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Effect of Weekly Time Spent Learning and Practicing Musical Instruments on the Intensity of Jitteriness among High School Teenagers in Mainland China

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ABSTRACT

Psychological disorders have become increasingly prevalent [Liang, 2021]. Among 875 cases, 33.03% of high school students in Mainland China possess some psychological problems [Liang, 2021]. Research has shown that successful musical engagement positively affects physical, social, educational, cognitive, and emotional health [Wang (2022).]. Unfortunately, Chinese teenagers aren't thoroughly studied the connection between musical training and mental health [Pang et al. (2017)]. Also, no statistically significant association between music playing and psychological well-being is seen in previous research [Wesseldijk et al. (2019)]. So, this study investigates how time spent practicing musical instruments influences the intensity of jitteriness among high school teenagers (15~18 years old) to provide insights about mental health-directed musical education in mainland China. This study recruits 200 teenagers from mainland China across 11 provinces via convenience and snowball sampling method. Models were conducted hierarchically using linear regression. In the univariate model, time spent practicing musical instruments weekly was associated negatively with the intensity of jitteriness (β=-0.151, p-value=0.033). In the multivariant model, participants' time spent practicing musical instruments per week was significantly and negatively associated with the intensity of jitteriness (β=-0.312, p-value=0.001), adjusted for confounding variables: total time spent on playing musical instruments, positive emotion intensity, negative emotion intensity (other than jittery), and age. The model was built using simple linear regression with r^2=0.267. This cross-sectional study shows a significant negative association between weekly time spent practicing musical instruments and the intensity of negative emotions.

Introduction

Music, a multisensory and motor experience, is an indispensable part of entertainment activities. Much research about mental health and musicianship shows that hours of music practice have correlated with a lower possibility of alexithymia (a dysfunction in emotional awareness and interpersonal interaction) [Wesseldijk et al. (2019)].

Specifically, music, as an emotional stimulus can change the mood and improves memory [Moltrasio et al.]. By immersing themselves in music or actively participating in playing music, students can improve their aesthetic appreciation, relieve their stress, and build confidence [Wang (2022).]. Playing a musical instrument has been shown to improve psychological well-being in students, older adults, and people with mild brain injury by affecting movement, cognition, and interpersonal communication. For instance, music engagement improves mental well-being among women with postnatal depression and depression among sedentary people [Dingle et al. (2021)]. Moreover, music instrument learning and practicing elevates passion, happiness, relaxation, and tolerance of uncertainty among adolescents [Dingle et al. (2021)]; music learning helps ease anxieties and improves attentiveness or concentration [Harney et al. (2022)].

Music education, however, is an interdisciplinary demanding profession that requires the collaboration of psychologists, neurologists, teachers, and therapists [Wang, (2022).]. Generally, music education concentrates on developing music skills from rudimentary music theories, specific instrumental techniques, and music composition skills to interpretation of traditional music culture or national spirit [Dong, (2022).]. It's believed that music education and training to theorize the impact of music on psychological well-being is helpful for students' mental health. Therefore, besides time spent practicing musical instruments, music training goals can affect teenagers' mental health [Sun (2022)]. Besides time spent on musical instrument practice, other factors, including the difficulty of the musical instrument, the difficulty of the piece of music, the level of supervision, and the purposes of learning, can all affect negative emotions. At the same time, emotional regulation ability is a possible moderator between the effect of time spent practicing musical instruments and negative emotions. Emotional regulation allows humans to recover more quickly from psychological stress [Wang, (2022).]. Time spent practicing musical instruments is an effective emotion regulator by generating, maintaining, or enhancing emotions for personal benefits [Henry et al. (2021)].

Hypothesis

Jitteriness refers to a negative emotional state of intense nervousness, anxiety, and apprehension, usually with trembling [Armentrout and Caple (2001)]. For this study, the null hypothesis (H0) is that the time spent practicing musical instruments does not affect the intensity of jitteriness. The alternative hypothesis is that the time spent practicing musical instruments will affect the intensity of jitteriness. The more time spent practicing musical instruments until reaching a specific time limit, the lesser the occurrence of jitteriness among high school students (15-18) in mainland China.

