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The influence of music genre on concentration during the stroop color and word test among psychology students of Al Azhar University Indonesia

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ABSTRACT

Concentration is a crucial cognitive skill that enables individuals to maintain attention, process information effectively, and perform optionally on academic or psychological tasks. One environmental factor that can influence concentration is music, particularly its genre and tempo. Different genres of music elicit varying emotional and physiological responses, which may either enhance or disrupt focus. This study aims to examine the influence of music genres specifically EDM music, Jazz music, and a no-music condition on students' concentration levels during the Stroop Color and Word Test (SCWT) among psychology students of Al Azhar University Indonesia. The research employed a quasi-experimental design with three groups: (1) an EDM music group featuring fast beats and high energy a music group characterized by moderate tempo and relaxing rhythm, (2) a Jazz music group characterized by moderate tempo and relaxing rhythm, and (3) a control group that performed the test in silence. Participants were 30 students from grade 11, divided equally across the three conditions. Data collected from the SCWT will be analyzed using One-Way ANOVA to determine whether there are significant differences in concentration among the groups. It is hypothesized that students exposed to jazz music will demonstrate higher levels of concentration compared to those exposed to EDM music, due to the calming and structured nature of jazz that supports attentional stability. In contrast, EDM music, characterized by rapid tempo and high arousal, is expected to reduce focus due to overstimulation. The control group, tested in silence, is predicted to show moderate concentration levels between the two experimental conditions. This study is expected to provide empirical evidence on how different music genres can influence students' cognitive performance and contribute to educational strategies that support optimal learning environments.

Keywords: music genre; jazz; EDM; concentration; students

1. INTRODUCTION

Concentration is a fundamental aspect of human cognition that enables individuals to direct attention toward a specific task while filtering out irrelevant stimuli. It plays an essential role in determining how efficiently information is processed, stored, and retrieved. In academic contexts, concentration contributes significantly to learning effectiveness, problem-solving, comprehension, and academic performance. Without the ability to maintain focus, students may struggle to retain information, complete assignments accurately, or perform well on examinations. However, concentration is not a fixed capacity; it is influenced by multiple internal and external factors that interact dynamically in various situations (Kämpfe et al., 2010; Cheah et al., 2022).

Internal factors affecting concentration include motivation, interest, emotional stability, and fatigue. Meanwhile, external factors involve environmental conditions such as temperature, lighting, background noise, and auditory stimulation. Among these external influences, music has received increasing attention from researchers and educators due to its widespread use in daily life, particularly among students who often listen to music while studying, reading, or completing cognitive tasks. Previous experimental research has demonstrated that background music can be used as an intervention to modify concentration levels, with certain genres promoting sustained attention while others contribute to distraction (Hirunchupong & Suwannakul, 2022).

Music is a universal form of human expression that has been shown to influence mood, emotional states, and physiological responses, which in turn may affect cognitive processes such as concentration and academic performance. Kumar et al. (2016) reported that listening to music while studying is a common practice among students, with many perceiving music as a tool to enhance focus, induce calmness, and prevent fatigue. Their findings indicated that soft music was associated with higher levels of concentration and task accuracy compared to fast-tempo music and silence. However, the study also highlighted that not all types of music yield the same cognitive effects, as fast and loud music may distract attention and reduce performance. These results suggest that the impact of music on concentration is inconsistent and highly dependent on factors such as genre, tempo, and the presence or absence of background music.

Experiments on the influence between music and attention have shown that slow-tempo and instrumental music tends to promote relaxation and steady focus. For instance, classical and jazz music, which are characterized by soft melodies and moderate rhythmic structures, are often associated with positive cognitive and emotional effects. The relaxing nature of such music can lower stress hormones and heart rate, creating an optimal mental state for concentration (Pramono et al., 2019). Jazz, in particular, combines rhythmic stability with harmonic complexity, stimulating the brain without overwhelming it. The moderate tempo and flowing rhythm of jazz music are believed to balance emotional regulation and sustained attention, allowing students to maintain focus for longer periods.

