

Exploring The Perceptions Of Students On Music As An Aid Or Distractor In Learning

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Abstract:

Background: The influence of music on cognitive functions, particularly memory retention, has been a subject of debate in the fields of psychology and education. While some studies suggest that music can improve focus and memory recall, others argue that certain types, especially lyrical music, may be distracting. As more students incorporate music into their study routines, understanding its effects on learning and retention is crucial for optimizing academic outcomes. This study aims to assess students' perceptions of how listening to music affects their ability to retain information during study sessions. It explores the relationship between different music genres, study habits, and their perceived impact on academic performance and memory retention.

Materials and Methods: A cross-sectional, questionnaire-based survey was conducted among students, covering secondary, undergraduate, and postgraduate levels. The online survey consisted of 15 closed-ended questions regarding demographics, music preferences during study, and participants' views on music's impact on retention. Data were analyzed as frequencies and percentages, with demographic factors and preferences examined.

Results: A majority (63.8%) of participants reported listening to music while studying. Preferences were diverse, with 56.7% favoring hip hop and LoFi music, and 36.7% choosing instrumental music. However, opinions on whether music enhances retention were mixed: 10% felt music did not help, 40% believed it did, and 50% were uncertain. Instrumental music was deemed more beneficial for memory retention by 40% of respondents. Notably, 80% of participants found music helpful for retaining information in mathematics, while its impact on other subjects was less pronounced.

Conclusion: The study reveals that music's role in memory retention is highly individualized, with mixed responses regarding its impact on academic performance. Instrumental music appeared to aid retention more effectively than lyrical music, particularly in mathematics. However, the overall effect of music on learning and retention is influenced by genre preference and individual differences, highlighting the need for more targeted research to better understand these dynamics.

Keywords: Music; information retention; academic performance; lyrical music; instrumental music.

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I. Introduction

The influence of music on cognitive processes has gained significant attention across various fields, including psychology, neuroscience, and education (1). One area of growing interest is the relationship between music and memory retention in the students. As educational environments continue to evolve, understanding the potential benefits or drawbacks of music as a study aid is crucial for developing effective learning strategies.

Music engages a wide array of neural networks and has been shown to impact mood, concentration, and cognitive performance (2,3). The influence of music on cognitive processes has been a hot topic for research across various fields, including the link between psychology, neuroscience, and education. However, the specific effects of music on memory retention are complex and inconsistent. The "Mozart effect," which links classical music to improved spatial reasoning skills, serves as a foundational concept (4). Music training can improve verbal memory and learning abilities, suggesting a link between music and enhanced cognitive functions (5). In particular, the relationship between music and memory retention in students has risen in popularity. As educational environments continually evolve, understanding the potential benefits or drawbacks of music as a study aid is crucial for developing effective learning strategies. However, the specific effects of music on memory retention remain complex and occasionally inconsistent. While some studies suggest that certain types of music can enhance focus and memory recall, others indicate that music, especially with lyrics, can be distracting to students and have an impact on how much knowledge they are able to absorb (6).

An article by Mercer (2023), cites cognitive neuroscientist, Steven Smith, to put across the point that, “Words in music are generally distracting. So, if you want to listen to music while you study, try to listen to something that does not have words, or if it does have words, hopefully, it’ll be in a language that you don’t understand at all, otherwise that’s going to distract from the stuff you’re trying to study” (7).

Understanding how music influences memory retention can provide helpful and crucial insights for educators and students. If certain types of music are found to enhance learning, they should be integrated into study environments to improve educational outcomes. Conversely, identifying disruptive and distracting elements of music can help in designing more effective study practices. This study aims to explore the perceptions of participants on the subtle effects of music on retention capabilities in students.

II. Material And Methods

Study settings and participants: This cross-sectional study is a questionnaire-based survey. The study was conducted in July 2024 among participants. The participants were students pursuing higher secondary, graduation and post-graduation. The participants were required to give an online implied consent before taking the survey.

Study tool: The study employed an online closed-ended questionnaire with 15 questions in English language that was divided into three sections: demographics, preference to music listening while studying and perceptions to the influence of music listening while studying. The questionnaire developed with advice from clinical, statistical, and applied biology experts. The readability and understanding of the questionnaire were assessed through a pilot testing in six participant and then the questionnaire was shared for survey.

Statistical analysis: The sample size covered is 47. Demographical details such as gender and education were represented as frequencies and percentages. Responses of the participants to questions were presented as frequencies and percentages. Responses on music listening by gender and education level were compared using chi- square test. p-value < 0.05 is taken as statistically significant. Data analysis was done using SPSS software (version 26).

