
The Influence of Music Education on Undergraduate Students' Pro-Social Behavior in China

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Abstract

Introduction: This research addresses the evolving landscape of China's higher music education, its integration with innovative and entrepreneurial education, and its impact on students' psychological well-being and prosocial behaviors, aiming to provide insights for educators and policymakers in a unique cultural context.

Methodology: This study is a cross-sectional study using survey method. This paper will collect the modern music education and prosocial behavior of college students in first-tier cities. Therefore, the dependent variable for stage performance, College Students modern music education (MME) as independent variables; Metacognition (MCQ) will be regarded as mediating variables. The sample number of this study is 672.

Results and discussion/Themes and findings: Modern music education directly influences students' prosocial behaviors through curriculum resources and teaching methods. Metacognition Directly Impacts Students' Prosocial Behavior Through Dimensions of Cognitive Confidence and Control Belief. In sampled universities, the influence of modern music education on prosocial behavior through metacognition appears relatively subdued.

Metacognition has a significant direct influence on prosocial behavior, which may be associated with the moral and humanistic education centered around China's esteemed traditions during its compulsory education phase.

Conclusion and/or recommendations: The study reveals that modern music education, particularly high-quality curriculum resources and teaching methods, significantly positively impacts the prosocial behaviors of university students in China's first-tier cities. However, the proficiency in musical skills doesn't directly influence such behaviors, and metacognition plays a relatively subdued moderating role between music education and prosocial behavior, though it directly positively affects prosocial behavior.

Keywords: *Prosocial Behaviors; Music Education; Metacognition; Chinese Higher Education.*

1. Introduction

The selection of this research question stems from the significant transitional phase observed in China's higher music education system, which is aiming for high-quality development. Recent initiatives by national and provincial entities to create tailored development plans for higher education highlighted the importance of music and arts in Chinese colleges and universities. Furthermore, with the rapid progression of information technology and cultural integration, there's a discernible shift in music education pedagogies in Chinese universities.

Alongside this, there's a rising trend to integrate "Innovation and Entrepreneurial Education" to address employment challenges faced by music major graduates. Amid these developments, the psychological well-being and prosocial behaviors of university students have become areas of growing interest and concern. Given the limited preliminary studies available on this topic, particularly in relation to the interplay between music education and students' prosocial behaviors, there was a pressing need to delve deeper and explore the intricate connections, especially within the unique cultural and educational context of China. This research aims to fill that knowledge gap and provide actionable insights for educators and policymakers.

Literature review

Modern music education can influence students' cognition and behavior

Modern music education is constantly innovating and changing, focusing on the integration and application of traditional cultural heritage with internet technology. It explores a "people-centered" approach, investigating how music education shapes an individual's character, impacts their psychology, and influences their behavior (Zhang, 2023; Xie, 2022; Sun, 2020; Cui, Bai, 2022). Throughout this process, educators emphasize designing teaching plans based on the GLM theory (Liu, 2022; Zheng et al., 2020). Modern music education can leverage the General Learning Model (GLM) theory to teach students systematic professional knowledge in both short and long-term time frames. It guides students to form a method of understanding the world (affecting students' cognition) and also significantly impacts their behavior (Wu et al., 2012).

Prosocial behaviour may be influenced by music education

Starting from the influence of video games on pro-social behavior, scholars, with the help of GLM theory, proposed that an individual's cognition, emotions, and decision-making patterns

formed during specific learning and deep involvement in projects directly affect their pro-social behavior. The impact deepens with extended participation in the activity or project (Zheng, et al., 2020; Liu, 2022). Research on social cognition theory also indicates that the clearer a person's overall cognition of their behavior and external environment, the more pronounced the "cognition-behavior-environment" feedback mechanism becomes. This can significantly strengthen specific behavioral response patterns (Ge et al., 2022; Liu, 2021; Li et al., 2022). The music education students receive and their cognitive state are vital factors affecting their pro-social behavior. However, current research on these influencing factors and their mechanisms still needs further exploration (Qi Lei et al, 2023; Zhan & Xiong, 2021).

Prosocial behaviour may be influenced by music education

The direction of modern music education design tends to ensure students' skills acquisition results and subsequently improve their employment and income. It also emphasizes the inheritance of traditional Chinese music, the promotion of modern music teaching technology and methods, aiming to drive the transformation and high-quality development of modern music education (Yang, 2022; Chen & Feng, 2022). Although existing research has clarified the current direction of modern music education development and transformation and systematically analyzed traditional music inheritance, modern music teaching, curriculum design, and educational strategies, it has to some extent overlooked the specialized guidance of students' psychological cognition shaping and pro-social behavior (Lee, 2022).