Hypothesized Model

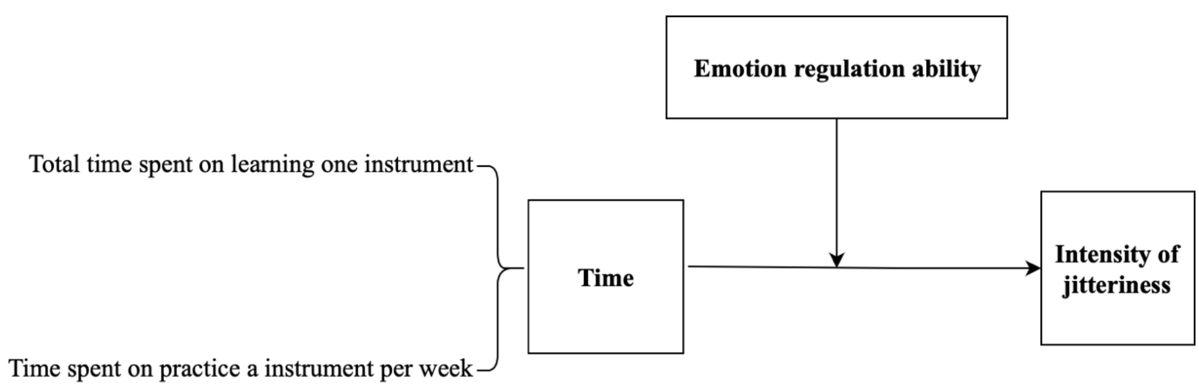

Figure 1. Conceptual model about effect of time spent on practicing musical instruments on intensity of jitteriness with emotion regulation ability as moderator

Methods

Study Design

A web-based, cross-sectional survey was conducted using a convenience and snowball sample of 200 15~18 years old students. These participants had expressed their willingness to be involved in the study and were contacted online via social media (WeChat) and face-to-face offline. The survey consists of four sections: socio-demographic data, emotion regulation data, types of positive and negative emotions experienced, and negative emotions related to jitteriness to provide a comprehensive understanding of the participants. At the same time, this study population was obtained from 11 different provinces in mainland China. The survey was administered between June 27th 2023 and June 30th 2023.

Time spent practicing musical instruments assessment

The assessment of time spent on musical instrument practice was determined by the Motivation for Learning Music (MLM) questionnaire [Comeau et al.] and the Edinburgh Lifetime Musical Experience Questionnaire (ELME) of music instrument practice, including years played, years of formal training, frequency of regular exercise, and time of usual practice [Okely et al.]. Before teenagers proceed to other sections, they were asked whether the played musical instruments by clicking “Yes” or “No” to divide participants into two groups: musical instrument learning group and the placebo group. The amount of time a person spends practicing a musical instrument varies by level of skill, type of instrument, efficiency of practice, and personal goals and motivation. Research suggests an average of 4 hours of daily practice over ten years is required to reach the expert level [Zhukov (n.d.)]. However, this time varies depending on the instrument played. Physical demands and general difficulty of instruments, pianists, and violinists practice the most. Woodwind players, brass players, and singers practice the least due to their dependence on the lungs. For beginners, at least an average of 1~2 hours per week or an average of 10~20 minutes per day is needed to simply play through the music [Musicnotes (2023)]. As a result, questions in the study include types of musical instruments played, number of musical instruments learned, total time spent on weekly practice of musical instruments, and total time spent on learning musical instruments.

