions, my results were locked behind a paywall.

A study done by Desling and his colleagues found similar results in 2008 (Gelitz, 2011). Desling utilised data from a survey from a separate study administered among Dutch teenagers, in which questions about music tastes were asked. To match the music genres set by Gosling and Rentfrow in 2003, Desling found that some genres such as folk and blues were not popular in Holland, while other genres such as punk and goth were (Gelitz, 2011). After accounting for these natural differences in music listening behaviours across the two countries, Desling still found similar trends between respondents' music taste and their personalities (Gelitz, 2011).

On further analysis, this raises the question of which came first - one's personality or his music taste? Interactionist theories suggest that one's personality is stable and is more likely to influence his music taste instead, however, it is still possible to hypothesise that frequently listening to a specific type of music can in turn influence one's personality instead (Greenberg et al., 2022). For example, listening to music from other cultures tends to cause one to be more accepting of other cultures.

It has also been debated whether personality has the heaviest impact on one's music taste. Although one's personality is related, it seems that other factors such as one's age, gender and salary tend to play a bigger role (North, 2010). However, to focus on the role of microbes in this topic specifically, it suffices to take one's personality to have significant influence on one's music taste.

Conclusion and Reflections

At last, what seemed to be an obscure relation between what I am learning in class and something that has always been part of my life, turned out to be possible and not that otherworldly after all. I learnt more about the Gut-Brain Axis and its implications on one's personality and subsequently, how one's personality is linked to her music taste. Coming from a background in Pharmacy, being exposed to countless pathophysiology and case studies, it has always made perfect sense how viruses, bacteria, and even fungi play an integral part of life. However, throughout the course of exploring this topic, I was seeing for myself how microbes truly are everywhere and are involved in everything we do, even when we least expect it. It was exciting to search for the answers for something that entirely resonated with my interests. Moving forward, I will always be reminded of this experience every time I turn on *Pomplamoose* on Spotify, while silently thanking my microbes for the Spotify recommendation.

Word count (including subheadings): 1501 words

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