Methodology

Research Design

This study is a cross-sectional study using survey method. This paper will collect the modern music education and prosocial behavior of college students in first-tier cities. Therefore, the dependent variable for stage performance, College Students modern music education (MME) as independent variables; Metacognition (MCQ) will be regarded as mediating variables. This study is a quantitative cross-sectional study design, the survey data will be collected within a certain research time.

Study Population, Sampling, and Unit of Analysis

This paper adopts the method of questionnaire survey to collect the actual data of modern music education, pro-social behavior, Metacognition (MCQ) of college students in China 's first-tier

cities. Based on the Literature results of modern music education prosocial behavior of college students in first-tier cities of China, this paper discusses the relationship between prosocial behavior and College Students modern music education (MME), prosocial cognition. On this basis, the influence mechanism of college students' prosocial behavior in China's first-tier cities is formed from the perspective of systematic research, which provides reference for improving college students' prosocial behavior and improving and promoting modern music education.

Study Population, Sampling, and Unit of Analysis

This paper adopts the method of questionnaire survey to collect the actual data of modern music education, pro-social behavior, Metacognition (MCQ) of college students in China's first-tier cities. Based on the Literature results of modern music education prosocial behavior of college students in first-tier cities of China, this paper discusses the relationship between prosocial behavior and College Students modern music education (MME), prosocial cognition. On this basis, the influence mechanism of college students' prosocial behavior in China's first-tier cities is formed from the perspective of systematic research, which provides reference for improving college students' prosocial behavior and improving and promoting modern music education. The sample number of this study is 672.

Measurement and Instrumentation

In order to effectively measure the above model, this paper will use the prosocial behavior tendency scale (PTM), college students modern music education survey scale, scale (revised version) (PANAS-R), Metacognition(MCQ) three tools for data collection and analysis, the basic situation as shown in table.

Table 1: Basic Information of Research Tools

Variable	Questionnaire	Abbreviation	Source
Dependent variable	Prosocial Behaviour	PSB (Prosocial Behaviour)	Carlo et al., (2002)
Independent variable	Modern musical education	MMEA(Course and resource evaluation) MMEB(Proficiency and initiative)	Li(2016)

		MMEC(Recommendation degree of teaching mode)	
Mediator Variable	Metacognition	MCQCC(Cognitive Confidence) MCQNC(Need to Control Thoughts)	Fan et al. (2017)
Controlled variable		CV1-Gender\CV2-Age\CV3-Grade\CV4-School \CV5-Music Exposure Time	Self-established

Source: Developed for this research.

Data Collection Procedures

The survey targeted music majors across five prominent Chinese universities, utilized both online and offline methods over a span of two months in 2023(June 11th, 2023, to July 28th, 2023) incorporated stratified sampling to ensure diverse representation, and utilized the WenJuanXin application for online data collection via WeChat.

Results and discussion/Themes and findings

Respondents' Summary

Table2 In terms of age groups, individuals aged 18-20 years constitute the majority at 54.60% (n=367) of the sample, while the 21-23 age group represents 45.40% (n=305).

Table 2: Respondents' profile (n=672)

Questions	Valid	Frequency	Percent
Age	18-20 years old	367	54.60
	21-23 years old	305	45.40
Years of study	Year 1	164	24.40
	Year 2	203	30.20
	Year 3	178	26.50
	Year 4	127	18.90
University	Sichuan University	186	27.70

	Southwest University for Nationalities	171	25.40
	Xihua University	75	11.20
	Sichuan Normal University	99	14.70
	Xihua Normal University	141	21.00
Music Years	Less than 1 Year	170	25.30
	1 – 3 Years	254	37.80
	3 – 5 Years	142	21.10
	More than 5 Years	106	15.80

Source: Developed for this research.

Common Method Variance

In this study, Harman's single-factor test was implemented, utilizing the principle component analysis (PCA) extraction method. This technique was employed to establish interrelationships among all items across six dimensions in the study (Dien, 2012; Eichhorn, 2014). The results, as outlined in Table 4.2, revealed that the initial factor, with eigenvalues of 1.0, accounted for only 21.781% of the total variance. This outcome suggests that the investigated indicators did not strongly converge towards a single dominant factor, and no single factor explained a substantial portion of the variability. Consequently, the study's findings imply that the presence of common method bias (CMB) did not raise significant concerns.

Table 3: Harman's single-factor test - total variance explained

Factor	Total	Initial Eigenvalues % of Variance	Cumulative %
1	5.881	21.781	21.781
2	2.902	10.746	32.527
3	2.354	8.720	41.247
4	2.051	7.597	48.844
5	1.791	6.635	55.479
6	1.507	5.583	61.062

Source: Developed for this research.