Intensity of jitteriness assessment

The questionnaires used in this research were adapted from those used in previous relevant research. In this research, the Positive and Negative Affect Schedule (PANAS) [Karim et al., 2011], the multidimensional emotional questionnaire (MEQ) [Klonsky et al. (2019)], and the Emotion Regulation Questionnaire (ERQ) [The Experiment Factory: Survey, n.d.] were synthesized into one new questionnaire measuring emotional experiences. Repeated items of the questionnaires were deleted to prevent collinearity problems. These questionnaires have two main advantages. First, both of these questionnaires have high internal reliability. PANAS has an average Cronbach alpha coefficient score ranging from 0.86 to 0.90 for the Positive Emotion Scale and 0.84 to 0.87 for the Negative Emotion Scale [Díaz-García, 2020]. MEQ has Cronbach's alpha values of 0.85~0.98 for each emotion. Most items had a corrected item-total correlation higher than 0.30 ($r>0.3$) [Widiasih, 2023]. ERQ has a statistical significance among Chinese children (10~12 years old) with the Cronbach's alpha value of CR (cognitive reappraisal emotion regulation strategy) =0.75, and that of ES (expressive suppression emotion regulation strategy) was 0.72, suggesting acceptable reliability [B. Liu, 2015]. Second, PANAS and MEQ are complementary. PANAS screens the relationship between the positive and negative affect of certain personality traits since options like "Very Slightly or Not at All, A Little, Moderately, Quite a Bit, and Extremely" aggregate the complexity of emotional experiences into one single rating. MEQ, which contains different dimensions (frequency, intensity, persistence, and regulation difficulty) of one type of emotion, can complement the limitation of PANAS.

Study population

The population of my study is teenagers (15~18 years old) in high school in mainland China. Therefore, the standard score (Z value) with 95% confidence level and 5% margin of error is $\mathrm{invNorm}(0.975, 0, 1) = 1.95996 \approx 1.96$. Therefore, the sample size with finite population of 660 students can be calculated as [Cochran, W.G., 1963]

$$n' = \frac{n}{1+\frac{Z^2 \times P(1-P)}{\varepsilon^2 \times N}} = \frac{\frac{Z^2 \times P(1-P)}{\varepsilon^2}}{1+\frac{Z^2 \times P(1-P)}{\varepsilon^2 \times N}} \frac{384.16}{1+\frac{1.96^2 \times 0.5(1-0.5)}{0.05^2 \times 600}} = 234.206$$

where z is the z score, ε is the margin of error, N is the population size, and p is the population proportion (use 0.5 when unknown). As a result, 235 samples should be included to possess 95% confidence interval, and the sample size response rate is 85.1% (n=200).

Subjects and recruitment

All Chinese mainland students within 15~18 years old of age represented eligible participants. The age range ensures that the research is focused on teenagers. Students from Hong Kong, Macao, or abroad were not included because of possible heterogeneity in the musical education system. However, Chinese students with non-China nationality were included in the study. Students not in mainland China were not eligible and excluded from the third question of the first section of the online survey. The introduction section of the questionnaire provided study details and emphasized that students did not have to practice musical instruments to participate. Participants were asked to recall their time spent practicing musical instruments (timing per regular practice and total learning time) and emotional experiences within one week (7 days). Participants who completed the survey online were automatically entered into a prize draw; each person could win one 5¥. Other participants recruited offline were awarded a snack.

Participants eligibility

A total of 200 teenagers 15~18 years old responded to the survey. 189 were from mainland China with 11 respondents from abroad. All the students (n=200) were within 15~18 years old since eligible participants were contacted in advance. Three people with invalid total time musical instrument learning (less than three months) were excluded. Therefore, 93% (n=186) data collected were effective. Figure 2 shows the number of teenagers excluded based on the eligibility criteria.

