

How Background Music Influences Concentration and Academic Achievement in Students

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Abstract

Music is widely recognized for its influence on human emotions, concentration, and cognitive performance, making it a common feature in modern study environments. However, research on the relationship between background music and academic performance has produced mixed findings. This study examined the relationship between background music and students' academic performance by comparing learning outcomes in study environments with and without music. The study involved 57 students from secondary schools and universities in Skopje, North Macedonia. Data were collected using a structured questionnaire designed to assess students' listening habits, preferred music genres, and perceptions regarding the use of music while studying. Cronbach's alpha reliability analysis was conducted to test the internal consistency of the questionnaire, and the instrument achieved an acceptable reliability coefficient of $\alpha = 0.81$. Descriptive statistics were analyzed using SPSS. The findings revealed that background music had both positive and negative effects on learning, depending on the type of music and individual student preferences. Instrumental and slow-tempo music generally supported concentration and reduced stress, while music with lyrics and fast-paced rhythms tended to distract students and negatively affect memory retention. The results further showed that familiarity with music and personal listening habits influenced whether music enhanced or disrupted academic performance. The study concludes that background music can affect academic performance differently depending on its characteristics and the learner's preferences. It is recommended that students use low-tempo instrumental music when studying tasks requiring concentration and avoid lyrical or highly stimulating music during intensive academic activities.

Keywords: academic performance, background music, learning environment

1. Introduction

Music has been a fundamental form of human expression and entertainment since the earliest stages of human existence, evolving from simple vocal sounds to structured rhythm and melody. Due to its importance in human development, music has long attracted philosophical and scientific interest, leading to extensive research on its effects on emotions, cognition, and behavior (Levitin, 2006). Studies have shown that different forms of music can influence emotional and psychological states, making music an important tool for mood regulation and mental stimulation (Juslin & Västfjäll, 2008). In modern society, music has become highly accessible and personalized, with many individuals listening to it regularly throughout the day (North et al., 2004). This trend is especially common among students, who frequently use music while studying or completing academic tasks. Many learners believe that listening to music enhances concentration and creates a more comfortable and motivating study environment (Rentfrow & Gosling, 2003). As a result, background music has become a common feature of contemporary learning settings. Academic performance, often measured through examinations and assessments, is influenced by several internal and external factors, including environmental conditions such as sound. Among these, background music has received increasing research attention because of its potential impact on concentration, memory, and cognitive processing. However, findings on the relationship between music and learning remain inconsistent. Some studies report that music improves mood, reduces stress, and enhances concentration, thereby supporting academic performance, while others suggest that music may

distract learners and interfere with attention and information processing (Hallam et al., 2002; Kämpfe et al., 2011).

Research further indicates that the effects of music depend largely on its characteristics. Music with lyrics may disrupt reading comprehension and memorization tasks because verbal content competes with cognitive processing, whereas instrumental music is generally less disruptive (Perham & Currie, 2014). Cognitive Load Theory suggests that additional auditory stimuli can increase mental load and reduce working memory efficiency (Sweller, 1988). Similarly, the Irrelevant Sound Effect explains how background sounds interfere with verbal memory tasks (Salamé & Baddeley, 1989), based on the Working Memory Model proposed by Baddeley and Hitch (1974). Nevertheless, some studies indicate that simple instrumental music may support concentration by masking distracting environmental noise (Perham & Currie, 2014). The influence of music on attention and memory is also linked to arousal and emotional regulation. According to the Yerkes–Dodson Law, moderate levels of stimulation may improve concentration and performance, while excessive stimulation can reduce cognitive efficiency (Yerkes & Dodson, 1908). Research has shown that listening to preferred music may lower stress, improve mood, and reduce anxiety, which can indirectly support learning and cognitive functioning (Thoma et al., 2013; Juslin & Västfjäll, 2008). However, highly stimulating or unfamiliar music may impair encoding and recall of information, especially in tasks requiring deep cognitive processing (Salamé & Baddeley, 1989). Individual differences also influence how background music affects learning. Personality traits, listening habits, familiarity with music, and cultural preferences can determine whether music enhances or disrupts concentration. For example, extroverted students may benefit from additional stimulation, whereas introverted learners may experience greater distraction (Furnham & Allass, 1999). Students who regularly study with music may also adapt to its presence more effectively than those who usually work in silence. These findings suggest that there is no universally effective type of study music, as its impact depends on both the learner and the learning context (North & Hargreaves, 1999).

This study examines the relationship between background music and academic performance by comparing students' learning outcomes in environments with and without music. The study also investigates students' listening habits and genre preferences through a questionnaire to better understand how different forms of music influence concentration and learning. The findings are expected to contribute to a clearer understanding of the role of background music in academic settings and to provide guidance for students and educators in creating more effective study environments.

