

# Does Absolute Music Help Chinese College Students Improve the Study Performance? A Test of Absolute Musical Influence

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## ABSTRACT

This study investigated the absolute music's short-term effect on Chinese college students' academic performance. One questionnaire contains Chinese college freshmen level Math problems (Estimated time: 40 mins), which were picked from several final review question lists. Based on our two groups (totally 52 persons) of participants' Math learning experiences during the first year of college. One group of students listened to absolute music for 30 minutes before the Math test, another group of students did not listen to absolute music before the Math test. The result of the comparison between two groups revealed differences among two groups. The group with absolute music had a higher average score and used less time than the non-absolute music group. Our findings echoed previous studies on the relationship between absolute music and academic performance, enabling us to better understand the positive study effect of absolute music.

**Keywords:** Chinese college student, absolute music, academic performance, math, positive affect.

## 1. INTRODUCTION

Absolute music, very similar to pure music, has no lyrics and simply gives people auditory enjoyment by just using musical instruments, which is a universal thing. The term absolute music has both a normative and a descriptive aspect, was originally conceived as an ideal form of composition, and the normative dimension of absolute music indicates that absolute music is the ideal choice for composition [1]. Many people relax and relieve stress after listening to absolute soothing music [2], and this trait can also be applied to college students. According to Kumar et al. [3], listening to music can improve undergraduate medical students' attention and academic performance. This study hopes to find out whether absolute music can relieve students' study pressure and improve students' performance [4].

The development of today's society has increased the popularity of higher education, but it has also increased the pressure on senior high school [5] and college students [6]. Some students are addicted to some bad behaviors, such as smoking and drinking [7]. Many

students can't bear the pressure brought by study and choose suicide to end their lives [8]. This study pursues the fundamental source of study pressure is study performance. Therefore, by improving study performance, students can relieve the pressure of learning.

There's actually been some research on how music can improve Academic Performance. For example, in one recent study, Yoon [9] found that music plays an important role in children's brain development and academic performance, as it improves performance in math, language, and other areas of learning. And Muslimah [10] found that listening to music when studying could help make Medical undergraduate students have better concentration and academic performance. Still, there has been no detailed research about the relationship between the short-term study performance of Chinese college students with absolute music.

This research study intends to establish an experiment with listening to/not listening to absolute music as the independent variable and participants' answers to

mathematical questions [9] as the dependent variable. This research design helps to test whether listening to absolute music before learning would improve study/academic performance [11] by collecting and analyzing experimental data to determine and draw conclusions.

### ***1.1. The importance of the research***

This study claimed that by releasing pressure and preventing outside distractions with absolute music, college students' learning efficiency could be greatly improved. The increasing psychological pressure of college students results in tremendous psychological pressure, like anxiety, depression, and sleep problems. Music, at this time, could heal the pressure accumulated in the student community and purify their soul. Also, music can effectively affect people's emotions and is reflected in people's psychological responses. According to Aalberset et al. [12], music could be applied to alleviate students' depressive psychological symptoms, relieve their nervousness and anxiety, and encourage the mental health of college students.

Therefore, by constructing the mathematic test with and without absolute music as two manipulated independent variables, this research tries to explain and evaluate the correlation between absolute music and college students' study performance. To be more specific, this study predicts that listening to absolute music during study can release college students' pressure and improve their learning quality and results. Based on Innes' and his colleagues' [13] research, people's cognitive and memory functions could be dramatically enhanced by listening to music.

#### ***1.1.1. How to solve the problem***

To help college students to find better ways to relieve pressure through research to improve learning efficiency while having a better learning environment, this study solves the situation that students are under great learning pressure but cannot find reasonable and effective ways to relieve pressure. The importance of finding out the correlation of musical variables and study efficiency is that listening to music is very popular [14]. The phenomenon of listening to absolute music while doing important work is becoming more and more common in society. In addition, there are many types of music. Students also have a wide choice of music. It is very important to choose suitable music adapting to the present situation [15].

