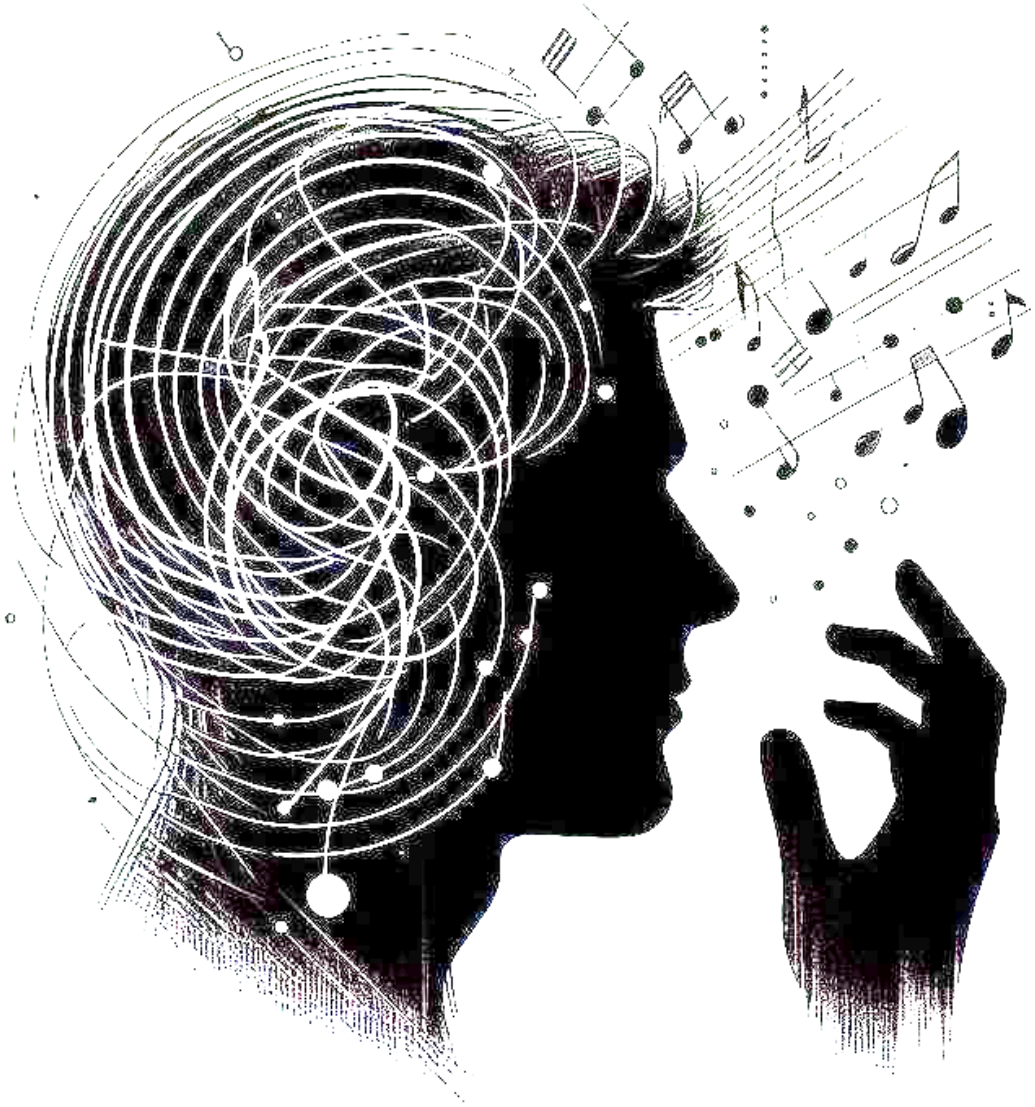
The Effects of Music on Cognitive Performance and Study Efficiency



I can never concentrate when there is music playing. When I attempt to do so , I end up beating time with a pen, singing along with the music, or am completely tired out after only twenty minutes. But my friends do the exact opposite. They play lo-fi hip hop or classical music playlists and say that it “helps them concentrate.” All these years, I have taken their words at face value, assuming that they were fooling themselves into believing this notion. But lately, it has dawned

upon me that maybe music does help them concentrate , whereas mine reacts in a totally different way. This was the beginning of my research paper.