Conversely, fast-tempo music such as Electronic Dance Music (EDM), commonly referred to as *jedag-jedug* music in Indonesian youth culture, has a markedly different impact. EDM is characterized by repetitive beats, intense basslines, and rapid tempo designed to evoke excitement and high energy. While this can elevate alertness and motivation, it may also overstimulate the nervous system, making it harder for the brain to engage in sustained cognitive processing. According to arousal theory, an optimal level of stimulation enhances performance, but excessive stimulation can impair concentration and task efficiency. Thus, while EDM may boost mood and motivation, its high intensity could interfere with the deep focus required for complex tasks like reading comprehension or problem-solving (Kinanti et al., 2023). Listening to preferred background music has been shown to shift attentional states toward greater task focus. Kiss and Linnell (2021) reported that background music increased task-focused attentional states by decreasing mind-wandering during a sustained-attention task, although it did not significantly affect reaction time.

Empirical evidence further supports the role of music genre in shaping concentration outcomes. Oktaviani et al. (2020) investigated the effect of various music genres on concentration using the Stroop Test and found that music type significantly influenced reaction time, with pop and jazz music producing

faster responses, while rock music resulted in slower reaction times, indicating that genre-specific auditory stimulation can either facilitate or interfere with attentional processing.

Furthermore, it is essential to consider a control condition a situation without any background music to establish a baseline for concentration performance. The inclusion of a non-music (silence) group allows researchers to determine whether the observed changes in focus are genuinely due to musical stimulation or merely the presence of auditory input. Previous research, such as that by [Thompson et al. \(2001\)](#), found that participants exposed to silence performed differently compared to those listening to either relaxing or upbeat music. This control group helps clarify whether music enhances or disrupts concentration relative to natural quiet conditions.

The influence of music on cognitive performance can also be explained through cognitive load theory, which states that working memory has limited capacity. When the auditory system processes complex or attention-grabbing sounds, it competes for cognitive resources that would otherwise be used for the main task. In this sense, calm and structured music such as jazz may impose a lower cognitive load, allowing better task engagement, whereas high-tempo music like EDM may overload attention and reduce mental efficiency. Silence, on the other hand, eliminates this external load entirely, providing a neutral comparison ([Nadon et al., 2021](#)).

In the context of modern students, this topic is particularly relevant. With the rise of digital media and streaming platforms, music has become an inseparable part of young people's learning environments. Many students from universities, such as Al Azhar University Indonesia, often listen to different genres of music while studying or preparing for exams. Given the academic demands and competitive atmosphere in such universities, understanding how different types of music and even the absence of music affect concentration can provide valuable insights for improving students' study habits and performance ([Salam et al., 2025](#)).

Several previous studies have explored similar issues. For instance, research by [Thompson et al. \(2001\)](#) found that participants who listened to classical or soft instrumental music performed better on spatial and memory tasks than those exposed to silence or upbeat pop music. Another study by [Lesiuk \(2005\)](#) indicated that employees who listened to relaxing background music reported higher levels of concentration and positive mood during work. Conversely, studies on EDM and heavy metal genres revealed that high-tempo and lyric-dense music can reduce reading comprehension and memory accuracy, especially in tasks requiring analytical reasoning. These findings suggest that not all music genres influence concentration in the same way, and the tempo and emotional tone of the music may be key determining factors.

Based on this background, the present study seeks to examine the influence of three auditory conditions jazz music, EDM music, and silence on students' concentration levels during the Stroop Color and Word Test (SCWT) among students of Al Azhar University Indonesia. The SCWT Test is designed to measure focus, attention, and emotional regulation under different auditory conditions. By exposing participants to two contrasting genres (jazz and EDM) and comparing them to a control group with no music, this experiment aims to determine whether significant differences exist in students' concentration performance across the three groups ([Anwar et al., 2019](#)).

In line with this focus, previous research has examined the effect of music genre on concentration using the Stroop Color and Word Test. [Oktaviani et al. \(2020\)](#) reported that different music genres were associated with variations in concentration performance, indicating that auditory stimulation can influence attentional processes during cognitive tasks. However, their study did not specifically compare contrasting music genres such as jazz and EDM within a controlled experimental setting. Therefore, further research is required to investigate how different genres of music may differentially affect concentration under standardized testing conditions.