As part of the statistical analysis process, the study also integrated Kock's (2020) comprehensive covariance test to assess the potential common method bias (CMB). This test involves the evaluation of variance inflation factor (VIF) values, where a VIF exceeding 3.3 indicates a substantial CMB concern (Diamantopoulos & Siguaaw, 2006). Examination of Table 4.3 reveals that all constructs displayed VIF values below 3.3, aligning with the criteria stipulated by Hair et al. (2017). Therefore, the study's findings suggest the absence of common method bias (CMB), indicating that CMB did not pose a significant issue within the study.

Table 4: Full covariance test

MCQCC	MCQNC	MMEA	MMEB	MMEC	PSB
1.109	1.131	1.106	1.110	1.087	1.035

Source: Developed for this research.

Measurement Model Assessment

The internal consistency of the measurement was assessed through composite reliability (CR) values, which indicate the extent to which a group of indicators exhibits internal consistency with the underlying constructs. As indicated in Table 5, the CR values for MMEA (0.862), MMEB (0.887), MMEC (0.835), MCQCC (0.872), MCQNC (0.918), and PSB (0.846) all surpass the minimum recommended threshold of 0.7, in accordance with the recommendation by Nunnally and Bernstein (1994). Additionally, all constructs comfortably exceed the suggested CR value of 0.80, providing further assurance regarding the reliability of the measurements within this study.

This study employs the average variance extracted (AVE) to assess the convergent validity of the constructs. Following the criteria set by Fornell and Larcker (1981), an AVE value exceeding 0.50 is deemed acceptable, indicating that indicators within the same constructs should account for more variance than measurement error. The outcomes provided in Table 5 demonstrate that all constructs, specifically MMEA (0.610), MMEB (0.724), MMEC (0.628), MCQCC (0.576), MCQNC (0.615), and PSB (0.523), surpass the recommended AVE threshold. This implies a satisfactory level of convergent validity for each construct. In the realm of social work research, the significance of reliable and valid measurement cannot be overstated.

Table 5: Measurement model for reliability and validity

Dimension	Items	Loading	CR	AVE
MCQCC	MCQCC1	0.744	0.872	0.576
	MCQCC2	0.761		
	MCQCC3	0.795		
	MCQCC4	0.731		
	MCQCC5	0.764		
MCQNC	MCQNC1	0.799	0.918	0.615
	MCQNC2	0.735		
	MCQNC3	0.798		
	MCQNC4	0.784		
	MCQNC5	0.784		
	MCQNC6	0.800		
	MCQNC7	0.787		
MMEA	MMEA1	0.786	0.862	0.610
	MMEA2	0.761		
	MMEA3	0.797		
	MMEA4	0.778		
MMEB	MMEB1	0.862	0.887	0.724
	MMEB2	0.829		
	MMEB3	0.861		
MMEC	MMEC1	0.759	0.835	0.628
	MMEC2	0.804		
	MMEC3	0.813		
PSB	PSB1	0.725	0.846	0.523
	PSB2	0.680		
	PSB3	0.741		
	PSB4	0.730		
	PSB5	0.740		

Note: MMEA - Modern music education Course and resource evaluation, MMEB - Modern music education Proficiency and initiative, MMEC - Modern music education Recommendation degree of teaching mode, MCQCC – Metacognitive Cognitive Confidence, MCQNC – Metacognitive Need to Control Thoughts, PSB - Prosocial behavior.

Based on the empirical results presented in Table 6, all six constructs exhibit adequate validity in measuring their respective dimensions, as indicated by the empirical t-values surpassing the critical threshold of 1.96 (Hair, Hult, Ringle, & Sarstedt, 2014; Winship & Zhuo, 2020; Kokin & Wang, 2014). This observation implies that the utilized measurements for each construct are statistically significant and possess satisfactory validity for the study.