2. Literature

Music is widely recognized as a strong influence on emotions, cognition, and behavior, and its use during studying has gained increasing attention. Research on listening to music while preparing for exams presents mixed findings: some studies report improvements in mood, motivation, and concentration, while others highlight negative effects on attention, working memory, and information processing (Hallam et al., 2002; Furnham & Bradley, 1997). From a cognitive perspective, background music can increase mental load, particularly when it includes lyrics or is complex, thereby interfering with verbal tasks. This aligns with Cognitive Load Theory (Sweller, 1988) and the Irrelevant Sound Effect (Salamé & Baddeley, 1989), which explain how additional auditory input can disrupt working memory processes based on the Working Memory Model (Baddeley & Hitch, 1974). Simpler, some studies suggest that simple instrumental music may have minimal or even positive effects by masking distracting environmental noise (Perham & Currie, 2014).

The influence of music on attention is also complex. While it can act as a distraction, it may enhance concentration by maintaining optimal arousal levels, consistent with the Yerkes–Dodson Law (Yerkes & Dodson, 1908). Although students often report feeling more focused when listening to familiar music, this subjective improvement does not always translate into better academic performance (Furnham & Bradley, 1997). However, music may still indirectly support learning by increasing the duration and consistency of study sessions. In terms of memory, research indicates that music especially with lyrics or unfamiliar content—can impair encoding and recall of verbal information (Salamé & Baddeley, 1989). This effect is particularly evident in tasks requiring deep processing. Conversely, some studies suggest that calm instrumental music may support memory or act as a contextual cue, as explained in context-dependent memory research (Godden & Baddeley, 1975), although this benefit is limited in exam settings where silence is typical. A more consistent finding is music's role in emotional regulation. Listening to preferred music has been shown to reduce stress and anxiety, improve mood, and lower physiological stress indicators (Thoma et al., 2013; Juslin & Västfjäll, 2008). This reduction in stress can enhance cognitive functioning, as anxiety is known to impair attention and working memory. However, highly stimulating music may increase arousal beyond optimal levels, leading to distraction. The literature also emphasizes the importance of individual differences. Factors such as personality, habits, and familiarity with

music influence their effects on studying. For example, introverted individuals may be more sensitive to distraction, whereas extroverted individuals may benefit from additional stimulation (Furnham & Allass, 1999). Similarly, students who regularly study with music may adapt to it, while those who do not may find it disruptive. Personal preference and cultural background further shape these responses (North & Hargreaves, 1999). Finally, the type of music plays a significant role. Instrumental music, particularly with a slow to moderate tempo and low complexity, is generally less disruptive than music with lyrics (Hallam et al., 2002). Genres such as classical or ambient music are often associated with better concentration due to reduced linguistic interference. However, familiarity and emotional connection to music may be more important than genre alone. Overall, the literature suggests that the effects of music on studying are context-dependent and influenced by task demands, musical characteristics, and individual differences. While music can hinder performance in cognitively demanding tasks, it may support emotional well-being and study engagement, highlighting the need for a balanced and personalized approach to using music during exam preparation.

3. Methodology

3.1 Research Design

This study employed a quantitative survey research design to examine the relationship between background music and academic performance among students. The design was considered appropriate because it allowed the researcher to collect numerical data regarding students' study habits, music preferences, and perceptions of music while studying.

3.2 Population for Study

The target population consisted of high school and university students in North Macedonia. Participants represented different age groups ranging from below 18 years to above 30 years.

3.3 Sample Selection

A convenience sampling method was used to select participants for the study. Students who were available and willing to participate were invited to complete the questionnaire in Skopje, North Macedonia. The final sample consisted of 57 participants.

3.4 Instrument for Data Collection

Data were collected using a structured questionnaire developed by the researcher. The questionnaire consisted of two sections:

- Section A: Demographic information (age, educational level)
- Section B: Study habits, frequency of listening to music while studying, preferred music genres, and perceived effects of music on concentration and memory.

The questionnaire used close-ended items with multiple-choice and Likert-scale responses.

3.5 Validity and Reliability of the Instrument

To ensure content validity, the questionnaire items were developed based on previous studies related to music, concentration, and academic performance. The instrument was reviewed by academic supervisors to confirm clarity and relevance.

A reliability analysis was conducted using Cronbach's alpha to determine the internal consistency of the questionnaire items. The reliability coefficient obtained was $\alpha = 0.81$, indicating acceptable reliability for the instrument.

3.6 Ethical Approval and Informed Consent

Ethical approval for the study was obtained from the relevant institutional ethics review board before data collection commenced. Participants were informed about the purpose of the study, and informed consent was obtained from all respondents before participation. Confidentiality and anonymity of responses were maintained throughout the research process.