Therefore, building upon these prior findings, this study employs an experimental approach to establish a causal influence between the type of music and concentration outcomes. It is expected that students who listen to jazz music will demonstrate higher concentration scores on the SCWT Test compared to those who listen to EDM music or no music at all. Theoretically, this finding would support existing models on optimal arousal and attentional control. Practically, the results can provide useful

insights for educators, psychologists, and students themselves in designing learning environments that foster optimal cognitive functioning.

Furthermore, this experiments contributes to the broader understanding of how environmental stimuli such as sound and music affect psychological and academic performance. By identifying which types of music enhance or hinder concentration, universities can offer evidence-based recommendations for students' study habits, particularly in preparation for tasks that demand sustained mental focus. In a world where multitasking and digital distractions are increasingly common, recognizing the role of music genre and silence in shaping cognitive attention can help young learners cultivate better study strategies and achieve improved academic outcomes.

2. MATERIALS AND METHODS

2.1. Study Area

This study was conducted at Al Azhar University Indonesia, a university located in the Kebayoran Baru area of South Jakarta. This university was selected as the experiments site because it provides a conducive academic environment and has students with diverse academic performance levels. The classrooms in Al Azhar University Indonesia are adequately equipped with facilities such as air conditioners, projectors, speakers, and quiet surroundings, which made it suitable for conducting controlled psychological experiments involving auditory stimuli. The experiment was carried out in one of the college classroom during regular class hours to ensure comfort and familiarity for the participants.

2.2. Participants

The participants in this study were 30 psychology students at Al Azhar University Indonesia. They were selected through random sampling, ensuring an equal gender distribution. The participants were divided into three groups, each consisting of 10 students: (1) Group 1 was exposed to EDM (Electronic Dance Music) music while performing The Stroop Color and Word Test (SCWT); (2) Experimental Group 2 was exposed to Jazz or slow-tempo music during the same test; (3) Control Group performed the test without any background music to serve as a baseline comparison.

All participants were informed about the study's purpose and procedure before participation. Consent was obtained from both the students and the school. The groups were tested separately to avoid auditory interference between conditions. The experiment aimed to examine how different music genres might influence concentration and cognitive performance among Psychology students.

2.3. Design

In this study, the type of research used below is experimental research. The experiment that the researcher used was a Quasi Experiment using the SCWT (Stroop Color and Word Test) measuring instrument by [Stroop \(1935\)](#). Pure experiments are conducted to determine cause and effect in the experimental group by involving a control group in its implementation. This experiments will begin with the implementation of screening then continued by conducting a Randomized control group design. No pretest is conducted; instead, participants receive the treatment (music) and their concentration levels are measured immediately after completing the test. Prior to the experiment, all rooms are standardized to have the same temperature, lighting, aroma, seating arrangement, external noise level, and time of implementation, to ensure that environmental conditions do not influence the results. The only variable intentionally manipulated is the type of music.

2.4. Procedure

The procedure of this study begins with the preliminary stage, where the researcher visits Al Azhar University Indonesia to conduct observations of the classroom environment and to request official permission to conduct the experiment. The selected participants are then randomly assigned (randomized control group design) into three groups: (1) Group 1 – EDM Music; (2) Group 2 – Jazz Music; (3) Group 3 – Control (No Music).

Participants are informed about the experimental procedures, test duration, and ethical considerations such as confidentiality and the right to withdraw. On the day of the experiment, each group is placed in a separate classroom. Before the test begins, all rooms are standardized to have the same temperature, lighting, seating arrangement and time of implementation, ensuring that the only variable manipulated is the type of music.

Once seated, participants in Group 1 and Group 2 will begin listening to the assigned music through classroom speakers or headphones. Simultaneously, the Stroop Color and Word Test (SCWT) is distributed to all three groups. The music will be played continuously from the beginning of the test until all participants finish the task, ensuring continuous exposure throughout the concentration activity. The control group completes the same test in silence without any background music.