Table 6: Measurement model for loading- T statistics and P value

Dimension	Items	Loading	T-Statistics	P-value
MCQCC	MCQCC1	0.744	27.956	0.000
	MCQCC2	0.761	28.190	0.000
	MCQCC3	0.795	36.258	0.000
	MCQCC4	0.731	23.467	0.000
	MCQCC5	0.764	27.243	0.000
MCQNC	MCQNC1	0.799	42.672	0.000
	MCQNC2	0.735	27.921	0.000
	MCQNC3	0.798	45.345	0.000
	MCQNC4	0.784	41.952	0.000
	MCQNC5	0.784	36.048	0.000
	MCQNC6	0.800	46.535	0.000
	MCQNC7	0.787	38.530	0.000
MMEA	MMEA1	0.786	33.717	0.000
	MMEA2	0.761	27.392	0.000
	MMEA3	0.797	33.829	0.000
	MMEA4	0.778	29.612	0.000
MMEB	MMEB1	0.862	48.841	0.000
	MMEB2	0.829	35.818	0.000
	MMEB3	0.861	47.626	0.000
MMEC	MMEC1	0.759	23.624	0.000
	MMEC2	0.804	28.072	0.000
	MMEC3	0.813	29.157	0.000
PSB	PSB1	0.725	27.641	0.000
	PSB2	0.680	17.845	0.000
	PSB3	0.741	26.747	0.000
	PSB4	0.730	24.284	0.000
	PSB5	0.740	30.360	0.000

Note: MMEA - Modern music education Course and resource evaluation, MMEB - Modern music education Proficiency and initiative, MMEC - Modern music education Recommendation degree of teaching mode, MCQCC – Metacognitive Cognitive Confidence, MCQNC – Metacognitive Need to Control Thoughts, PSB - Prosocial behavior.

In Table 6, the loadings and cross-loadings of the items have been presented. The standard for assessing the quality of indicator loadings, as recommended by Hair et al. (2010), was a minimum threshold of 0.5. Examining Table 7, it becomes apparent that all indicator loadings surpass the threshold of 0.5. Furthermore, each indicator in the study effectively corresponds with its intended construct, exhibiting a distinct correlation compared to unrelated constructs. The highest loading value among indicators is 0.862 (specifically, indicator MMEB1), while

the lowest loading value is 0.680 (specifically, indicator PSB2). Consequently, this study has effectively established discriminant validity.

Table 7: Loading and cross-loadings

Items	MCQCC	MCQNC	MMEA	MMEB	MMEC	PSB
MCQCC1	0.744	0.204	0.128	0.142	0.172	0.100
MCQCC2	0.761	0.175	0.165	0.131	0.144	0.159
MCQCC3	0.795	0.213	0.121	0.189	0.179	0.158
MCQCC4	0.731	0.187	0.111	0.114	0.081	0.107
MCQCC5	0.764	0.215	0.137	0.153	0.151	0.098
MCQNC1	0.246	0.799	0.137	0.135	0.187	0.146
MCQNC2	0.162	0.735	0.076	0.091	0.188	0.120
MCQNC3	0.196	0.798	0.146	0.212	0.251	0.162
MCQNC4	0.187	0.784	0.131	0.197	0.166	0.122
MCQNC5	0.219	0.784	0.144	0.167	0.198	0.093
MCQNC6	0.200	0.800	0.155	0.240	0.232	0.156
MCQNC7	0.225	0.787	0.112	0.194	0.170	0.151
MMEA1	0.164	0.101	0.786	0.197	0.151	0.189
MMEA2	0.113	0.111	0.761	0.125	0.189	0.190
MMEA3	0.138	0.130	0.797	0.138	0.203	0.231
MMEA4	0.131	0.177	0.778	0.202	0.133	0.187
MMEB1	0.212	0.201	0.208	0.862	0.219	0.123
MMEB2	0.113	0.177	0.175	0.829	0.207	0.140
MMEB3	0.163	0.213	0.159	0.861	0.238	0.113
MMEC1	0.125	0.166	0.205	0.144	0.759	0.158
MMEC2	0.154	0.203	0.140	0.179	0.804	0.175
MMEC3	0.183	0.237	0.175	0.284	0.813	0.134
PSB1	0.138	0.113	0.177	0.086	0.155	0.725
PSB2	0.067	0.143	0.124	0.058	0.162	0.680
PSB3	0.132	0.086	0.197	0.087	0.155	0.741
PSB4	0.106	0.135	0.198	0.160	0.098	0.730
PSB5	0.149	0.160	0.216	0.126	0.142	0.740

Note: MMEA - Modern music education Course and resource evaluation, MMEB - Modern music education Proficiency and initiative, MMEC - Modern music education Recommendation degree of teaching mode, MCQCC – Metacognitive Cognitive Confidence, MCQNC – Metacognitive Need to Control Thoughts, PSB - Prosocial behavior.

Examining Table 7, the results indicate that the square roots of the Average Variance Extracted (AVE) for the diagonal elements of each construct (ranging from 0.723 to 0.851) surpass all off-diagonal elements, both vertically and horizontally. This finding serves to validate the efficacy of the Fornell & Larcker criteria approach and provides affirmation of discriminant validity. Within the scope of this study, discriminant validity refers to the capability of measurement indicators to effectively differentiate distinct constructs. The assessment presented in Table 8 employed the Fornell & Larcker criteria method for this purpose, which involves comparing the square root of the Average Variance Extracted (AVE) for each construct with its correlation values against other constructs, both in horizontal and vertical orientations.