III. Results

The demographics of the participants in the study revealed a diverse representation. A majority of the respondents 26 (55.3%) were male, while 17 (36.2%) were female, and a small number 4 (8.5%) preferred not to disclose their gender. Regarding their educational background, A majority 35(74.47%) were school going and 12(25.53%) were collegiates. (Table 1)

Table no 1: Socio-Demographic Characteristics of Sample Respondents (n=47)

Category	Frequency	Percentage (%)
Gender		
Boys	26	55.32
Girls	17	36.17
Prefer Not to Disclose	4	8.51
Education		
School Going	35	74.47
Collegiates	12	25.53

Information was elicited on duration of continuous study by the respondents. A little over one third (34.0%) of participants have reported the ability to study continuously for more than one hour. This proportion was same among boys (34.62%) and girls (35.29%) but was higher for collegiates (50.01%) as compared to school going (28.57%). Importantly, none among girls have reported to studying less than 30 minutes. (Table 2)

Table no 2: Distribution according to duration of continuous study by respondents (n=47)

Category	<30 min	30-45 min	45 min - 1 hour	>1 hour
	n(%)	n(%)	n(%)	n(%)
Gender				
Boys (n = 26)	4(15.38%)	7(26.92%)	6(23.08%)	9(34.62%)
Girls (n = 17)	0(0%)	5(29.41%)	6(35.29%)	6(35.29%)
Education Level				
School Going (n = 35)	4(11.43%)	11(31.43%)	10(28.57%)	10(28.57%)
Collegiate (n = 12)	1(8.33%)	1(8.33%)	4(33.33%)	6(50.01%)
Overall (n = 47)	5 (10.6)	12 (25.5)	14(27.8)	16 (34.0)

Regarding music listening habit, out of 47 students, 30(63.8%) reported as listening music while studying. This proportion was higher among boys (76.9%) as compared to girls (52.9%) and the difference was statistically highly significant. Further, though the proportion of respondents listening music was higher among school going students (68.6%) as compared to collegiates (50%), the difference was not statistically significant. (Table 3)

Table no 3: Distribution of Music Listening Habits Among Participants by Gender and Education Level (n=47)

Category	Yes	No
	n (%)	n (%)
Overall		
	30 (63.8)	17(36.2)
Gender		
Boys (n = 26)	20(76.9%)	6(23.1%)
Girls (n = 17)	8(47.1%)	9(52.9%)
Chi square = 7.29; p – value < 0.01		
Education Level		
School Going (n = 35)	24 (68.6%)	11(31.4%)
Collegiate (n = 12)	6 (50.0%)	6(50.0%)
Chi square = 3.72; p – value = 0.051		

Among those who listened to music, their preferences varied: Hip hop (56.7%) and slow tempo/LoFi music (50.0%), followed by instrumental music (36.7%), classical (33.3%), indie pop and heavy metal 30% each. Less popular genres included jazz (16.7%) and K-pop (3.3%). Importantly, more than one music genre was being preferred by most respondents.

Regarding music preferences, 66.7% preferred listening to music through headphones or devices, while 33.3% preferred background music.(Table 4)

Table no 4: Music preference and Mode (n=30)

S. No.	Music Type	n (%)
Preferred Music Type		
1.	Hip Hop	17 (56.7)
2.	LoFi	15 (50.0)
3.	Instrumental Music	11(36.7)
4.	Heavy Metal	9(30.0)
5.	Classical	10(33.3)
6.	Indie Pop	9(30.0)
7.	Jazz	15(16.7)
8.	K-Pop	1(3.3)
Mode of music playback		
1.	Headphones/Device	20 (66.7)
2.	Background Music	10 (33.3)

Opinions on whether music aided retention were divided: 40% believed it did, only 10% said it didn't help, and as high as 50% were uncertain. Additionally, (40%) believed instrumental music helped retain information better than lyrical music, while 26.7% disagreed, and 33.3% were unsure.

As to the response to noticing a change in performance in exams when studied whilst listening to music, compared to studying without music more than three-fourth (76.7%) reported as yes.

In further analysis, 46.7% of students reported a change in exam performance when studying with music. Among those who noticed a change, the majority (45%) rated the effect as moderate (score of 3), while (5%) experienced minimal impact (score of 5). Additionally, 15% each rated the effect as low 1 and 2.

Based on the questionnaire, among those who found music helpful, 80 % said it aided retention in mathematics, 35 % in sciences, 25% in social studies and 15% in other subjects, and 10% in arts and 15% in languages (Table 5).

Table no 5: Impact of Music Listening on Retention while studying (n=30)

Does listening to music promote retention abilities?		
1.	Yes	12 (40.0)
2.	No	3 (10.0)
3.	Not Sure	15 (50.0)

Does instrumental music help retain information better than lyrical music?		
1.	Yes	12(40.0)
2.	No	8(26.7)
3.	Not Sure	10(33.3)
Does listening to music have a positive impact on exam performance?		
1.	Yes	14(46.7)
2.	No	16(53.3)
Subjects with Noted Changes in Performance When Studying with Music		
1.	Mathematics	16 (80.0)
2.	Social Studies	5(25.0)
3.	Sciences	7(35.0)
4.	Language	3(15.0)
5.	Arts	2(10.0)
6.	Others	3(15.0)
Comparison of studying with and without music		
1.	Positive Impact	23(76.7)
2.	No Significant Change	7 (23.3)
Effectiveness of music on a scale of 1-5		
1.	1	3 (15.0)
2.	2	3(15.0)
3.	3	9(45.0)
4.	4	4(20.0)
5.	5	1(5.0)
Can you recall specific songs related to study topics?		
1.	Yes	18 (60.0)
2.	No	12 (40.0)

IV. Discussion

The present study aimed to explore students' perceptions of the influence of music on memory retention, focusing on preferences for music during study sessions and the effects on academic performance.

