

EFFECTS OF BACKGROUND MUSIC IN COMPLETING ACADEMIC TASKS AMONG CHILDREN

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Abstract. Majority of adolescent read, study for test, and complete their homework while listening to music. Listening to music while studying is known as multitasking. Focus and ability to multitask play a large role whether or not adolescents listen to music while studying. Previous studies on the effect of background music on the performance of certain tasks have shown positive, negative, and neutral effects. The purpose of this quantitative study was to explore the effects of background music in completing academic task in Malaysian schools. A total of thirty-eight (N = 38) secondary school students completed the test papers, under the no music condition and with background music condition. An analysis of variance (One-Way ANOVA) determined that there is no significant difference in test scores between the two groups. Thus, the learning condition without music or learning condition with music does not have any effect on the students' test scores. Results are important for students, parents, and educators to enhance and improve students' academic achievement through students' learning styles.

Keywords: *music education, teaching and learning, quantitative, ANOVA, children, early childhood*

Introduction

Music is significant in our lives. People listen to music on the radio at home and in their car; they watch music videos on television or mobile; they buy CDs or download music; and they attend concerts (Adriano, 2010). For many centuries, music has played an important role in daily life. Recent technological developments (e.g., the CD, the Internet, the iPod) have made listening to music increasingly accessible, convenient, portable, and affordable (Lonsdale and North, 2011). Previous studies have proven the importance of music to support children's development, enhance their cognitive and coordination ability (Anuar and Ismail, 2021; Ismail and Anuar, 2020). Music affects important aspects of adolescent development; it may be both protective and risky; and it can be used as an auxiliary component in prevention and intervention (Miranda, 2012).

Young adults listen to music for approximately 18 hours a week (Greasley and Lamont, 2011). Lyle and Hoffman (1972) reported that half of their male adolescent participants listened to music for three hours per day while half of their female adolescents listened for four hours per day (North et al., 2000). North et al. (2000) also found that listening to music was preferred above other indoor activities but not outdoor activities. Lonsdale and North (2011) found that people spend 3.66 hours daily listening to music. Fitzgerald et al. (1995) reported that Irish adolescents put their interest in music rather than all other leisure activities. Hui (2001) discovered that Hong Kong students spend their free time listening to recorded music for one to two hours and listening to the radio for less than an hour. Rana et al. (2011) found Pakistani young adults listen to music for an average of 1.45 hours per day. English and American adolescents listen to music to meet social and emotional needs (Tarrant et al., 2000).

Most studying undertaken at home is accompanied by music or the TV playing in the background (Patton et al., 1983). The study of adolescents doing reading assignments in a quiet setting and then studying in non-quiet setting (with music or TV in the background) for different homework, found students admitted that quiet setting is the best study condition to achieve best performance. Listening to music while studying could help students concentrate (Kumar et al., 2016). Kotsopoulou and Hallam (2004) found that American, English, Greek and Japanese students seldom listening to music while revising for examinations, memorizing, or learning foreign language. Most turned off the music when they felt it was interfering with their concentration. Goltz and Sadakata (2021) discovered people listen to music while doing cognitive tasks such as reading, writing, memorizing, and critical thinking.

Importance of music to adolescent

Academic task is a piece of work that connected with education such as written assignments, homework, reading, and studying. In education, something a teacher gives students to do as part of the educational process that may be done in or out of class (Ismail et al., 2021a). Having students complete an assignment, memorize a piece of music, or read and outline a chapter from the textbook are all educational task (Ely and Rashkin, 2005). Students always insist they can study better while listening to music (Anderson and Fuller, 2010). Although they agreed that a quiet setting is conducive to studying, but they still preferred to do their homework with music and TV playing in the background (Patton et al., 1983).