Table 8: Fornell-Larcker criterion

Dimension	MCQCC	MCQNC	MMEA	MMEB	MMEC	PSB
MCQCC	0.759					
MCQNC	0.261	0.784				
MMEA	0.176	0.167	0.781			
MMEB	0.195	0.233	0.213	0.851		
MMEC	0.196	0.257	0.216	0.261	0.792	
PSB	0.167	0.176	0.256	0.146	0.195	0.723

Note: MMEA - Modern music education Course and resource evaluation, MMEB - Modern music education Proficiency and initiative, MMEC - Modern music education Recommendation degree of teaching mode, MCQCC – Metacognitive Cognitive Confidence, MCQNC – Metacognitive Need to Control Thoughts, PSB - Prosocial behavior.

The assessment of discriminant validity among the components in the study utilized the Heterotrait-Monotrait (HTMT) correlation ratio. The computed HTMT values for each set of dimensions are presented in Table 9 below. Typically, the conventional threshold for establishing discriminant validity is 0.85 (Henseler et al., 2015). Upon reviewing the HTMT values, it becomes clear that all of them are below 0.85, indicating strong confirmation of discriminant validity across all dimensions. In its entirety, the HTMT analysis validates the

discriminant validity of the measurement model, highlighting the effective differentiation of the constructs employed within this study.

Table 9 Heterotrait-Monotrait ratio (HTMT)

Dimension	MCQCC	MCQNC	MMEA	MMEB	MMEC	PSB
MCQCC						
MCQNC	0.305					
MMEA	0.217	0.194				
MMEB	0.230	0.263	0.264			
MMEC	0.249	0.315	0.294	0.337		
PSB	0.201	0.208	0.321	0.182	0.268	

Note: MMEA - Modern music education Course and resource evaluation, MMEB - Modern music education Proficiency and initiative, MMEC - Modern music education Recommendation degree of teaching mode, MCQCC – Metacognitive Cognitive Confidence, MCQNC – Metacognitive Need to Control Thoughts, PSB - Prosocial behavior.

Collinearity Estimation

Prior to conducting the path modeling analysis, the researcher initially evaluated the potential presence of collinearity among the predictor variables by calculating the variance inflation factor (VIF) (Garca et al. 2015; Salmerón Gómez et al. 2016; Oke, 2019; O'Brien, 2007). Koay et al. (2023) recommend that VIF values should remain below 3.3 to address potential concerns related to collinearity. Upon reviewing the findings presented in Table10, it becomes evident that the highest observed VIF value was 1.158, which is significantly below the specified threshold. This observation indicates that the predictor variables within the dataset do not manifest any noteworthy issues of collinearity.

Table 10: Inner variance inflation factor values

Dimension	MCQCC	MCQNC	PSB
MCQCC			1.121
MCQNC			1.158
MMEA	1.079	1.079	1.099
MMEB	1.103	1.103	1.145
MMEC	1.105	1.105	1.158

Note: MMEA - Modern music education Course and resource evaluation, MMEB - Modern music education Proficiency and initiative, MMEC - Modern music education Recommendation degree of teaching mode, MCQCC – Metacognitive Cognitive Confidence, MCQNC – Metacognitive Need to Control Thoughts, PSB - Prosocial behavior.

The study also assessed the Variance Inflation Factor (VIF) values of the items, which ranged from 1.365 to 2.153 (Table 11). To address potential challenges associated with collinearity, Hair, Hult, Ringle, Sarstedt, and Thiele (2017) suggest considering the removal of an indicator if its VIF exceeds 5. However, in this investigation, both the internal VIF values (below 3.3, as recommended by Koay et al., 2023) indicated the absence of significant multicollinearity concerns. Consequently, the assessment results confirm that there are no noteworthy collinearity issues among the items employed in this study.

Table 11: Outer variance inflation factor values

Item	VIF	Item	VIF
MCQCC1	1.535	MMEA1	1.593
MCQCC2	1.537	MMEA2	1.539
MCQCC3	1.638	MMEA3	1.556
MCQCC4	1.616	MMEA4	1.503
MCQCC5	1.641	MMEB1	1.716
MCQNC1	2.153	MMEB2	1.773
MCQNC2	1.794	MMEB3	1.837

MCQNC3	1.939	MMEC1	1.365
MCQNC4	2.016	MMEC2	1.385
MCQNC5	1.991	MMEC3	1.372
MCQNC6	1.963	PSB1	1.445
MCQNC7	1.999	PSB2	1.396
		PSB3	1.477
		PSB4	1.451
		PSB5	1.400

Note: MMEA - Modern music education Course and resource evaluation, MMEB - Modern music education Proficiency and initiative, MMEC - Modern music education Recommendation degree of teaching mode, MCQCC – Metacognitive Cognitive Confidence, MCQNC – Metacognitive Need to Control Thoughts, PSB - Prosocial behavior.

