The Influence of Psychological Quality on Learning Outcomes in Vocal Music: An Empirical Study Based on Performance Anxiety

Chen Jiaxin[1,2], Hong ji-myeong[1]

1 Sehan University, Jeollanam-do 58447, Korea
2 Guangdong Polytechnic Normal University, Guangdong 510665, China

Abstract: This study examines the influence of Psychological Quality on the learning outcomes of vocal music majors and the mediating role of Music Performance Anxiety (MPA). A quantitative design was employed with 100 undergraduate students from five Chinese universities. Structural Equation Modeling (SEM) was used to test the relationships among the variables. Results showed that Psychological Quality positively predicted learning outcomes ($\beta = 0.48$, $p < 0.001$) and negatively predicted MPA ($\beta = -0.42$, $p < 0.001$). MPA negatively predicted learning outcomes ($\beta = -0.31$, $p < 0.001$) and partially mediated the effect of Psychological Quality, accounting for 27.1% of the total effect (indirect effect = 0.130, 95% CI [0.072, 0.201]). These findings suggest that Psychological Quality can both directly enhance learning outcomes and indirectly improve performance by reducing MPA, offering empirical support for integrating psychological support into vocal music education.

Keywords: Psychological Quality; Music Performance Anxiety; Vocal Music Learning Outcomes; Mediation Effect; Vocal Music Majors

1 Introduction

1.1 Research Background

Vocal music education is a complex learning process requiring mastery of breathing control, vocal techniques, and musical expression, while also demanding emotional communication and artistic appeal in classroom and stage performances (Vasylevska-Skupa et al., 2024). Because the body functions as the "instrument" in vocal training, learners' psychological states directly influence singing quality, stage performance, and learning persistence (Papageorgi, Hallam, & Welch, 2007). In such performance-oriented contexts, Music Performance Anxiety (MPA) has become a prevalent difficulty, typically manifested as accelerated heart rate, distraction, and self-doubt (Kenny, 2011).

MPA is a form of situational anxiety triggered by evaluative threats, encompassing physiological symptoms such as palpitations and sweating, as well as cognitive symptoms like distraction and memory decline (Burin & Osório, 2017; Kenny, 2011). For vocal performers, this condition is particularly salient since the instrument resides within the body (Becker, 2023). Emotional disturbances can destabilize singers' "sense of the instrument" undermining stage control and expressive performance (Kiik-Salupere, 2012). Thus, vocal students are especially vulnerable to emotional fluctuations, which can hinder performance quality, stage expressiveness, and learning persistence.

In contrast, Psychological Quality is recognized as a key resource, encompassing emotional regulation, self-belief, stress tolerance, and resilience. Research shows that students with higher resilience sustain stronger motivation and stability under pressure (Cassidy, 2016; Yang et al., 2024). Nevertheless, within vocal training—a domain of high emotional exposure and frequent evaluation—systematic empirical studies on how Psychological Quality influences performance anxiety and learning outcomes remain scarce (Yang et al., 2025; Vasylevska-Skupa et al., 2024).

1.2 Research Objectives

Building on the above, this study aims to examine the impact pathways of Psychological Quality on vocal music learning outcomes, with a particular focus on the mediating role of Music Performance Anxiety. Specifically, it proposes and tests a mediation model in which "Psychological Quality→Music Performance Anxiety→Learning Outcomes." Two hypotheses are posited:

(1) Psychological Quality positively predicts vocal music learning outcomes.

(2)Music Performance Anxiety partially mediates the relationship between Psychological Quality and vocal music learning outcomes.

Through survey data and quantitative analysis of undergraduate vocal music majors, this study seeks to clarify the internal mechanisms by which individual psychological states shape artistic learning performance.

1.3 Research Significance

This study carries both theoretical and practical implications. According to the Control-Value Theory, learners' control and value appraisals of learning activities are key antecedents of achievement emotions (e.g.,anxiety, pride, boredom). These emotions act as mediators between individual traits and learning performance, ultimately influencing achievement quality (Pekrun, 2006; Pekrun, 2024). Therefore, whether Psychological Quality enhances vocal learning outcomes by alleviating performance anxiety is a mechanism worthy of in-depth examination.

