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# *Mechanisms and Intervention Pathways of School-Based Music Therapy for Alleviating Students' Academic Anxiety*

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***Abstract.*** Against the backdrop of intensifying academic competition and rising learning pressure, academic anxiety has become highly prevalent among student populations. Conventional school-based psychological interventions are constrained by insufficient professional resources and high levels of student resistance. As a flexible, accessible, and non-pharmacological intervention, music therapy has been increasingly integrated into school mental health services. Employing a combination of literature review, case analysis, and comparative research, this study examines three core functioning mechanisms of music therapy—emotional regulation, cognitive defusion, and interpersonal support. It further proposes a three-tiered intervention model and analyzes key influencing factors from both intervention design and individual student perspectives. Evidence from studies on Orff-based group music therapy indicates that group music interventions can significantly alleviate anxiety symptoms, and artificial intelligence technologies can facilitate its scalable implementation in school settings. Currently, the field faces two prominent bottlenecks: a shortage of trained professionals and insufficient targeted empirical evidence. Future efforts should strengthen workforce development, promote interdisciplinary collaboration, and establish standardized school-based intervention systems. This study provides practical guidance for optimizing the mechanism of music therapy in alleviating academic anxiety within school mental health intervention frameworks.

***Keywords:*** school-based music therapy, academic anxiety, alleviation mechanisms, intervention pathways, group music therapy

## 1. Introduction

As competition for educational advancement and academic achievement continues to intensify, academic anxiety has become an increasingly prominent issue among students, representing a widespread mental health concern that impairs both physical well-being and academic development. Epidemiological surveys of university students show that over 40% of respondents experience varying degrees of psychological distress, with anxiety being the most prevalent symptom. At the secondary education level, the pressure of the National College Entrance Examination coincides with the psychological turbulence of adolescence, making study-related emotional distress a key and intractable challenge in school mental health education. Existing school-based psychological interventions are limited by three inherent constraints: an insufficient supply of trained mental health

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professionals, students' concerns about being "labeled" when seeking one-to-one counseling, and the inability of universal lecture-based courses to address individualized needs. As a non-invasive psychological intervention, music therapy has gradually been adopted in school settings. Although policies supporting diversified psychological interventions have created favorable conditions for its application, the mechanisms by which music therapy alleviates academic anxiety and its systematic implementation models have not yet been comprehensively reviewed.

Internationally, music therapy has developed into a mature discipline with well-established professional education and clinical practice systems. Neuroscientific research has confirmed that music modulates emotion and cognition by activating the brain's reward circuitry and regulating neural oscillations, providing a solid theoretical foundation for its therapeutic application. In China, the philosophical roots of music-based healing can be traced back to ancient classical texts, while the modern discipline of music therapy has developed progressively since its introduction in the 1980s. Empirical studies have demonstrated the effectiveness of Orff-based group music therapy in reducing anxiety among university students, and high schools have also explored music-based stress reduction practices. Nevertheless, systematic research specifically focusing on academic anxiety remains limited [1]. This study adopts literature review, case analysis, and comparative research methods. Theoretically, it helps refine the explanatory framework of how music therapy alleviates academic anxiety in school contexts. Practically, it provides actionable approaches for schools at different educational stages to construct tiered intervention models and optimize intervention programs.

## 2. Academic anxiety and music therapy: theoretical foundations and challenges in school-based intervention

### 2.1. Concept, classification, and psychological and physiological manifestations of academic anxiety

Academic anxiety is a situational form of negative anxiety arising in contexts of academic competition and evaluation. Its typical manifestations can be divided into three dimensions. Emotionally, it involves persistent tension and unease as well as excessive worry about academic outcomes. Cognitively, it involves difficulty concentrating and the recurrence of negative thoughts. Physiologically, it may be accompanied by somatic symptoms such as an accelerated heartbeat, muscular tension, and sleep disturbance. When academic anxiety remains unresolved over time, it can reduce learning efficiency, undermine academic performance, and potentially contribute to secondary problems such as depression and low self-esteem, thereby harming students' physical and mental health and social adaptability. Academic anxiety can be classified into three levels according to severity: mild anxiety involves brief tension only in specific learning situations and has limited effects on daily study and life, moderate anxiety continuously disrupts learning and emotional stability, and severe anxiety produces pronounced somatic symptoms and impaired social functioning and therefore requires professional intervention [2].