Path Coefficients - Direct Effects

Table 12 presents the results of path coefficients for the direct effects H1-H11. The research findings demonstrate significant correlations supporting various hypotheses. Hypothesis 1 (H1) is validated, showing a significant relationship between MMEA and MCQCC, with a beta value of 0.117 and a p-value of 0.003. H2 also indicates a significant correlation between MMEA and MCQNC. For H3 and H4, the MMEB dimension shows significant correlations with MCQCC and MCQNC, respectively. The MMEC dimension, addressed in H5 and H6, similarly demonstrates significant correlations with MCQCC and MCQNC. Furthermore, H7, which explores the relationship between MCQCC and PSB, is supported by a significant correlation, while H8 also shows a significant correlation between MCQNC and PSB. H9 confirms a significant correlation between MMEA and PSB, while H10 finds no significant correlation between MMEB and PSB. Finally, H11 validates a significant correlation between MMEC and PSB. These results underscore the significant interrelationships among various dimensions of MMEA, MMEB, MMEC, MCQCC, MCQNC, and PSB. As a result, the support for H1, H2, H3, H4, H5, H6, H7, H8, H9, H10 is confirmed, while H11 is not supported.

Table 12: Path coefficients for direct effects

Hypothesis	Direct Effect	Beta	SE	T-Statistics	P Value
H1	MMEA -> MCQCC	0.117	0.042	2.775	0.003
H2	MMEA -> MCQNC	0.090	0.044	2.040	0.021
H3	MMEB -> MCQCC	0.135	0.041	3.298	0.000
H4	MMEB -> MCQNC	0.162	0.046	3.555	0.000
H5	MMEC -> MCQCC	0.136	0.046	2.967	0.002
H6	MMEC -> MCQNC	0.196	0.044	4.411	0.000
H7	MCQCC -> PSB	0.082	0.042	1.941	0.026
H8	MCQNC -> PSB	0.085	0.043	1.968	0.025
H9	MMEA -> PSB	0.196	0.039	4.977	0.000
H10	MMEB -> PSB	0.042	0.042	0.986	0.162
H11	MMEC -> PSB	0.104	0.044	2.371	0.009

Note: MMEA - Modern music education Course and resource evaluation, MMEB - Modern music education Proficiency and initiative, MMEC - Modern music education Recommendation degree of teaching mode, MCQCC – Metacognitive Cognitive Confidence, MCQNC – Metacognitive Need to Control Thoughts.

Path Coefficients - Indirect Effects

Table 13 presents the results of path coefficient analysis for indirect effects H12, H13, H14, H15, H16, and H17.

The research findings indicate that none of the hypotheses from H12 to H17 are supported, as they all concern the lack of significant correlations in various mediation models. Specifically, H12 and H13 find that the MMEA dimension does not have a significant correlation with PSB via MCQCC and MCQNC, respectively. Similarly, H14 and H15 reveal that the MMEB dimension is not significantly correlated with PSB through MCQCC and MCQNC. Lastly, H16 and H17 demonstrate that the MMEC dimension does not show significant correlations with PSB through MCQCC and MCQNC, respectively. These results collectively affirm the insignificance of the proposed mediation models involving MMEA, MMEB, MMEC, MCQCC, MCQNC, and PSB.

Table 13: Path coefficients for indirect effects

Hypotheses	Path	Effect	SE	T-Statistics	P Value
H12	MMEA -> MCQCC -> PSB	0.010	0.007	1.464	0.143
H13	MMEA -> MCQNC -> PSB	0.008	0.006	1.336	0.182
H14	MMEB -> MCQCC -> PSB	0.011	0.007	1.601	0.109
H15	MMEB -> MCQNC -> PSB	0.014	0.008	1.673	0.094
H16	MMEC -> MCQCC -> PSB	0.011	0.007	1.520	0.129
H17	MMEC -> MCQNC -> PSB	0.017	0.010	1.737	0.082

Note: MMEA - Modern music education Course and resource evaluation, MMEB - Modern music education Proficiency and initiative, MMEC - Modern music education Recommendation degree of teaching mode, MCQCC – Metacognitive Cognitive Confidence, MCQNC – Metacognitive Need to Control Thoughts, PSB - Prosocial behavior.