Listening to music while studying is known as multitasking (Paul, 2013). Multitasking slows the mental processes. Focus and ability to multitask play a large role whether or not adolescents listen to music while studying. Music simply can be harmful if they cannot adequately complete three or more task simultaneously. Music can either be a great motivator for learning or a huge distraction. There have been studies done over the years about the effect of music and learning. Salame and Baddeley (1989) in Sandberg and Harmon (2003) stated that listening to lyrical music while studying creates a huge distraction. The disruption with music is apparent with speech. Distractions from bothersome surrounding discussions are equivalent to listening to music. Music was used most frequently for creative learning activities and less for memorization (Rodel, 2021).

Effect of background music on academic task

Hallam et al. (2002) found that students always perform reading or mathematical tasks with calming background music. William (1961) found that popular music negatively affects mental test performance requiring quantitative ability. Meanwhile, classical music did not affect mental test performance negatively. This is supported by the evidence that studies conducted on popular music leads to detrimental effects (Adriano, 2010; Anderson and Fuller, 2010; Furnham and Bradley, 1997; Fogelson, 1973; Henderson et al., 1945) while some studies found that classical music have positive effects (Hallam et al., 2002; DeMers, 1996). However, Thompson et al. (2011) revealed that classical music is most likely to disrupt reading comprehension when the music is fast and loud. On the other hand, Manthei and Kelly (1999) found that both classical and popular background music have no effect on the Math test scores. Previous studies by Dodge and Mensink (2014) discovered students studying under the

conditions of being accompanied by pop music, classical music, or silence indicates no effect. Thus, studying for a test while listening to music may cause little to no detriment to comprehension. Dobbs et al. (2011) found students performed better in silence and music than in noise when doing the cognitive test. This finding is supported by a study conducted by Peter (2010). The participants who scored the best in the reading comprehension task were those who performed the reading task in silence. Thus, he concludes that the best way for students to study is to study in a quiet room.

Music had more detrimental effect on the children of lower ability than those of higher ability (Fogelson, 1973). Cassidy and Macdonald (2006) reported that participants perform poorly in all cognitive tasks in the presence of background music compared to the condition of silence. This supported the previous studies on the negative effects of background music. Henderson et al. (1945) found the effect of music as a source of distraction during taking a test (Kotsopoulou and Hallam, 2006). According to Boyle and Coltheart (1996), both lyrical and instrumental music negatively affects the achievement of reading comprehension and short-term memory tasks (Anderson and Fuller, 2007). Furnham and Strbac (2002) found that both music and noise were equally distracting when they compared the differences in distraction between music and noise in the background while subjects doing a reading comprehension task. A study by Adriano (2010) reported that participants, who listen to music while completing reading and writing assignments, tend to have lower Math and English grades. A study conducted by Anderson and Fuller (2007) indicated that students studying with no music scored better than those who listened to music. Thompson et al. (2011) found that listening to background instrumental music is most likely to disrupt reading comprehension when the music is fast and loud. Ismail et al. (2021b; 2020) found music helps gifted children to overcome their problems such as asynchronous development and overexcitability. However, Sandberg and Harmon (2003) found that there was no significant difference in the absence or presence of background music. A study conducted by Gillis (2010) also indicated that there were no significant differences between silent and music conditions.

On contrary, some studies suggest that background music could enhance the speed of working on mathematical problems (Hallam et al., 2002). The calming music led to a better performance on both arithmetic and memory task when compared with a no music condition (Hallam et al., 2002). DeMers (1996) found that students performed better on the reading comprehension test with background music. Hall (1952) in Kotsopoulou and Hallam (2006) found that performance on reading comprehension tests was significantly improved when background music was playing. Bahr and Christiansen (2000) explored the inter-domain transfer of knowledge between music and math (Cox and Stephens, 2006). They found that students performed better on mathematical tasks only if the mathematical tasks were of the same structure as those found in music. Feng and Bidelman (2015) discovered that listening to familiar music decreases the frequency of mind-wandering episodes and accelerates reaction times (RTs). As part of an experiment including a lexical congruity test, the researchers examined the impact of familiar and unfamiliar classical music on mind wandering. They found that familiar music led to faster reaction times and fewer instances of mind wandering than new music. Feng and Bidelman (2015) hypothesized that the larger beneficial impact of familiar music may have resulted from its familiarity inducing emotional arousal and enjoyment, hence reducing stress. However, they did not compare the effects of music and quiet, nor did they do a sustained-attention test.