### 2.2. Existing models of school-based psychological intervention and their inherent limitations

Current school-based interventions for academic anxiety still rely primarily on conventional mental health education and generally take three forms. The first is universal mental health education, centered on disseminating psychological knowledge. The second is individual counseling, in which full-time school counselors provide one-to-one support to students experiencing emotional

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difficulties. The third is group counseling, which uses structured activities to address psychological concerns shared by students. This system has three inherent limitations. First, trained professionals are scarce. China has a limited capacity to train specialists in targeted psychological interventions such as music therapy, and the full-time mental health staff at most schools cannot meet the diverse needs of tiered intervention. Second, students experience stigma: one-to-one counseling can create concerns about being "labeled", leading some students with academic anxiety to avoid professional intervention. Third, coverage is limited. Conventional courses and counseling depend on fixed times and locations, making them difficult to integrate into everyday learning and leaving students with mild anxiety particularly underserved. These practical challenges make music therapy, with its flexibility and low threshold for participation, an important complement to school mental health intervention systems [3].

### 2.3. The dual-mechanism theory underpinning music therapy

Music therapy is an interdisciplinary applied field integrating music, psychology, and medicine. At its core, it uses systematic musical experiences together with the therapeutic relationship established during treatment to help participants achieve health-related goals. Its intervention logic rests on both physiological and psychological mechanisms [4]. Physiologically, calming music can slow the heart rate and breathing, reduce blood pressure, and decrease adrenaline secretion, thereby directly relieving the physical tension caused by anxiety. It can also activate the brain's reward circuitry, promote dopamine release, and regulate brain-wave states through neural oscillatory entrainment, enabling targeted regulation of physical and mental states. Psychologically, music therapy follows a pathway in which "emotion shapes cognition". By using nonverbal forms to bypass students' psychological defenses, it first regulates emotional states and then promotes changes in cognitive patterns, making it especially suitable for students with strong psychological defenses [5].

### 2.4. Distinctive advantages of music therapy in school-based intervention

On the basis of these dual physiological and psychological mechanisms, music therapy offers three major advantages that directly address the limitations of conventional interventions for academic anxiety in schools. First, it encounters little resistance and enjoys high acceptance. The entertaining and aesthetic qualities of music weaken the label of "therapy". Surveys indicate that more than 60% of university students are interested in music-related activities, providing a strong basis for school-wide promotion and effectively reducing students' concerns about seeking help [4]. Second, it takes diverse forms and provides broad coverage. Music therapy can be delivered as professional individual or group therapy as well as through lightweight formats such as campus broadcasts and everyday listening. It can therefore reach students with anxiety ranging from mild to severe and accommodate schools' multilevel intervention needs [5]. Third, it is non-invasive and highly safe. As a non-pharmacological intervention with minimal side effects, music therapy does not impose an additional physical burden on students and is suitable for routine use in schools [6].

## 3. Multidimensional mechanisms through which music therapy alleviates academic anxiety

### 3.1. Emotional regulation: relieving anxiety through auditory musical experiences

Emotional regulation is the most fundamental pathway and encompasses both physiological regulation and emotional guidance. Physiologically, calming music at 60–72 beats per minute

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approximates the human heart rate and can slow the heart, reduce muscular tension, regulate activity in the hypothalamic-pituitary-adrenal axis, and reduce the secretion of stress hormones such as cortisol (a glucocorticoid secreted by the adrenal cortex and an important human stress hormone involved primarily in glucose metabolism, immune regulation, and stress responses). These effects alleviate physical tension and anxiety at their physiological source. Emotionally, music preferred by students can activate reward-related regions such as the nucleus accumbens (also known as the accumbens nucleus, a neural nucleus located at the junction of the basal ganglia and limbic system, it is a cluster of striatal neurons in the basal forebrain, and its shell is associated with the mechanisms of epilepsy), promote dopamine release, and directly elicit positive emotions such as pleasure and calm, offsetting the low mood and irritability associated with anxiety. Music also provides a safe outlet through which students can release suppressed negative emotions and regain emotional calm [7].