Conclusion and/or recommendations

Discussion of Findings on Direct Relationship

Modern music education directly influences students' prosocial behaviors through curriculum resources and teaching methods.

According to the findings mentioned above, current data suggests that modern music education indeed wields a direct positive influence on students' prosocial behaviors, but this influence varies across different dimensions of music education. The dimension of curriculum and resource evaluation in modern music education has shown a pronounced positive influence on students' prosocial behaviors (Zhou, 2022). This suggests that the content of the music curriculum and the quality of educational resources play a pivotal role in shaping students' social skills and empathy. In this setting, as students delve into music, they not only hone their musical talents but also augment their social interaction capabilities, collaborative spirit, and concern for others (Guo & Che, 2022). This offers a critical insight for music educators: the selection and design of curriculum and resources are indispensable in fostering students'

prosocial behaviors. The dimension of recommended teaching methods also revealed a significant positive impact on students' prosocial behaviors.

Metacognition Directly Impacts Students' Prosocial Behavior Through Dimensions of Cognitive Confidence and Control Belief.

This research reveals that metacognition can directly influence students' prosocial behavior. Specifically, both dimensions of cognitive confidence and control belief prominently manifest a significant positive influence on students' prosocial actions. The findings underscore that metacognition genuinely possesses the capability to directly and positively impinge upon students' prosocial behavior. Prosocial behavior encompasses actions intended to assist others, such as sharing, collaborating, and aiding. When students exhibit elevated metacognitive skills (Qi, Xu & Liu, 2023), they can more adeptly comprehend and modulate their thoughts and emotions. Such capability might render them more attuned to others' needs, thereby predisposing them to adopt prosocial behaviors. Within the ambit of metacognition, two pivotal dimensions—cognitive confidence and control belief—emerge as particularly salient in their positive impact on students' prosocial tendencies (Xu, Yu & Ji, 2023).

Discussion of Findings on Mediation

In sampled universities, the influence of modern music education on prosocial behavior through metacognition appears relatively subdued.

More specifically, both metacognitive confidence and the demand for metacognitive control thinking, as potential mediators or moderators, play a limited role in the relationship between music education and prosocial behavior. While metacognitive abilities have long been considered pivotal factors influencing learning and behavior, within the context of China's contemporary music education system, they seem not to have played a significant mediating or moderating role in the relationship between modern music education and prosocial behavior (Zhou & Cao, 2023). This suggests that, rather than emphasizing the role of metacognition, the direct path from music education to prosocial behavior should be given more consideration.

Metacognition has a significant direct influence on prosocial behavior, which may be associated with the moral and humanistic education centered around China's esteemed traditions during its compulsory education phase.

This study discerned that students' metacognitive abilities can substantially and positively impact their prosocial behaviors directly. When discussing the prosocial behaviors of university students, the direct impact of metacognitive abilities becomes particularly pronounced (Zhao, 2022). Upon delving into the relationship between metacognition and China's exemplary traditions, one can discern that China's compulsory education deeply explores and perpetuates the nation's cherished traditions within its moral and humanistic curriculum. These traditional values, such as filial piety, loyalty, benevolence, and humility, underscore harmonious interpersonal interactions, mutual aid, and collective growth. Such emphasis on community and interpersonal relationships sets a positive behavioral model for students. Concurrently, metacognitive skills bridge these traditional values with real-life social scenarios, guiding students in making apt behavioral choices (Zhang, 2016).