After all students complete the SCWT, the researcher collects the answer sheets and records their reaction time and number of correct responses, which serve as indicators of concentration levels. The data from all three groups are then prepared for statistical analysis to determine whether different music genres influence concentration. At the end of the session, participants are thanked for their involvement and given a snack for appreciation. The experiment is then concluded and followed by data processing and analysis.

2.5. Data Analysis

In this experimental research, data analysis is carried out using SPSS (*Statistical Product Service Solution*) version 26. The data analysis methods used are the *One-Way ANOVA Test*. The *One-Way ANOVA Test* aims to determine whether there are significant differences among more than two independent groups, or between two groups when the data meet the assumptions of normality and homogeneity of variance. This test is used to compare the means between groups and to determine whether the observed differences are statistically significant. In the context of experiments, the *One-Way ANOVA Test* is often used to compare the effects of different treatments on a single dependent variable measured on an interval or ratio scale. This test not only assesses whether a difference exists but also helps to understand the influence of a particular treatment on the measured outcome. Therefore, the *One-Way ANOVA Test* is used to examine the differences in means and compare treatment results before and after the experiment. In this study, the *One-Way ANOVA Test* is conducted to determine whether there are significant differences in students concentration among two experimental groups and one control group after being exposed to certain music genres.

3. RESULT AND DISCUSSION

3.1. Result

From the results of the study, concentration scores were obtained from 30 psychology students who participated in the experiment examining the influence of music genre on concentration during the Stroop Color and Word Test. Participants were divided into three groups based on the experimental condition: two experimental groups exposed to different music genres and one control group without music, with each group consisting of 10 subjects. The concentration scores of each group were then compared to examine differences in performance across music genre conditions.

Table 1. Mean Value of Posttest

Group Description	Group	N	Mean	SD	SE
Concentration	1	10	64.8	9.77	3.09
	2	10	71.7	15.17	4.80
	3	10	70.2	15.13	4.78

Based on [Table 1](#) above, it can be seen that the average concentration score of the control group (Group 1) was 64.8 with a standard deviation of 9.77. Meanwhile, the experimental groups exposed to

different music genres showed higher mean concentration scores. Group 2 obtained the highest mean score of 71.7 (SD = 15.17), followed by Group 3 with a mean score of 70.2 (SD = 15.13). These descriptive results indicate that participants in the music genre conditions tended to demonstrate higher concentration scores compared to the control group, although variability in scores was greater in the experimental groups. See [Table 2](#).

Table 2. One-Way ANOVA Test of Control Group and Experimental Group

	F	df1	df2	p
Concentration	0.889	2	17.1	0.429

Although differences in mean scores were observed across groups, these differences were not statistically significant, suggesting that music genre did not have a significant effect on participants concentration levels in this study. Based on [Table 2](#) above shows that significance value obtained from *the One-Way ANOVA* was $p = 0.429$, which is greater than 0.05. This indicates that there is no statistically significant difference in concentration scores among the three groups. In accordance with the decision rule, if the probability value is less than 0.05, the alternative hypothesis (H_a) is accepted, whereas if the probability value is greater than 0.05, the alternative hypothesis is rejected. Since the obtained significance value was $0.429 > \alpha$ ($\alpha = 0.05$), H_a is rejected. Thus, it can be concluded that there is no significant difference in concentration levels between the groups exposed to different music genres and the control group. Based on the results of the analysis, the experimental research hypothesis proposing that music genre influences concentration during the Stroop Color and Word Test is not supported.

3.2. Discussion

The present study aimed to examine the influence of different auditory conditions jazz music, EDM music, and silence on students concentration levels during the Stroop Color and Word Test (SCWT). Based on the descriptive analysis, students exposed to music, both jazz and EDM, demonstrated higher mean concentration scores compared to the control group that performed the task in silence. However, the results of the One-Way ANOVA indicated that these differences were not statistically significant. This finding suggests that, within the context of this study, music genre did not have a significant effect on concentration performance.