Deems (2001) found that students who often study with music scored higher on the reading comprehension test than students who did not usually study with music.

Many studies have been conducted to study if background music influences the performance of many different tasks. The examples cited in Adriano (2010) are spatial activities (Jones and Estell, 2007; Jones et al., 2006; McKelvie and Low, 2002; Thompson et al., 2001; Nantais and Schellenberg, 1999), math performance (Hallam et al., 2002; Hallam and Price, 1998), and reading comprehension, mental arithmetic, and prose recall (Furnham and Strbac, 2002). Previous studies of the effect of background music on the performance of certain tasks have shown positive, negative, and neutral effects. Some researchers concluded background music leads to distraction (Thompson et al., 2011; Adriano, 2010; Peter, 2010; Anderson, 2007; Cassidy and Macdonald, 2006; Furnham and Strbac, 2002; Furnham and Bradley, 1997; Boyle and Coltheart, 1996; Fogelson, 1973; Henderson et al., 1945), some studies claimed beneficial effect (Dobbs et al., 2011; Hallam et al., 2002; Deems, 2001; Bahr and Christensen, 2000; DeMers, 1996; Hall, 1952) and yet other studies proclaimed neutral effect (Dodge and Mensink, 2021; Gillis, 2010; Sandberg and Harmon, 2003; Manthei and Kelly 1999).

Adolescents continue to study and complete their homework while listening to music. However, previous studies do not consistently confirm whether this has positive or negative effects. After extensive research, it can be safely pointed out that a study on the effects of background music in completing academic tasks has never been carried out in Malaysia, thus this study is warranted. Malaysian educators could benefit from the study to improve students' academic achievement through their learning styles.

Materials and Methods

Research design

This study applies a quantitative approach using the quasi-experimental design specifically nonequivalent groups design. A quasi-experimental design, similar to a true experiment, seeks to demonstrate a cause-and-effect relationship between the independent variable and dependent variable. In contrast, quasi-experiments are not dependent on random assignment. Instead, subjects are randomly assigned to groups based on factors other than chance. When a true experiment cannot be conducted for moral or practical reasons, quasi-experimental design is a useful alternative (Reichardt, 2019). Nonequivalent group design involves selecting similar pre-existing groups, but only one of the groups gets treatment. In this study context, the nonequivalent group design is implemented by involving two groups of students (experiment group and control group) as shown in *Figure 1*.