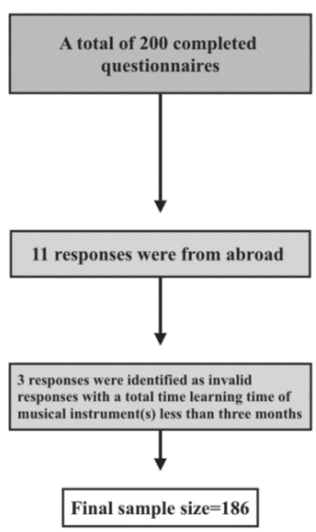

Figure 2. Numbers of teenagers excluded based on fulfilment of various eligibility criteria

Covariants

The analysis selected covariates based on current knowledge of potential confounders associated with the intensity of jitteriness. Social-demographic characteristics considered were sex (male or female), current age (15~18 years old), cities and provinces in mainland China, and intensity of positive emotions measured by the PANAS scale. Musical instrument learning and practicing experiences (total time spent on learning musical instruments varied from less than three months to more than ten years, number of musical instruments learned (1 to more than 3), types of instruments, and quality of practicing musical instruments).

Results

Statistical analysis

In this study, Pearson's correlation analysis examined the broad picture of the relationship between time spent practicing musical instruments and negative emotions. The detailed models were constructed hierarchically, starting with Model 1 (univariant linear regression model), which included only the routine time spent practicing musical instruments and negative emotions. Subsequently, Model 2 (Multivariant linear regression model) was developed, incorporating social-demographic data; quantitative variables of grade levels, number of musical instruments learned, and total time spent on learning musical instruments. The effect of confounding categorical variables (locations and types of musical instruments) on negative emotions are tested by chi-square.

Two linear regression models and chi-square tests are used to assess the associations between time spent practicing musical instruments and negative emotions and analyze whether practicing musical instruments lead to differences in the intensity jitteriness. Differences were considered statistically significant if $p<0.05$ (two-sided). Multiple regression models made were considered significant if $p<0.05$. Adjustments were made for potential confounders, and beta values (β) were analyzed to account for their influences. The covariates considered in the analysis included (current ages, intensity of positive emotions, total time spent on learning musical instruments, number of musical instruments learned, and quality of practicing musical instruments). The results of the univariant model about the effect of time spent practicing musical instruments on negative emotions and the simple linear regression model with confounders were reported.

Descriptive statistics summarize the data collected, providing numerical information on the effect of time spent practicing musical instruments on negative emotions. Data management and analysis were conducted using Wen Juan Xing and SSPSAU (version23.0), respectively [*SPSSAU – online SPSS analysis application*, n.d.].

As seen in Table 2. The average score of 186 participants experiencing positive emotions (items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19 on the PANAS scale) is 32.42 out of 50 marks (64.84%). The average score of 186 participants experiencing negative emotions (items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20 on the PANAS scale) [Karim et al., 2011] is 24.55 out of 50 marks (49.10%). Thereby, participants experience more positive emotions than negative emotions as a whole. Among 186 participants, 27.00% (n=54) feel jittery "very slightly or not at all". 26.00% (n=52) feel "a little" jittery. 24.00% (n=48) feel jittery "moderately". 18.50% (n=37) feel jittery "quite a bit". 4.50% (n=9) feel "extremely" jittery.