From a practical standpoint, the findings provide empirical evidence for integrating psychological support into higher education vocal training. They highlight the importance of systematically cultivating students' emotional regulation and Psychological Quality alongside technical training, in order to enhance stage performance and learning persistence, thereby promoting the holistic development of artistic talent.

The specific research questions include:

Q1:Does Psychological Quality have a significant positive effect on vocal music learning outcomes?

Q2:Does Psychological Quality exert a negative effect on Music Performance Anxiety?

Q3:Does Music Performance Anxiety negatively affect vocal music learning outcomes?

Q4:Does Music Performance Anxiety mediate the relationship between Psychological Quality and vocal music learning outcomes?

2 Literature Review

2.1 Psychological Quality in Vocal Learning

"Psychological Quality" is a concept developed within Chinese psychology. Zhang Dajun's research team has conducted systematic studies on its structure and measurement tools, which have gained recognition in the international academic community (Chen, 2012). They define Psychological Quality as stable traits rooted in physiological conditions that transform external acquisitions into adaptive, developmental, and creative behaviors, and classify it into three dimensions: cognitive, personality, and adaptive factors (Zhang et al., 2000).

In Western research, some aspects of Psychological Quality overlap with the concept of self-efficacy. Bandura's (1997) self-efficacy theory states that individuals' beliefs about their abilities directly influence their motivation, persistence, and performance. In music education, self-efficacy is strongly linked to learning persistence, vocal performance, and stage confidence (McCormick & McPherson, 2003). At the same time, Music Performance Anxiety (MPA) is another critical entry point for studying Psychological Quality. Kenny (2011) suggested that learners often experience anxiety in evaluative contexts, which negatively affects stage performance and learning outcomes. In vocal learning, such anxiety often manifests in physiological tension that interferes with voice control and emotional expression. Therefore, Psychological Quality, self-efficacy, and performance anxiety together form a key psychological mechanism influencing the effectiveness of vocal learning.

2.2 Vocal Learning and Psychological Factors

Vocal learning is not merely a technical process but also a highly emotional and performative activity. Previous studies highlight the significant role of confidence and self-efficacy in vocal learning outcomes. McPherson and McCormick (2006) found that self-efficacy strongly predicts both expressive performance and persistence. For vocal students, higher self-efficacy enhances artistic expressiveness and vocal control during stage performance.

Anxiety exerts a dual effect in music learning. Moderate anxiety can help maintain alertness and focus, thereby improving performance (Yerkes & Dodson, 1908). However, excessive anxiety leads to distraction, cognitive rigidity, and impaired vocal control (Kenny, 2011). In vocal contexts, the coexistence of facilitative and debilitative anxiety is particularly evident. While some students harness mild nervousness

to improve classroom performance, excessive anxiety during formal recitals often results in breakdowns. Thus, the effectiveness of vocal learning largely depends on students' Psychological Quality and their ability to regulate performance anxiety.

2.3 Limitations of Existing Research

Although international research on Psychological Quality, self-efficacy, and performance anxiety has advanced, significant gaps remain in the context of Chinese vocal education. Most studies focus on Western student populations, giving limited attention to the psychological characteristics and learning patterns of students in Asian cultural contexts (Papageorgi, Hallam, & Welch, 2007). Moreover, current research predominantly relies on quantitative surveys, with insufficient use of qualitative methods such as interviews or classroom observation, which constrains deeper understanding of Psychological Quality (Kenny, 2011). In addition, while Zhang Dajun's team has proposed a theoretical framework and measurement tools, these have not been widely applied or validated in music education. Therefore, integrating this indigenous framework with international findings is necessary to systematically examine the effects of Psychological Quality on vocal learning outcomes and to reveal the mediating role of performance anxiety. Such efforts can enrich the field of music education psychology and provide local-ized empirical evidence for vocal education in China.

3 Research Methods

3.1 Statistical Method

This study employed Structural Equation Modeling (SEM) as the primary statistical tool, with AMOS software used for data analysis. SEM allows for the simultaneous examination of complex relationships between observed and latent variables, making it suitable for testing both direct and indirect effects among Psychological Quality, performance anxiety, and learning outcomes. The visualization and rigorous statistical capabilities of AMOS further ensure the reliability and accuracy of the research findings.

3.2 Measurement Instruments

Data were collected via an online questionnaire including three core parts.