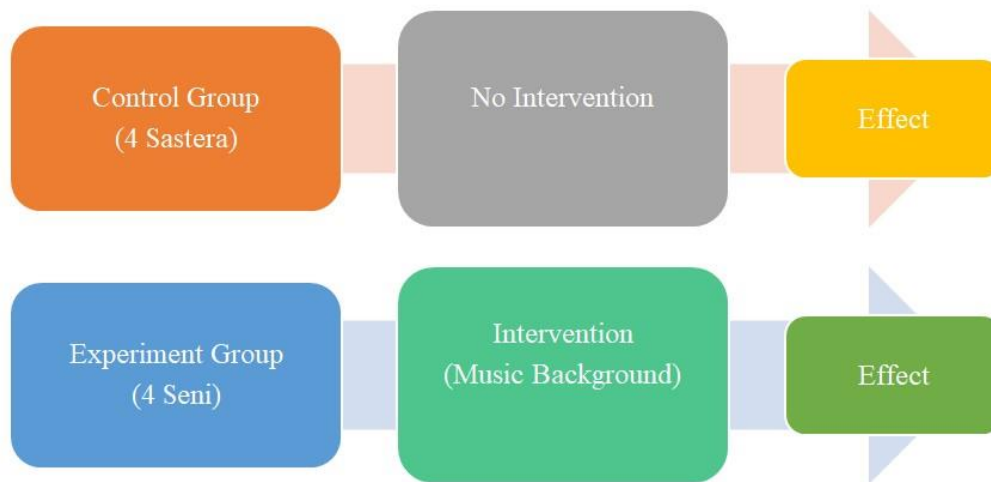


Figure 1. *The Nonequivalent Group Design.*

This study was conducted in classrooms of Sekolah Menengah Kebangsaan Rantau Panjang, Klang. The static-group comparison design was selected for this study. In the static-group comparison design, two existing groups are used (two classes). Two groups are selected because the two groups being compared are already formed – that is, the subjects are not randomly assigned to the two groups. The researcher would (a) find two intact groups (4 Sastera and 4 Seni), (b) assign the new treatment (background music) to one of the classes but have the other class do the tests without any music present, and then (c) measure the test scores of both groups. The independent variable is the learning condition which is learning condition with music and learning condition without music. Meanwhile, the dependent variable is the test scores. There were two groups for this study: control and experimental. The test without background music was administered to the control group while the test with background music was administered to the experimental group. The treatment sessions were conducted under two learning conditions: (a) in a classroom without any background music, and (b) in a classroom with background music. The Bahasa Melayu and Mathematics tests were administered under both learning conditions. The study was conducted in two days period.

Sample

The present study was conducted in urban area in a secondary school in Selangor, Malaysia. Approval was obtained from the Ministry of Education and Selangor Education Department to conduct this study. The students were selected by class distribution. The two selected classes were 4 Sastera (N = 20 students) and 4 Seni (N = 18 students). A total of thirty-eight N = 38 students (N = 19 males, N = 19 females) were assessed during this study. The students from 4 Sastera were doing the test without the presence of background music, while the students from 4 Seni were doing the test with the presence of background music. The participants' mean age was 16 years. All the students were competent in speaking, reading and writing Bahasa Melayu, and competent in mathematical calculations.

Data collection

The Bahasa Melayu reading comprehension test consists of three passages, each consisting of three questions. The test was adapted from *Praktis A++ SPM Bahasa Malaysia Tingkatan 5* workbook published by Penerbitan Pelangi Sdn. Bhd. Permission was given by the publisher to reproduce the pages 33-36. Based on the pilot study, the number of question was decreased to eight questions. The test reliability is $r = 0.73$ that shows the test is reliable and should produce consistent results. The Mathematics test consists of thirty objective questions which were based on Chapter 1 of Form 4 KBSM Mathematic syllabus. The test was translated to Bahasa Melayu because the students learned Mathematics in the language. The use of calculator was allowed during the test. The test was adapted from *Smart Practice: Mathematics Topical Practice Form 4* workbook published by Oxford Fajar Sdn. Bhd. Permission was given by the publisher to reproduce the pages 5-6. The reliability of this test is $r = 0.84$ which should produce consistent results.

The music that was played in the background during the treatment session consisted of 2012 and 2013 popular songs downloaded from YouTube. A total of 17 songs were selected to be played during the treatment session. The list of songs are Oppa Gangnam Style (Psy), Sayang (Shae), Sahabat (Najwa Latif), Danza Kuduro (Don Omar), Ombak Rindu (Hafiz & Adira), 0330 (U-Kiss), Beautiful Monster (Neyo), Anak Kampung (Jimmy Palikat), Cinta Qaseh (Nubhan & Mila), Tapi Bagaimana (Spider), Bila Aku Jatuh Cinta (Awi Rafael), Taboo (Don Omar), Harlem Shake (Baauer), Stay (Rihanna & Mikky Eko), Busan Vacance (Haha & Skull), and The Girl Who Can't Break Up, The Guy Who Can't Leave (Lee & Jungin).