Participant Characteristics

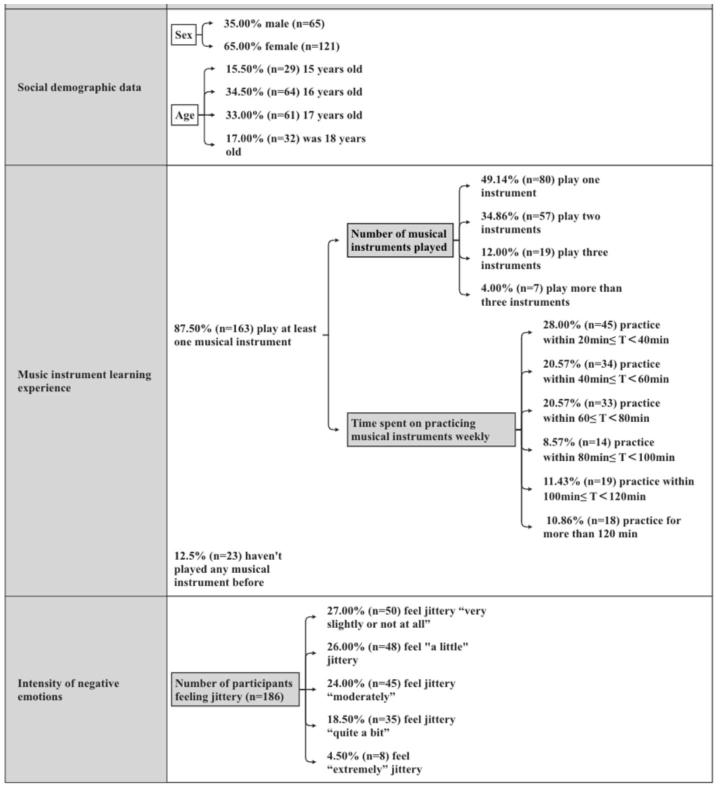

Figure 3. Participants characteristics (social-demographics data and music-learning experience assessment)

Univariate regression model

Table 1. Key statistical indicators (central tendency, kurtosis, skewness, and coefficient of variation) of jitteriness and time spent on practice musical instrument per week.

Name	Average±1SD	Variance	Q1	Median	Q3	Standard error	Average 95% CI(LL)	Average 95% CI(UL)	IQR	Kurtosis	skewness	coefficient of variation(CV)
Intensity of negative emotion (jittery)	2.475±1.199	1.437	1	2	3	0.085	2.309	2.641	2	-0.968	0.307	48.43%
Time spent on practice musical instrument per week	2.140±2.506	6.282	1	2	4	0.177	1.793	2.487	3	0.011	-0.576	117.12%

Model 1 is the basic model displaying the relationship between time spent on practicing musical instruments and the intensity of jittery using linear regression. VIF value<5 and tolerance value >0.2 indicate that the model has no collinearity problems. The model formula is:

$$INE_{Jittery} = -0.072T_{week} + 2.630$$

$INE_{Jittery}$ represents the negative emotional intensity jitteriness, and T_{week} represents time spent practicing musical instruments per week. Overall, the VIF value=1.000 and Tolerance value=1.000 suggest no collinearity problem. Also, the D-W value=1.938 is closer to 2, suggesting no autocorrelation. The model R^2 is 0.023 means that time spent practicing musical instruments per week can explain the 2.3% change in the intensity of jitteriness. The model passed the F-test (F=4.623, p-value=0.033), which means that, as a whole, the time spent practicing musical instruments statistically significantly impacted the intensity of jitteriness in the previous week. The value of the regression coefficient is -0.072 (t=-2.150, p-value=0.033), which means that, on balance, time spent practicing musical instruments impacts the intensity of jitteriness negatively. So, the more time spent practicing musical instruments, the less intense jitteriness will be.

Table 2. Univariant linear regression about the effect of time spent on practicing musical instrument on intensity of jitteriness (n=186).

	Unstandardized coefficient		Standardized coefficient	t	p	Collinearity test	
	B	Standard error	Beta			VIF	Tolerance
Constants	2.63	0.111	-	23.785	0.000**	-	-
Time spent on practice musical instrument per week	-0.072	0.034	-0.151	-2.15	0.033*	1.000	1.000
R^2				0.023			
Adjusted R^2				0.018			
F				F (1,198)=4.623,p=0.033			
D-W value				1.938			

Independent variable： Intensity of the negative emotion (Jittery)

* p<0.05 ** p<0.01

Multivariant Model

Besides the independent variable of time spent on playing musical instruments per week" (T_{week}), model 2 incorporates other confounding variables. They are "total time spent on playing musical instruments" (T_{total}), "positive emotion intensity of being interested" ($IPE_{interested}$), "negative emotion intensity of being distressed" ($INE_{distressed}$), "positive emotion intensity of attentiveness" ($IPE_{attentive}$), and "age" (Age). All the confounding variables have VIF value larger than 10 and tolerance smaller than 0.2. The equation of model 2 is:

$$INE_{Jittery} = -0.151T_{week} + 0.072T_{total} - 0.300IPE_{Interested} + 0.391INE_{distressed} + 0.318IPE_{attentive} + 0.095Age$$