Psychological Quality was measured with the Brief College Students' Psychological Quality Questionnaire (Wang et al., 2017). It covers three dimensions—cognitive, personality, and adaptive factors—reflecting traits such as metacognition, confidence, and social adaptation. Sample items include: "I often know what I should and should not do" and "I am confident and appropriate in social situations." Prior studies showed high reliability ($\alpha > 0.80$).

Music Performance Anxiety (MPA) was assessed using the Kenny Music Performance Anxiety Inventory (K-MPAI) (Kenny, 2011). It measures physiological (e.g., rapid heartbeat), cognitive (e.g., fear of failure), and behavioral (e.g., avoidance) responses. Example items in-clude: "I often feel nervous before a performance" and "I worry about making mistakes in front of an audience."

Learning Outcomes were evaluated with the Learning Outcomes Scale (리우닝, 2025), consisting of six dimensions: learning meth-ods, engagement, experience, attitude, ability, and course satisfaction. Sample items include: "I developed a feasible study plan," "I actively participated in discussions," and "I am highly satisfied with my learning achievements." All dimensions demonstrated good reliability ($\alpha > 0.80$).

3.3 Data Collection

The online questionnaire was distributed to 120 undergraduate vocal music majors from five universities in China, with 100 valid re-sponses obtained (valid response rate = 83.3%).

Sample characteristics were as follows: gender—42 males (42%) and 58 females (58%); year of study—28 freshmen (28%), 32 soph-omores (32%), 25 juniors (25%), and 15 seniors (15%); vocal specialization—45 in bel canto (45%), 30 in traditional Chinese vocal music (30%), and 25 in popular singing (25%). Participants' ages ranged from 18 to 25 years (M = 21.36, SD = 1.82).

To control for common method variance (CMV), anonymity was ensured and some items were reverse-coded. Harman's single-factor test revealed that the first factor explained 22.3% of the variance, below the 40% threshold, indicating no significant CMV issue.

4 Date Results

4.1 Descriptive Statistics and Correlation Analysis

The descriptive statistics of the three core variables are presented in Table 1. The overall level of Psychological Quality among vocal music majors was moderately high (M = 3.62, SD = 0.54), their learning outcomes were relatively high (M = 3.84, SD = 0.49), and performance anxiety was at a moderate level (M = 2.97, SD = 0.68).

Correlation analysis results (Table 2) indicated the following:

(1)Psychological Quality was significantly positively correlated with learning outcomes (r = 0.56, p < 0.001).

(2)Psychological Quality was significantly negatively correlated with performance anxiety (r = -0.42, p < 0.001).

(3)Performance anxiety was significantly negatively correlated with learning outcomes (r = -0.47, p < 0.001).

Table 1. Descriptive Statistics and Reliability/Validity Indicators of the Variables

Variable	Mean (M)	Standard Deviation (SD)	95% Confidence Interval	Cronbach's α	AVE
Psychological Quality	3.62	0.54	[3.51,3.73]	0.892	0.623
Performance Anxiety	2.97	0.68	[2.83,3.11]	0.901	0.589
Learning Outcomes	3.84	0.49	[3.74,3.94]	0.876	0.594

Table 2. Results of Correlation and Path Analysis (p < 0.001)

	(1)Psychological Quality	(2)Performance Anxiety	(3)Learning Outcomes
(1)Psychological Quality	1	-0.42***	0.56***
(2)Performance Anxiety	-0.42***	1	-0.47***
(3)Learning Outcomes	0.56***	-0.47***	1

4.2 Model Fit Test

The proposed mediation model was tested for model fit. Results showed that all indices met acceptable standards (Byrne, 2013; Kline, 2010): GFI = 0.912, AGFI = 0.895, NFI = 0.903, IFI = 0.921, CFI = 0.918, RMSEA = 0.043 (90% CI [0.031, 0.055]), indicating that the model demonstrated a good fit to the data.

4.3 Structural Model Results

The standardized path coefficients of the structural model are presented in Table 3:

(1)Psychological Quality significantly and positively predicted learning outcomes (β= 0.48, p < 0.001).

(2)Psychological Quality significantly and negatively predicted performance anxiety (β= -0.42, p < 0.001).

(3)Performance anxiety significantly and negatively predicted learning outcomes (β= -0.31, p < 0.001).