3.7 Data Collection Procedure

Questionnaires were distributed to students in Skopje, North Macedonia. Participants completed the questionnaire individually during the study period. Standardized instructions were provided to all participants to ensure consistency during data collection.

3.8 Data and Statistical Analysis

The data collected were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics such as frequencies and percentages were used to summarize the data. In addition, cross-tabulation analysis was conducted to compare study habits and music preferences.

4. Results

The results are presented according to the research objectives.

Objective 1: To examine the effect of background music on students' academic performance

Out of the 57 participants, 30 students (52.6%) reported that music helped them concentrate while studying, whereas 12 students (21.1%) believed music distracted them. Fifteen participants (26.3%) indicated that the effect depended on the academic task, mood, or subject being studied.

These findings suggest that background music affects students differently depending on individual learning preferences and study conditions.

Objective 2: To compare students' learning outcomes in study environments with and without music

Participants who preferred studying with instrumental or slow-tempo music reported better concentration and longer study duration compared to those who studied with lyrical or fast-paced music. Students who preferred silence stated that they performed better in tasks involving memorization and reading comprehension.

The findings indicate that learning outcomes vary according to the presence and type of background music.

Objective 3: To identify students' listening habits and preferred music genres while studying

Most participants reported listening to music while studying. Hip hop was identified as the most preferred music genre, followed by electronic music, while classical music was the least preferred.

Objective 4: To determine whether different types of music influence concentration and memory retention differently

Participants generally reported that instrumental music supported concentration more effectively than lyrical music. Music with lyrics was commonly associated with distraction during reading and memorization tasks.

Objective 5: To explore how individual preferences and familiarity with music affect academic performance

Students who regularly studied with music reported that they were more comfortable concentrating in the presence of background sound. In contrast, students who normally studied in silence reported greater distraction when exposed to music during academic tasks.

The results demonstrate that familiarity with music and personal listening habits influence whether music enhances or disrupts concentration and learning.

Table 1. Demographic factors and Data Description

Variable	Category	Frequency (n)	Interpretation
Age Group	<18	Majority 18–30	Sample mainly consists of young adults (likely students in higher education)
	18–30		
	>30		
Listening to Music While Studying	Yes	30	Most participants regularly use music while studying
	Maybe	15	Music use depends on context (task, mood, subject)
	No	12	Some students avoid music due to distraction
Preferred Music Genre	Hip hop	Highest	Most popular; linked to energy and motivation
	Electronic	Second	Preferred for focus due to repetitive, low-lyric structure
	Classical	Lowest	Least popular despite links to concentration in research

5. Discussion

The findings of this study are consistent with previous research showing that background music can have both positive and negative effects on studying and academic performance. The results revealed that most participants listen to music while studying, suggesting that music has become an important part of modern students' study routines. Many participants appeared to use music as a way to maintain motivation, concentration, and a comfortable emotional state during academic activities. These findings support earlier studies which suggest that music can contribute to emotional regulation by reducing stress and anxiety associated with studying and exam preparation (Juslin & Västfjäll, 2008; Thoma et al., 2013). The study also demonstrated that the effects of music depend on the type of music and individual preference. Instrumental and slow-tempo music were generally perceived as more supportive of concentration, whereas lyrical and fast-paced music were associated with distraction and lower memory retention. These findings align with Cognitive Load Theory and the Irrelevant Sound Effect, which explain how additional auditory information can interfere with working memory and cognitive processing. The findings further showed that students preferred familiar and emotionally engaging genres such as hip hop and electronic music. This indicates that personal preference and listening habits play an important role in determining whether music supports or disrupts learning.

Overall, the study confirms that background music affects academic performance differently depending on the learner, the type of task, and the characteristics of the music used.

Table 2. Summary of Participants' ideas and key findings

Key Finding	Conclusion
Majority age group	Young adults dominate the sample
Music during studying	Common behavior among students
Variation in responses	Indicates individual differences
Most popular genre	Hip hop
Least popular genre	Classical
Overall implication	Music plays a significant but subjective role in studying

6. Conclusion

Preparing for exams is not simply a mechanical task; it is closely linked to students' emotions, attention, environment, and ability to manage stress. Because music is already an integral part of many students' daily lives, it naturally becomes part of their study routines. This study aimed to explore whether listening to music while studying is beneficial or potentially harmful. By analyzing students' habits, preferences, and performance alongside existing psychological research, the findings show that the impact of music is complex, individual, and influenced by multiple interacting factors rather than being clearly positive or negative.