Confounding variables, including total time spent playing musical instruments (β=0.200, p-value=0.030), positive emotion intensity (interested) (β=-0.257, p-value=0.000), positive emotion intensity (attentive) (β=0.293, p-value=0.000), and negative emotion intensity (depressed) (other than jitteriness) (β=0.333, p-value=0.000) were included to build the final model explaining the relationship between time spent on practicing musical instruments and the intensity of jitteriness.

Overall, the D-W=1.941 is closer to 2, suggesting an excellent model without autocorrelation. Also, based on the collinearity test, VIF values are all smaller than 5 and tolerance values are all larger than 0.2, indicating no collinearity problems. According to the F test (F=12.084, p=0.000), the model is statistically effective. The model R^2 is 0.273 means that five variables above can explain the 27.3% change in negative emotion intensity of jitteriness.

Only two variables: "the time spent on practicing musical instruments per week" and "positive emotion intensity of being interested negatively associate with intensity of jitteriness". Specifically, the more teenagers practice per week (20 minutes to more than 120 minutes), the less intense the jitteriness will be. Since researches have suggested that regardless of emotions expressed in music, longer exposure to music (more time on practice) improves emotional states and increases positive effects as well as decreases the negative ones [Magraner et al.]. Also, the more positive emotion of being interested, the less intense the jitteriness will be. Only the confounding variable of "Age" (p-value=0.223) isn't considered statistically significant. Consequently, the model can explain the relationship between regular time spent playing musical instruments and jitteriness. Because no clear gradation of stress can be seen in 186 samples, there is no significant correlation between grade level and negative emotions.

Table 3. Multivariant (including 4 other confounders) linear regression about the effect of time spent on practicing musical instrument on intensity of jitteriness (n=186).

	Unstandardized coefficients		Standardized coefficients	t	p	Collinearity test	
	B	Standard error	Beta			VIF	Tolerance
Constants	1.435	0.346	-	4.151	0.000**	-	-
Time spent on practice musical instrument per week	-0.149	0.043	-0.312	-3.486	0.001**	2.117	0.472
How long have you played the music instrument(s)?	0.072	0.033	0.2	2.187	0.030*	2.213	0.452
Positive emotions of being interested	-0.296	0.078	-0.257	-3.793	0.000**	1.215	0.823
Negative emotions of being distressed	0.392	0.074	0.333	5.315	0.000**	1.039	0.963
Positive emotions of being attentive	0.322	0.074	0.293	4.339	0.000**	1.21	0.827
R^2				0.267			
Adjusted R^2				0.249			
F				F (5,194)=14.167,p=0.000			
D-W value				1.922			

Independent variable: Intensity of the negative emotion (Jittery)