Before reading any studies on the topic, I had my own theory. In my opinion, studying with music leads to overloading one's brain because concentration is required even without listening to anything else. It seems impossible to study effectively while simultaneously reading a book and having somebody speak to you. This idea was confirmed by research conducted on the subject. According to Sissons (2023), working memory is the system designed for temporary storage of information. Any processes connected with learning require working memory to be completed (Tina et all.,2017). When you introduce background music into the equation, you put additional pressure on an overloaded system. One of the students interviewed for the article published in the Korea Times made a very accurate comment, saying that music "clouds out what you're actually supposed to focus on"(Suh,2016). This statement describes my experience precisely.

But I also understand that my own personal experiences would not necessarily reflect those of everyone else. Therefore , I started research.

According to Kwik(2022), a youtuber who provides knowledge on learning techniques, Baroque musi enables people to learn foreign languages faster. From his arguments, it can be noted that Kwik introduces a theory where slow classical music is associated with a calm mind, which makes learning easier through enhanced focus and memory. This idea is, however, contradicted by Sung(2023), who holds that although music may aid learners in performing basic duties, it becomes a hindrance during intensive study sessions. Sung argues that while studying requires intensive brain activity, listening to music distracts a learner from concentrating on the subject.

Batra & Lakra (2014) were my first sources on the subject of music. The authors analyzed the effect of music on human psyche and physiology. According to Sendelbach et al. (2006), the cardiac surgery patients who were subjected to music therapy had a marked decrease in both pain and anxiety. This can be measured physiologically. Iwanage et la.(2005) discovered that sedative music elicited higher perception of arousal than exciting music.

Afterward , I came across the research done by Blood(1999 and 2001), in Blood's (1999) research , he demonstrated that musical dissonance provokes activation in paralimbic brain

areas. You do not even know your brain evaluates the music that you hear and categorizes it as either pleasant or unpleasant. Blood's (2001) second experiment revealed that listening to music provokes brain reward mechanisms that are comparable to those triggered when you eat food or consume medications. Music stimulates your brain's reward circuitry in much the same manner as food consumption does. It was my first major realization. For certain individuals, listening to music while doing assignments may be a rewarding activity. They have been subjected to minor doses of happiness in their brains.

According to Wang (2023), there is a well known "Mozart effect." which implies that listening to Mozart temporarily increases one's spatial intelligence. Nonetheless, the music was listened to prior to the testing, not during the test. In addition, the results showed no significant differences between listening to jazz or classical music and complete silence during the performance of a task ("Psychological reports,"2000). Thus , it is incorrect to claim that listening to classical music automatically turns a person into an excellent student while reading.

The most productive research is related to the connection between one's music preference and personality. As stated by Rentfrow (2012), music preference is one of the most frequently used

measures for everyday activities. Moreover , Hargreaves and North (1999) believe that people express two types of information about themselves through music preference, personality traits and group belonging.

This correlation between music preference and cognitive response was also found during the interviews I conducted myself. During my interview with George, a friend of mine, he mentioned that he prefers to listen to old rap music while studying. According to Rentfrow and Gosling (2007), those people who prefer energetic and rhythmic music like rap and hip-hop have stimulation seeking and high arousal tendencies. Thus, listening to such kinds of music can increase motivation. However, I tried to study by listening to this rap playlist while studying. Even though I like listening to rap music, it often causes me to get distracted and even feel a little sleepy. Hence, despite music preferences, the cognitive responses do not facilitate effective studying for everyone.

This was played out on Tik Tok as well. Creator one says, “I can’t study without my lo-fi playlist. It blocks out all the noise.” creator two adds, “Lo-fi puts me to sleep. I need total silence.” the comments section for that yet. Creator third adds, “everyone’s brain is different.” Although these are people and not scholarly sources, their arguments are exactly what the study tries to understand.

The classification of music is done in terms of three broad categories by Langmeyer, Guglhör-Rudan, and Tarnai (2012). However, the most significant conclusions have been made by Rentfrow and Gosling (2007). According to their study, extroverts prefer upbeat music such as rap and hip hop. Openness to experience people tend to like reflective music such as classical and jazz music.

In addition, those who enjoy reflective and complex music (such as classical, blues, jazz, and folk) will be open to experience, intellectually curious, and have a respect for knowledge. Those who listen to energetic and rhythmic music (such as hip-hop , funk, and electronic) will be introverts, meticulous , and not very aggressive on average. This is surprising to me since I am an introvert and meticulous myself. But it hasn’t happened for me yet. This means that personality is not the thing. Individual characteristics are equally important.

This is when my personal life became involved in my research. While working on my paper, I discovered something about myself. I turned on some jazz instrumental music, a trio of piano without any lyrics or singing with intricate improvisations. And I found out that I wasn't being distracted at all. On the contrary, I was able to concentrate better than ever. I didn't have any overload, instead I felt calm and more concentrated. That pushed me to conduct a more thorough search. Jazz music why jazz? And why did it work for me whereas pop and rock music failed?