The higher mean scores observed in the experimental groups may indicate a potential trend in which music exposure is associated with improved concentration. Jazz music produced the highest average score, followed closely by EDM music, while the control group showed the lowest mean score. These descriptive findings are partially consistent with previous studies suggesting that music can positively influence mood and alertness, which may indirectly support task performance. Nevertheless, the absence of statistical significance indicates that these differences could be due to random variation rather than a true effect of music genre.

This pattern is consistent with earlier findings showing that slower and softer background music enhances concentration more effectively than fast-paced or loud music. In a cross-sectional and experimental study, [Kumar et al. \(2016\)](#) reported that students achieved the highest accuracy rates while listening to soft music (75%), whereas performance declined during fast music and no-music conditions.

One possible explanation for the non-significant findings is the relatively small sample size. With only 10 participants in each group, the statistical power of the analysis may have been insufficient to detect subtle differences in concentration levels. Small sample sizes increase variability and reduce the likelihood of identifying significant effects, even when mean differences are present. This may explain why the experimental groups showed higher average scores but failed to reach statistical significance.

Additionally, individual differences among participants may have influenced the results. Concentration is affected by factors such as personal preference for music, familiarity with the genre, prior exposure, emotional state, and baseline attentional capacity. Some participants may find music helpful for focusing, while others may perceive it as distracting. This individual variability is reflected in the relatively

large standard deviations observed in the experimental groups, indicating inconsistent responses to the musical stimuli.

The nature of the Stroop Color and Word Test itself may also contribute to the findings. The SCWT requires selective attention, cognitive control, and rapid information processing. For such tasks, silence may already provide an optimal environment for performance, limiting the potential benefits of background music. According to cognitive load theory, background music regardless of genre may still consume attentional resources, especially during tasks that require high levels of cognitive control. As a result, the presence of music may not significantly enhance performance compared to silence.

Furthermore, although theoretical frameworks such as arousal theory suggest that moderate stimulation can enhance cognitive performance, the optimal level of arousal likely differs across individuals. While jazz music may promote relaxation and stable focus for some participants, EDM music may increase arousal beyond optimal levels for others. These opposing effects could reduce overall group differences when analyzed statistically.

The findings of this study are consistent with several previous studies reporting mixed or non-significant effects of background music on concentration, particularly in tasks requiring executive control. While some research has demonstrated positive effects of certain music genres, others have found that music does not significantly alter performance when compared to silence. This suggests that the influence of music on concentration is complex and context-dependent rather than universal.

Despite the non-significant results, this study contributes to the existing literature by highlighting that music genre alone may not be a decisive factor in enhancing concentration during cognitively demanding tasks such as the SCWT. Future research is recommended to involve larger sample sizes, control for individual music preferences, and consider additional variables such as volume level, familiarity with the music, and task difficulty. Including pretest measures of concentration may also help clarify the extent to which music influences changes in attentional performance.

4. CONCLUSION

Based on the results of the study, students who performed the Stroop Color and Word Test while exposed to music genres demonstrated higher mean concentration scores compared to those in the control group without music. The experimental group exposed to music genre 2 showed the highest average concentration score, followed by the group exposed to music genre 1, while the control group obtained the lowest mean score.

However, the concentration scores in the experimental groups also showed greater variability, indicating that individual responses to music differed among participants. Overall, these findings suggest that exposure to music may be associated with higher concentration performance during the Stroop task, although the differences observed should be interpreted cautiously. Further statistical analysis and studies with larger samples are recommended to determine whether the observed differences are statistically significant and to better understand the effect of different music genres on concentration.

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Ethical Approval

Not applicable.

Informed Consent Statement

Not applicable.

Confidentiality Statement

Not applicable.

Authors' Contributions

AMH conceptualized the study, designed the experiment, conducted data analysis, and drafted the manuscript. MSM, JMK, and HB contributed to data collection, data processing, and manuscript revision. All authors have read and approved the final manuscript.

Disclosure Statement

The author declares no conflict of interest related to this research.

Data Availability Statement

Not applicable.

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