* $p<0.05$ ** $p<0.01$

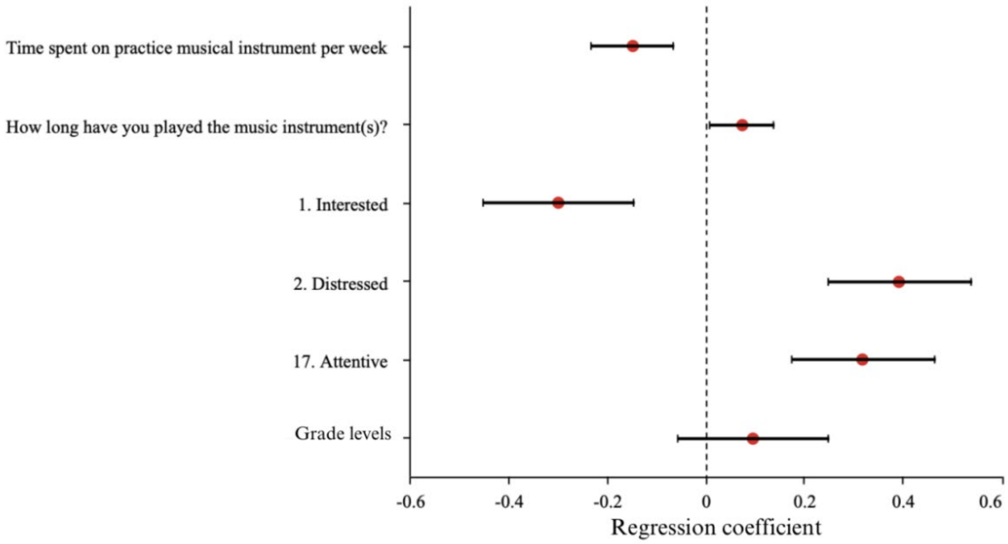

Figure 4. 95% regression coefficient about the effect of time spent on practicing musical instruments on intensity of jitteriness

Chi-square test

Chi-square tests were done to compare whether categorical social-demographic variables, including "Age", "Sex", and "Quality of practice." Affect the intensity of jitteriness. Different age groups (15~18 years old) do not show significant differences in the intensity of jitteriness (χ^2=9.300, p-value=0.677). Instead, the intensity jitteriness is consistent with all age groups. Similarly, different sexes (male and female) don't show a significant difference in intensity of jitteriness (χ^2=3.773, p-value=0.438). Also, the intensity of jitteriness doesn't demonstrate significant differences with respect to practice quality with detailed criteria (χ^2=11.483, p-value=0.933). Thus, no confounding categorical variables associate with intensity of jitteriness.

Table 4 (a). Chi-square test to determine whether sex affect intensity of jitteriness.

Dependent variable	Choices	Sex(%) (n=186)		Total	Chi-squre (χ2)	*p*
		Male	Female			
Intensity of jitteriness	very slightly or not at all	14(21.43%)	36(30.00%)	54(27.00%)	3.773	0.438
	Moderately	20(30.00%)	25(20.77%)	48(24.00%)		
	Quite a bit	14(21.43%)	20(16.92%)	37(18.50%)		
	Extremely	3(4.29%)	6(4.62%)	9(4.50%)		

* p<0.05 ** p<0.01

Table 4 (b). Chi-square test to determine whether age affect intensity of jitteriness.

Dependent variable	Choices	Age (years old): (%) (n=186)				Chi-square χ2	p
		15	16	17	18		
Intensity of jitteriness	A little	6(19.35)	19(27.54)	20(30.30)	7(20.59)	9.300	0.677
	Moderately	7(22.58)	17(24.64)	13(19.70)	11(32.35)		
	Quite a bit	5(16.13)	14(20.29)	12(18.18)	6(17.65)		

* *p* <0.05 ** *p*<0.01

Table 4 (c). Chi-square test to determine whether quality of practicing musical instruments affect intensity of jitteriness.

Dependent variable	Choices	Quality of practicing musical instruments (n=186)					χ2	p
		Level 0	level 1	Level 2	Level 3	Level 4		
Intensity of jitteriness	very slightly or not at all	27.78%	35.21%	22.73%	23.53%	0.00%	11.483	0.933
	A little	27.78%	21.13%	29.55%	23.53%	28.57%		
	Moderately	27.78%	22.54%	20.45%	29.41%	28.57%		

* p<0.05 ** p<0.01

Discussion

In this cross-sectional study, the relationship between time spent on practicing musical instruments and negative emotions through multiple linear regression. The study specifically focused on assessing, teenagers (15~18 years old) in mainland China. Both online and face-to-face recruitment method were used to distribute the web-based questionnaire utilizing convenience sampling and snowball sampling. The quantitative data was gathered swiftly within four days.