Procedure and analysis

The participants were assigned to one of two groups (control group or experimental group) according to the class distribution for reasons of efficiency. On the first day, the students in control group completed the Bahasa Melayu and Mathematics tests under the non-music condition. On the second day, the students in the experimental group completed the Bahasa Melayu and Mathematics tests with the presence of background music. The statistics used for data analysis was the One-way analysis of variance (One-Way ANOVA). One-Way ANOVA is used to determine the significant level for Bahasa Melayu and Mathematics tests achievement between the control and experimental groups.

Results and Discussion

The purpose of this study was to explore the effects of background music in completing academic tasks. This study examined the differences in scores obtained on Bahasa Melayu test and the Mathematics test given in two different conditions: (a) in a classroom without any background music and (b) in a classroom while they were listening to music. A total of thirty-eight ($N = 38$) Form 4 students participated in this study. The data obtained from $N = 38$ students was analysed. The data were analysed using the Statistical Package for Social Science software (SPSS) version 19. The comparison of mean between the two groups namely, the data compared the mean scores in Bahasa Melayu test and Mathematics test between the two groups (group with music and the group without music). This is to compare the mean between the two groups. Value which is greater than .005 is perceived as no significance difference and value less than .005 is considered as having a significance difference.

Table 1 shows the one-way ANOVA analysis on the significant level of Bahasa Melayu test scores between the two groups. There was a no significant difference between the Bahasa Melayu test scores and the groups ($p = .031$). This indicates the learning condition with the presence of background music or the learning condition without the presence of background music did not affect the Bahasa Melayu test scores. Table 2 shows the one-way ANOVA analysis on the significant level of Mathematics test scores between the two groups. There was a no significant difference between the Mathematics test scores and the groups ($p = .036$). This indicates the students who did the Mathematics test with background music or without background music does not have any effect on the test scores.

Table 1. One-Way ANOVA Analysis of Comparison between the Two Groups for Bahasa Melayu Test Scores.

		MS	F	P
Bahasa Melayu	Test scores	12.65	5.02	.031
		2.52	-	-

Table 2. One-Way ANOVA Analysis of Comparison between the Two Groups for Mathematics Test Scores.

		MS	F	P
Mathematics	Test scores	89.42	4.73	.036
		18.89	-	-

The current study found that students who did the tests while listening to background music performed at the same level as those without the music present. Results indicated that there were no significant differences between the two groups. This finding supports previous studies by Manthei and Kelly (1993), Sandberg and Harmon (2003), and Gillis (2010). The studies concluded that listening to music while completing an academic task does not make any difference in academic achievement when compared to the absence of music. The participants commented that the music was distracting. They were alert to the background music as evidenced by song recognition, foot tapping, and head nodding. They also tend to sing along with the music while completing the tests. The memory trace had been disrupted by the music. Based on the data analysis, there is no significant difference between the test scores and the two groups. Thus, the learning condition with the presence of background music does not have any effect on the test scores. The experimental group was doing the test in the presence of background music. They do not have any option to choose their preferred music played as background music. It is better if they do the test with their preferred music. Thus, this could lead to a more strong result. The control and experimental group were administered in classrooms. There was noise distraction which made the subjects unable to concentrate on the tests. It is necessary to conduct the tests in an appropriate room with no noise distraction. Thus, this could lead to a better result.

Conclusion

The present study was designed to explore the effects of background music in completing the academic task. After this research was done, it is clear that the use of popular background music does not affect the test scores. Findings found that there were no significant differences between the two groups. Students who did the tests while

listening to background music performed at the same level as those without the music present. Thus, learning in the presence or absence of music will not affect academic achievement. Future studies may want to explore the effects of various types of music such as jazz, hip hop, and classical on academic achievement.

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Conflict of interest

The author confirms that there is no conflict of interest with any parties involved with the study.

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