To provide effective answers and solutions for problems, this research should find the students at the same age doing the same set of math questions and a group under the condition of absolute music through the questionnaire, another group under the condition of no absolute music. Finally, this study would check the

accuracy rate of the math test and calculate the time it took to complete the math test. During the research process, this study will find out whether music is very helpful to improve college students' learning efficiency and can effectively neutralize the factors that distract our attention in the subconscious system. Additionally, there is no detailed research on how music can improve learning efficiency, so this opens the way for new research into the impact of music on learning efficiency.

## **2. PURPOSE OF THE STUDY**

### ***2.1. Objectives***

Given these considerations, the purpose of this study was to: examine the relations between absolute music and college student's academic performance and determine whether it has a positive influence on students' learning results.

#### ***2.1.1. Hypotheses and Predictions***

Consistent with the past studies conducted on Chinese college students [16], this research expected absolute music to be positively associated with academic performance [17] in Chinese college students. Moreover, consistent with general research findings, this study expected absolute music to be negatively associated with learning pressure like math anxiety [18]. This research study expected to see that participants who listened to absolute music before the study group gave the participants a math test performed better on the math test faster and with higher accuracy. In addition, through this experiment, this study hopes to find out whether absolute music can relieve the pressure of participants to improve their short-term concentration [19] and thinking ability [20] to better complete the problems within the scope of their math tasks in this semester.

Finally, this study group makes predictions because our group wants to find out more influential factors in the process of prediction and then control them as much as possible in the process of research to achieve the maximum success rate of the research. This research study is confident that in an absolute music-based environment, students can improve their concentration and prepare for exams in a better state of mind so that absolute music should have a short-term positive on their academic performance. And this study hypothesized that listening to absolute music while doing a math test would lead to better math test scores and efficiency.

## **3. METHOD**

### ***3.1. Participants***

This study plans to collect data from 52 participants (28 males, 53.84%) from two different Universities in

China. All the participants are freshmen, and they should be taking the same level of math course. They will be recruited through the Internet or post information on Wechat Moments.

Be sure the symbols in your equation have been defined before the equation appears or immediately following. Please refer to “Equation (1),” not “Eq. (1)” or “equation (1).”

### 3.2. Measures

#### 1. Experimental materials and instruments.

The experiment program is programmed by E-prime 2.0 software. All test questions are presented on a white background display screen; music is presented via earphones. Participants took part in the test individually in a quiet environment.

Test materials: A Math test paper with 1 multiple choice and 6 Computational problems would take about 40-50 minutes. The questions are the same average difficulty coefficient. The test questions are the learning content of the subjects in the current semester, drawn from the school's mid-term and final exams. The difficulty coefficient of each question is tested in advance by 52 freshmen college students with the same background to ensure that the overall answering time of the test paper is consistent with the correct answering rate.

Musical materials: Choose different types of absolute music (natural instruments and electronic instruments) to form a 30-minute playlist. The playlist order is determined, and the loudness of the music is kept consistent (50 dB). This experience [21] demonstrated the most comfortable loudness for pure tones is 51.7. For the experiment to be more controllable, the music to be more controlled, we decide to keep the pure music at 50 dB. And our group decided to use Mozart's Piano Concerto No. 21 CK467 as the absolute music group's music in the 30 minutes before the test. It will be played on a loop.

### 3.3. Procedure

In this experiment, the dependent variable is the reaction time and correct rate of the subjects in answering mathematics questions under different experimental conditions.

The procedure of the experiment is as follows: The experiment randomly divided all participants into two groups. This study assigned the first group does not listen to absolute music in their thirty minutes reviewing time before having the test, and this is the control group. In the experimental group, these participants listened to absolute music thirty minutes before the time to review. After the participant has solved the question, they would

provide us the time they used for the test and grade their tests. The entire test was prepared online, and the link was shared with participants who could voluntarily participate in the mathematics test.