This study shows a similar relationship between time spent practicing musical instruments and negative emotions compared to previous research. Nevertheless, other studies have shown a significant mediator effect of emotion regulation strategy. Other research points out that music engagement with cognitive and emotional regulation purposes through the mediation pathway of cognitive reappraisal reduces negative emotions and improves mental wellness [Chin and Rickard (2014)]. In particular, music practice links to the inclination to use positive and adaptive emotion regulation strategies and was more likely to predict higher levels of well-being through cognitive reappraisal [Chin and Rickard (2014)].

The study has several advantages. First, the questionnaire combines PANAS, ERQ, and MEQ together. Hence, it can better describe emotions and target specific types of negative emotions. Second, teenagers who learned musical instruments and those who didn't were included in the study as an experiment and a control group. Third, participants were recruited by face-to-face convenience sampling and online snowball sampling to ensure the questionnaire reached a wider population in different provinces of mainland China.

Limitation

The study has several limitations. First, the study incorporates a limited number of confounders. Other factors affect students' emotions, including parental supervision, coursework pressure, and music tutors. It is suggested that parents' effective and supportive parental involvement and proactivity ensure purposeful musical instrument learning [Cui, 2023], improve students' musical enjoyment, reducing the possibility of negative emotions [Upitis et al., 2016]. In this study, age is considered one of the confounding variables, but age couldn't correlate positively with academic stress. Therefore, academic stress, which correlates with negative emotions, can affect negative emotions measured in my study. Specifically, research shows a negative association between perceived academic stress and psychological well-being among U.S. college students [Barbayannis et al., 2022d]. In other words, academic stressors, including academic expectations, academic expectations, workload, and grading/scores, as well as students' self-perceptions, are as important as psychological well-being, and the higher the level of academic pressure, the lesser the time spent on practicing musical instruments. Therefore, academic stress can act as a mediator to affect negative emotions [Barbayannis et al., 2022].

Second, on average, the questionnaire contains four sections and 38 questions. Each section's instructions were written in English. Some teenagers from non-international schools might be confused by these instructions and hence add random errors to my study. At the same time, the questionnaire should be divided into four pages to ensure a clearer arrangement of questions. Moreover, recruiting participants by convenience and snowball sampling took a lot of work because most participants complained that the questionnaire was too long. Specifically, 487 people had accessed the link, but only 200 people had completed it, with a completion rate of 41.08%. For future improvement, a questionnaire should be more concise. For instance, questions about the frequency, intensity, duration, and regulation ability of grief can be combined into one question.

Third, negative emotions in my study were measured subjectively based on participants' self-reports. Nevertheless, combining it with objective measurement can improve the precision of negative emotion assessments. Scientists measure emotions directly based on the autonomic nervous system (ANS) and brain state. ANS contains sympathetic and parasympathetic branches, which contribute to activation and relaxation. ANS activation and relaxation can be measured by detecting electrodermal (i.e., sweat gland) or cardiovascular (i.e., blood circulatory system) responses. Specifically, SCL (skin conductance level) and PEP (pre-ejection period) predominantly reflect sympathetic activities, and HR (heart rate) and BP (blood pressure) reflect parasympathetic activities. More than that, Electroencephalography (EEG) measuring brain wave activities is used to analyze emotions [Mauss and Robinson (2009)]. Therefore, anxieties and worries linked to problem-solving lead to left-hemispheric activation. As a result, ANS or EEG activity measurements [Mauss and Robinson (2009)] can detect emotional responses during musical instrument practice to determine whether musical instrument practice significantly affects the intensity of jitteriness.

Furthermore, longitudinal research is needed to investigate how chronic musical practice affects negative emotions to draw a more accurate conclusion. Overall, this study emphasizes the importance of music engagement in mitigating negative emotions.

Conclusion

The time spent practicing musical instruments associates with the intensity of jitteriness negatively. My results suggested that the H0 hypothesis can be rejected, and the H1 hypothesis is accepted. Confounding variables, including total time spent on playing musical instruments, positive emotion intensity (interested), positive emotion intensity (attentive), and negative emotion intensity (depressed) (other than jittery), were included to build the final model explaining the relationship between time spent on practicing musical instruments and the intensity of jitteriness.

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