Table 3. Path Coefficients of the Structural Model

Path Relationship	Standardized Coefficient	Standard Error (S.E.)	p-value
Psychological Quality → Learning Outcomes	0.48	0.062	<0.001
Psychological Quality →Performance Anxiety	-0.42	0.058	<0.001
Performance Anxiety → Learning Outcomes	-0.31	0.049	<0.001

4.4 Mediation Effect Test

The mediating effect of performance anxiety was examined using the bootstrap method (5,000 resamples, 95% CI). Results (Table 4) showed that the indirect effect of Psychological Quality on learning outcomes via performance anxiety was -0.130, with a 95% confidence

interval of [0.072, 0.201], excluding zero. This indicates a significant mediation effect. After including performance anxiety, the direct effect of Psychological Quality on learning outcomes remained significant (β= 0.35, p < 0.001), but its magnitude decreased compared to the direct effect alone (β= 0.48). This suggests that performance anxiety plays a partial mediating role between Psychological Quality and learning outcomes, accounting for 27.1% of the total effect (0.130/0.480).

Table 4. Results of Mediation Effect Test

Effect Type	Effect Value	95% Confidence Interval	Significant
Total Effect	0.480	[0.365, 0.595]	Yes
Direct Effect	0.350	[0.231, 0.469]	Yes
Indirect Effect	0.130	[0.072, 0.201]	Yes

5 Conclusion and Recommendations

5.1 Research Conclusions

This study tested the mediation model of Psychological Quality→Performance Anxiety→Learning Outcomes. Results showed that Psychological Quality positively predicted vocal music students' learning outcomes (β=0.48,p< 0.001), with cognitive, personality, and adaptive factors jointly enhancing planning, persistence, and stress management. Psychological Quality negatively predicted performance anxiety (β=−0.42,p < 0.001), and performance anxiety partially mediated this relationship (indirect effect = 0.130, 95% CI [0.072, 0.201]). Differences were also observed by educational level: among undergraduates,Psychological Quality more strongly alleviated anxiety, while for graduate students,the adverse impact of anxiety on advanced learning abilities was more pronounced.

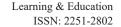### 5.2 Practical Recommendations

Universities should adopt an integrated training model that emphasizes both skills and psychology. Music psychology and emotion regulation courses can be introduced; undergraduates may benefit from"tutoring + peer support,"whereas graduate students could access academic counseling platforms. Faculty should embed psychological guidance and metacognitive strategies into teaching,while providing gradual,low-pressure performance settings.Students are encouraged to design individualized psychological training plans and engage in counseling and peer support, while families should focus on the learning process and provide emotional support through empathy and encouragement.

5.3 Research Limitations and Future Directions

This study had limitations, including a small sample (n =100), a cross-sectional design that could not establish long-term causality, and the omission of moderating variables such as repertoire type. Future research should adopt longitudinal designs, expand sample size,and include more moderators. Combining quantitative analysis with qualitative methods such as interviews and classroom observation could also provide richer evidence for practical interventions.

References

[1]Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

[2]Kenny, D. T. (2011). The psychology of music performance anxiety. Oxford: Oxford University Press.

[3]Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. Educational Psychology Review, 18(4), 315–341.

[4]McPherson, G. E., & McCormick, J. (2006). Self-efficacy and music performance. Psychology of Music, 34(3), 322–336.

[5]Wang Xinqiang, Zhang Dajun, Zhang Xueqi. (2017). Development of the College Student Psychological Suzhi of Scale(CSPS):Psychometric Properties CSPS Brief Mental Health Version.Journal of Southwest University(Natural Science Edition), 39(8),126-132.

[6]Zheng, M. P., & Zhang, D. J. (2006). Top-down and bottom-up and their complementarity: A metacognitive reflection on methodological trends at the Second National Symposium on Music Psychology. Journal of the Central Conservatory of Music, (04), 103–109.

[7]Wang,T.,Zhang,D., & Chen,J. (2003). A study on the developmental characteristics of psychological quality of contemporary college students.Psychological Science,26(5),847–850.

[8]Kenny, D. T., Davis, P., & Oates, J. (2004). Music performance anxiety and occupational stress amongst opera chorus artists and their relationship with state and trait anxiety and perfectionism. Journal of Anxiety Disorders, 18(6), 757–777.

[9]Liu,N. (2025). Instructional design and learning outcomes of university vocal music and music appreciation classes based on flipped learning. Department of Education, Dongshin University.