Approval for the study will be obtained from the Institutional Review Board of the participating university. Informed consent Participants will not be made aware of the purpose of the study until after they have completed all measures. After submission, they will be debriefed.

## 4. DATA ANALYSIS PLAN

In this study, we plan to test whether students could learn better with absolute music. The manipulated independent variables are two different learning environments given to the students: one is the learning environment with absolute music, and the other one is the learning environment without absolute music. And the dependent variable is the result of students' reading and mathematical performance, as rated by judges using a set of pre-established criteria.

Scores are obtained from each participant in each group, and the scores of the experimental group are compared with the scores of the control group. E-prime 2.0 was used to collect the answering time and the correct answer rate of the subjects. SPSS 19.0 was used to compare and analyze the problem-solving time and correct rate of students in the background of absolute music audition. Depending on the number of groups and the scale of measurement of the dependent variables, the dependent measure represents score data, and there are two groups. And this study used the t-test for independent groups to construct the statistical analysis and test the mean difference. Lastly, the T-statistic and p-value will be reported. Power and effect size will be calculated.  $P \leq 0.05$  is a sign of a significant difference.

## 5. RESULTS

### 5.1. Description and statistics

The descriptive statistics results for the listening group and non-listening music group, mean (M) and standard difference (SD), are shown in the following table (N= 52). The “Accuracy” is the ratio of the participant's scores to the total score of 14 points. No significant gender differences were found in response time, test score, and accuracy, according to the independent sample t-test (28 males, 24 females;  $P > 0.05$ ).

**Table 1.** Descriptive results of this study.

Listening, music group		Non-listening music group	
M	SD	M	SD

Response time (minutes)	39.35	10.04	43.35	6.21
Test score	8.69	1.78	7.77	1.53
Accuracy (%)	0.62	0.13	0.55	0.11

## 5.2. Difference analysis

To test the differences in response time, test scores, and accuracy of the two groups of individuals, this study used an independent sample t-test for analysis. It was found that for the response time, the listening music group was marginally significantly lower than the non-listening music group ( $t=-1.73$ ,  $p= 0.090$ , Cohen's  $d= -0.48$ ); At the same time, the test score of the music group was marginally significantly higher than that of the non-music group ( $t = 2.00$ ,  $p = 0.051$ , Cohen's  $d = 0.55$ ). In terms of answering accuracy, the correct rate of the music group was significantly higher than that of the non-music group ( $t= 2.01$ ,  $p= 0.050$ , Cohen's  $d=0.58$ ).

Overall, compared to the non-listening music group, the listening music group had faster answer times, higher test scores, and higher accuracy rates.

## 6. CONCLUSION

Based on Kumar's and colleagues' [3] findings, students' concentration and study productivity could be improved by music. Likewise, assuming that learning in the environment with absolute background music, we obtain students' study results and study efficacy would be better according to this research result.

Admittedly, this study has several limitations because of the Covid-19 pandemic. To make a more reliable conclusion, it would be better to have enough participants as sufficient as possible. This study only called together 52 students to participate in this research during this period. Also, because of the online research method we designed in the era of coronavirus, it is hard to strictly control some details in the experimental process. For example, we could not make sure whether our participants listened to the absolute music in the full 30 minutes we provided. Furthermore, all participants' intelligence level and their mathematical abilities were unknown in the study. In addition, this finding is the short-term process and reaction. Students could only improve their study performance and efficacy in the short term after studying with absolute music. To improve the study performance and maintain a high GPA in school for a long time, students still have to work hard and keep concentrating during study instead of relying on music.

However, these findings indeed have several implications for the educational field. More people will understand the importance of absolute music in educational and developmental psychology, and they could effectively apply it in a noisy environment to

ignore subconscious distracting factors when they are studying or working.

Our study wants to explore the impact of absolute music on the math performance of Chinese college students. Through the study, we find that absolute music has a positive impact on the math performance of Chinese college students. We were listening to absolute music to review before the test could improve the effect of math scores. The current test cannot guarantee much quantification because of many factors and will be improved in the future.

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