As it appears, science has an explanation for it. According to the findings by Dr.Charles Limb from John Hopkins University, the improvisation of jazz musicians entails deactivation of brain circuits that are associated with self-monitoring. As such , jazz allows a person to freely engage in creative processes. Limb claims that Jazz music can be considered a "brain simulator" because it imitates this process using rhythmic beats. Your brain is active since it tries to guess what will come next.

However, timing is key. A study conducted in 2020 by the institut Teknologi Sepuluh Nopember of Indonesia investigated the influence of Jazz music on cognitive functions. The researchers utilized Cambridge Brain Science assessments to evaluate short term memory and concentration skills as volunteers listened to Jazz music at various tempos. In conclusion, Jazz music at a tempo of 120 beats per minute (bpm) had a significant impact on cognitive performance. Volunteers performed better listening to 120 bpm jazz compared to silence or Jazz at 85 bpm and 160 bpm (Hefni, 2020).

That's why I have failed before. The tempo of most popular music varies dramatically. Such unpredictability activates the brain's "alert" system, drawing your attention away from work. However, music at a speed of 120 bpm falls into a "just right" category. It is sufficiently rapid to maintain alertness but predictable and instrumental to avoid distracting you from work. Studies show that optional performance requires moderate arousal levels. Low arousal (silence for some) leads to boredom, while excessive arousal results in mental overloading. Music at a speed of 120 bpm is the solution.

How come I can find this particular pace suitable for me and maybe not all individuals? My age and personality may be factors. According to Reaves et al.(2015), a study published in the Gerontologist shows that young people aged between 18 and 30 years old are less affected by background music during their tasks than older adults,, probably due to the fact that their brains are able to disregard" distracting task-irrelevant information"(Reaves et al.,2015). Kuckelkorn et al. (20121) state that individuals characterized by a higher level of "openness to experience" prefer complicated and novel sounds such as Jazz music.

Not even within the category of instrumentalists do all share a uniform approach. According to a study conducted by Nichols et al., in 2018, jazz artists and classical artists make use of different types of working memory skills during improvisation. In the former case, several improvisations can exist simultaneously in the brain without retaining the previous phrase.

I came across one more source which provided a brief but effective summary of the opposing point of view. Commenting on studying in a quiet environment, one student remarked that "sometimes, silence can be distractive"(Suh, 2016). It was something that I would not even think about. In my experience, silence equals serenity. Yet, in some cases, silence can be full of distracting thoughts.
Therefore, how would you conclude this review?

My original assumption has changed. My initial perception was that my friends were wrong; now I know that they are right as per their minds, while I am right as far as my mind is concerned. What is more, my experience of today has shown me that I do not fit into any category of studying only in silence. What I need is a particular type of music, specifically jazz.

Music impacts human cognition differently depending on the person. For some individuals, it triggers a reward mechanism in their brain, whereas others struggle with cognitive overload of working memory when listening to music. Extraversion and openness to new experiences can account for these differences to some extent, although attention regulation capacity, sensory processing ability, and age also matter. The genre of music makes an enormous difference as well. Tempo counts. Lyrics count. And ultimately, it's all up to your brain.

This project gave me an idea of how research is done. A good study should not just prove your existing assumptions but an enriched study should not prove your knowledge about the issue under consideration. I wanted to prove that all music is distracting and found evidence that certain genres of music such as Jazz at a tempo of 120 beats per minute can be helpful.

I continue to be primarily a silent learner when it comes to subjects I struggle in, like math or difficult reading. However, when it comes to writing and generating ideas, I am now in the jazz gang. I listen to my favorite 120 beats per minute piano trio playlist, and I can concentrate like

never before. My working memory is not overwhelming. Instead, it is perfectly stimulated. And when my buddy plays lo-fi hip-hop music, I don't believe "That's artificial anymore." Now, I believe, "Their reward system is aiding them and my Goldilocks jazz is benefiting me."

Comprehension of a topic requires holding two contradicting thoughts at the same time. Listening to music may improve focus, but it might also impede concentration. Being silent might relax the mind, but it could equally interfere with concentration. It all boils down to the individual listening to the music, the activity they are engaged in, and the kind of music. As a researcher, it is not my responsibility to come up with a conclusive judgment. Instead, it is my mandate to shed light on the reasons behind the contradicting views and assist individuals in finding what suits them best.

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