References

- Zhang Haixia. (2023). Innovation and construction of music teaching mode under the vision of ecological civilization. *Environmental Engineering* (04), 260-261.
- Xie Tong. (2022). Research on the application of MIDI computer music in college music courses. *Mass Literature and Art* (22), 172-174.
- Sun Liping. (2020). Analysis on the development of modern music education under the international comparative vision. *Northern Music* (17), 125-126.
- Cui Jiayue, Baiyunxin.(2022).' Internet + ' era of music education in colleges and universities,*Heilongjiang Higher Education Research*, 40, 156-160.
- Liu Liu, Wang Lulu & Kong Demin. (2020). —— Based on the relationship between inheritance and transmission. *Archival studies* (02), 90-97.
- Zheng Wenqian, Chen Yunyun, Song Guoping, Xu Min, Bai Yue & Li Lanjie. (2020). Effect of cooperation in prosocial video games on cooperative behavior in game decision making. *Psychological and behavioral Research* (01), 85-91.
- Wu Yuehua. (2020). Research on the influence mechanism of online games on adolescent morality. *Journal of Shanghai Jiao Tong University (Philosophy and Social Sciences edition)* (04), 71-84.
- Liu Yaoyao, Zhou Dian, Tian Di, Yang Yan, Wang Heng, JieChun Chun. & Wu Xuefeng. (2023). Model construction of the influence of DRG on physician behavior based on social cognition theory. *Hospital Management in China* (05), 13-17.
- Liu Yishu, Liu Xi, Zhang Zijian, Fu Xiaolan & Liu Ye. (2022). Musical training influences the cognitive neural mechanisms of speech awareness in children. *Progress in Biochemistry and Biophysics* (09), 1672-1686.
- Liu Yishu, Liu Xi, Zhang Zijian, Fu Xiaolan & Liu Ye. (2022). Musical training influences the cognitive neural mechanisms of speech awareness in children. *Progress in Biochemistry and Biophysics* (09), 1672-1686.
- Ge Wenjia, Xu Wanfei, Hou Miao Miao, Zhao Haichao & Chang Peiwen. (2022). The effect evaluation of the application of activity-based classroom teaching mode under the guidance of social cognition theory in doctor-patient communication courses. *Educational Theory and Practice* (36), 57-60.
- Liu Lingling. (2021). The characteristic teaching mode of regional folk music. *Journal of Ezhou University* (03), 68-69.

Qi Lei, Xu Yuping & Liu Bing. (2023). Research on the improvement path of employee creativity under the remote office situation: based on the perspective of social cognition theory. *Dongyue Theory Cong* (02), 137-144.

Zhan Xiaojun and Xiong Tianren. (2021). The observed influence of supervisor uncivilized behavior on employee uncivilized behavior —— is based on social cognitive theory. *Contemporary Finance* (10), 92-102.

Yang Zhuo. (2022). The Enlightenment of Guqin Music culture to modern music education. *The House of Theatre* (22), 107-109.

Chen Lili & Feng Xinxia. (2022). Analysis of prosocial behavior status and influencing factors in burned children based on structural equation model. *China Health Statistics* (03), 409-412.

Lee Angela H., Adams-Clark Alexis A., Martin Christina Gamache & Zalewski Maureen. (2023). Associations between maternal apology, parenting, and child internalizing, externalizing and prosocial behaviors. *Journal of Applied Developmental Psychology*.

Kock, N. (2020). Harman's single factor test in PLS-SEM: Checking for common method bias. *Data Analysis Perspectives Journal*, 2(2), 1-6.

Aguirre-Urreta, M. I., & Hu, J. (2019). Detecting common method bias: Performance of the Harman's single-factor test. *ACM SIGMIS Database: the DATABASE for Advances in Information Systems*, 50(2), 45-70.

Zhonglin, D. T. W. (2020). Statistical approaches for testing common method bias: Problems and suggestions. *Journal of Psychological Science*, 1, 215.

Dien, J. (2012). Applying principal components analysis to event-related potentials: a tutorial. *Developmental Neuropsychology*, 37(6), 497-517.

Eichhorn, B. R. (2014). Common method variance techniques. Cleveland State University, Department of Operations & Supply Chain Management. Cleveland, OH: SAS Institute Inc, 1(11).

Kock, N. (2020). Harman's single factor test in PLS-SEM: Checking for common method bias. *Data Analysis Perspectives Journal*, 2(2), 1-6.

Henseler, J. (2017). Bridging design and behavioural research with variance-based structural equation modelling. *Journal of Advertising*, 1-15.

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., & Thiele, K. O. (2017). Mirror, mirror on the wall: A comparative evaluation of composite-based structural equation modelling methods. *Journal of the Academy of Marketing Science*, 1-17.

Winship, C., & Zhuo, X. (2020). Interpreting t-statistics under publication bias: rough rules of thumb. *Journal of Quantitative Criminology*, 36, 329-346.

- Kokin, S., & Wang, T. A. (2014). Empirical research on business intelligence success. *Advanced Materials Research*, 842, 754-758.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate data analysis*. Upper Saddle River: Pearson Education, Inc.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of The Academy Of Marketing Science*, 43, 115-135.
- Koay, K. Y., Cheah, C. W., & Goon, S. W. U. (2023). How Do Perceived Social Media Marketing Activities Foster Purchase Intentions? A Multiple Sequential Mediation Model. *Journal of Global Marketing*, 1-15.
- Salmerón Gómez, R., García Pérez, J., López Martín, M. D. M., & García, C. G. (2016). Collinearity diagnostic applied in ridge estimation through the variance inflation factor. *Journal of Applied Statistics*, 43(10), 1831-1849.
- O'brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, 41, 673-690.