Regarding retention abilities, 40% of participants perceived that listening to music improved their retention abilities, while 10% disagreed and 50% were unsure. These findings are consistent with a study reported by Southern Methodist University in undergraduate students highlighting lyrical music may by cause distractions while instrumental music may enhance focus thus increasing the productivity. This distinction between the effects of different types of music supports broader research on how auditory environments impact cognitive performance (9).

The findings indicated a diverse range of experiences among participants, with some reporting improved memory retention and academic performance while studying with music, while others experienced distractions or no significant effect. Also, the demographic distribution highlights a significant focus on high school students, providing a comprehensive understanding of the impact of music on academic performance across different educational stages.

Research shows that the impact of background music is heavily influenced by individual factors, including personality traits and study habits. A study by Chamorro-Premuzic et al. (2012) reported that introverted individuals often perform worse in cognitive tasks when background music is present compared to extroverts, who might benefit from music as it improves their mood and reduces anxiety (10) This is in line with the current study's findings, where a significant portion of participants (10%) reported that music did not help with retention, possibly indicating individual differences in response to music while studying.

The preferences for music genres in the present study, where 56.7% preferred hip hop and 50% slow tempo/LoFi music, 3.3% preferred pop, and 36.7% preferred instrumental music, reflect a broad diversity in musical tastes. Similarly, Schäfer et al. (2013) emphasized that genre preferences play a crucial role in how music influences emotional and cognitive responses, which mirrors our findings where no single genre dominated (11). In fact, the lower popularity of jazz (16.7%) and K-pop (3.3%)—aligns with Schäfer's observation that a variety of musical styles influence emotional states differently.

Our study also aligns with Ransdell and Gilroy's (2001) findings, which showed that lyrical music could interfere with verbal memory tasks, supporting the notion that instrumental music may be less cognitively demanding and more conducive to memory retention (12). The current study's significant preference for instrumental music (40%) compared to genres with lyrics supports this argument, highlighting how instrumental music may create a less distracting auditory environment for studying.

Both our study and previous research suggest that music's impact on memory and cognitive tasks depends not only on individual preferences but also on the specific nature of the music. The diversity in musical

tastes found in our participants highlights how different genres can shape the cognitive and emotional context of study environments, contributing to varied effects on memory retention and focus.

Furthermore, the current study shows a notable benefit of music in certain subjects, such as mathematics. This finding aligns with research by Ferrari et al. (2021), who found that listening to music could enhance problem-solving abilities and reduce anxiety levels in mathematical tasks (13). Music's ability to modulate emotions may help students relax and concentrate, ultimately improving performance in subjects that often induce stress. Similarly, National University (2017) suggests that music can help students maintain focus during challenging subjects, supporting our study's result that 80% of participants reported music aided retention in mathematics (14). These consistent findings underscore the potential of music as a tool to enhance learning and performance in demanding academic areas.

The observed differences in students' experiences with music during study sessions may also be related to the cognitive load theory proposed by Sweller (1988). According to this theory, background music could potentially increase the cognitive load in learning environments, especially for complex subjects or tasks that require significant working memory capacity. This explains why some participants reported a detrimental effect when listening to music with lyrics, which could compete for cognitive resources (15). These results suggest that music's impact on memory retention varies, with the most common ratings falling in the middle of the scale.

Additionally, the mixed responses regarding music's influence on exam performance highlight the importance of considering the learning context. De La Fuente et al. (2020) found that while music may enhance mood and motivation during study sessions, it may not necessarily translate to improved test performance. This discrepancy might be due to the differences in study strategies, the timing of music exposure, and the type of content studied (16). This suggests that music may be particularly beneficial for subjects like math, but its effects vary across different areas of study.

Overall, the current study demonstrates that music's role in enhancing or hindering memory retention and academic performance is highly individualized. Factors such as genre, presence of lyrics, and individual cognitive and emotional needs play crucial roles in determining its impact. Future research should further explore the interaction between personal characteristics, music preferences, and the nature of study tasks to provide more definitive recommendations for using music as a study aid.

Limitations

A limitation of this publication is the limited sample size. This being a cross-sectional study based on perceptions, reliability of results could be impacted by personal bias. Future research should consider the assessment of actual music listening behavior and their academic performance to better understand the causal relationships and the long-term effects of music on academic performance. Further investigation into the individual differences among students, such as personality traits and learning styles, could provide more tailored recommendations for music use in educational contexts.

V. Conclusion

To summarize, this research study provided insights into the possible impact of music on academics for high schoolers, and university students. Prospectively, scientifically planned studies could be undertaken to establish the cause – effect relationship as to how listening to music while studying affects the performance of students in tests or exams.

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