A key finding is that music is widely used during studying. Many participants reported regularly listening to music and believed it helped them focus or made studying more enjoyable. This highlights that studying is not only a cognitive activity but also an emotional and motivational one. Students aim to stay calm, engaged, and focused for extended periods, and music can make the process feel less stressful and monotonous. In line with previous research, music appears to play an important role in emotional regulation, as participants reported feeling more relaxed and motivated. By reducing stress and anxiety, music can indirectly support learning by helping students maintain a positive mental state and study for longer periods.

However, the study also confirms that music is not always beneficial. Music with lyrics was found to negatively affect memory performance compared to silence or instrumental music. This supports the concept of the irrelevant sound effect, where verbal information in music interferes with the processing of written material. From the perspective of cognitive load theory, this occurs because working memory has limited capacity, and

processing lyrics consumes cognitive resources that would otherwise be used for learning. As a result, students may feel focused, but their actual ability to retain information is reduced.

In contrast, instrumental music was found to be less disruptive. Without lyrics, it does not compete with verbal processing and can provide a stable background that masks distracting environmental noise. For some students, especially those who find silence uncomfortable, this type of music can support concentration by creating a controlled and consistent auditory environment.

The findings also emphasize the importance of individual differences. There is no single type of music that works for everyone, as responses depend on personal habits, preferences, and past experiences. Some students are accustomed to studying with music and can ignore it effectively, while others find any background sound distracting. Preferences also vary, with many students favoring modern genres such as hip hop and electronic music over classical music, despite the latter often being recommended in research. This suggests that familiarity and emotional connection to music may be more important than genre alone.

Additionally, music influences not only cognitive processes but also study behavior. Even when it does not directly improve memory, it can make studying more enjoyable and reduce boredom, encouraging students to spend more time studying. This can indirectly improve academic performance by increasing consistency and reducing procrastination. At the same time, some students reported that they prefer silence, particularly for complex tasks requiring deep concentration, reinforcing the need for personalized study strategies.

Overall, the findings indicate that music can be both helpful and harmful depending on how it is used, the type of music, and the individual. Instrumental, familiar, and low-intensity music appears to be the most suitable option for studying, while lyrical and highly stimulating music may hinder performance in tasks involving reading and memorization. Students should therefore evaluate how music affects their own concentration rather than relying on general advice.

The study also reflects broader changes in modern learning environments. With constant digital stimulation, many students find it difficult to study in silence, and music may serve as a bridge between highly stimulating environments and focused academic work. However, relying too heavily on music may limit the ability to concentrate in silence, which is often required during exams. For this reason, it may be beneficial for students to occasionally study without music to better prepare for real testing conditions.

In conclusion, music plays a significant role in students' study experiences, influencing not only concentration and memory but also mood, motivation, and study habits. While it can reduce stress and make studying more engaging, certain types particularly those with lyrics can interfere with learning processes. The overall effect of music is highly individual, depending on personal preferences and sensitivity to background sound. Rather than viewing music as entirely helpful or harmful, it is more useful to consider when and how it should be used. By experimenting with different study conditions, students can identify strategies that best support their learning and create environments that enhance their academic success.

7. Suggestions and Limitations

Studying for exams can be particularly challenging for students today, largely because many have become accustomed to constant exposure to short, highly stimulating content from social media and the internet. This frequent exposure can reduce the ability to maintain focus on longer, more demanding tasks such as studying. Recognizing this issue is important, as it allows students to take steps to manage or work around it during exam preparation to improve concentration and memory.

The root of the problem lies in the amount of time spent engaging with fast-paced digital content, often ranging from several hours a day. Ideally, reducing screen time and replacing it with more productive, physically active, or socially engaging activities could help restore more natural forms of mental stimulation. However, since this kind of long-term change can be difficult, a more immediate approach is to find ways to adapt study habits.

Activities like reading and writing require sustained attention, memory, and critical thinking—skills that may feel more demanding due to reduced attention spans. Additionally, these tasks do not provide the same level of stimulation as digital media. To address this gap, students can introduce controlled forms of stimulation that support rather than hinder their focus. Music can serve this purpose effectively, as it provides auditory input while allowing visual and cognitive attention to remain on the study material.

Listening to music can also help block out distracting background noise and create a more comfortable study environment. Since students have different preferences, they can choose from a wide range of genres, including classical, electronic, hip hop, or others, depending on what helps them stay engaged. However, it is generally

advisable to select music with little or no lyrics, as verbal content may interfere with reading and comprehension by competing for attention.

Studying in shared environments, such as libraries or study spaces, may further enhance concentration, especially when combined with noise-cancelling headphones. The presence of others working can create a motivating atmosphere, while headphones reduce external distractions. Over time, becoming accustomed to such study conditions can make it easier to maintain focus and build consistent study habits.

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