### 3.2. Cognitive defusion: interrupting negative academic thought patterns through musical activities

The persistence and worsening of academic anxiety are closely related to repetitive negative thinking, which can produce a vicious cycle of "anxiety–distraction–reduced learning efficiency–greater anxiety". Music therapy can break this cycle through cognitive defusion. On the one hand, participatory activities in Orff-based group therapy, including rhythmic imitation, instrumental ensemble performance, and body movement, occupy substantial cognitive resources and leave students less able to repeatedly revisit academic worries, thereby directly interrupting negative rumination. On the other hand, because music is non-semantic and does not require logical reasoning, it can guide students into an immersive experiential state, reduce excessive concern with the past and future, and anchor attention in present sensory experience, temporarily distancing students from anxious thoughts. Empirical data show that students' obsessive-compulsive factor scores on the SCL-90 decreased significantly after the intervention ($P < 0.01$). This suggests that the repetitive and intrusive thinking associated with academic worries was substantially alleviated, supporting the practical effectiveness of this mechanism.

### 3.3. Interpersonal support: reducing perceived stress through group musical activities

Worsening academic anxiety is often accompanied by loneliness and inadequate social support. Group music therapy can reduce perceived stress by creating a supportive interpersonal environment. First, the experience of commonality within a homogeneous group helps students recognize that their difficulties are not unique, reducing self-denial and shame about anxiety. Cases involving Orff-based group music therapy at Chinese universities show that, during lyric-completion and sharing activities, many participants wrote study-related feelings such as "confused", "anxious", and "afraid of falling behind" in blank portions of lyrics. After sharing, they discovered that most group members experienced similar academic difficulties. Stress previously borne alone was eased through group empathy, and the intensity of anxiety decreased markedly. Second, the group emphasizes unconditional acceptance and mutual support. For example, mistakes during rhythm-passing activities are met with encouragement. This inclusive atmosphere can reduce social defensiveness and help students gradually build confidence. Third, collaborative tasks such as ensemble playing and group dance enable students to accumulate positive social experiences through cooperation and improve social adaptability. Strong social support is itself a core protective factor that buffers academic stress [8].

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## 4. A tiered model for implementing school-based music therapy interventions for academic anxiety

### 4.1. Targeted individual music therapy

One-to-one intervention is intended for students with moderate to severe anxiety and offers strong privacy and specificity. Therapists customize programs according to individual characteristics, combining musical relaxation with cognitive guidance. Within schools, counseling centers can also serve as referral channels for students with severe anxiety. At present, however, schools lack sufficient full-time music therapists, and standardized operating protocols have not yet been established. Consequently, this model has limited coverage, and its implementation procedures require further development.

### 4.2. Accessible group music therapy

Orff-based group therapy is suitable for students with mild to moderate anxiety and is highly feasible to implement. Groups should contain no more than 12 participants and complete ten 1.5-hour sessions organized into four stages. The first two sessions establish trust within the group. Sessions 3–6 use low-pressure activities such as ensemble performance and lyric writing to facilitate emotional expression. Sessions 7–9 develop emotion-management and collaboration skills through improvisation and group dance. The final session reviews the program through a relaxation experience and consolidates its effects. Empirical data show that, after the full intervention, the experimental group's anxiety factor score on the Symptom Checklist-90 decreased from 1.67 to 1.40 ($p < 0.01$), while accompanying symptoms such as social avoidance also improved significantly.

### 4.3. Lightweight music interventions for everyday use

This model is intended for all students and focuses on preventing anxiety and relieving mild stress without requiring continuous supervision by a professional therapist. It can be implemented in three ways: playing calming music at 60–72 beats per minute during school breaks and self-study periods, organizing singing and song-adaptation activities in class, and providing playlists tailored to different situations so that students can regulate their own emotions. Artificial intelligence can enhance lightweight interventions: mobile tools can generate personalized music programs according to students' real-time states, making routine support more precise and convenient [5].

## 5. Differences in the effects of music therapy on academic anxiety and key influencing factors

### 5.1. Comparison of the effects of different intervention models

Group music therapy has the strongest empirical evidence and produces the most comprehensive effects in reducing anxiety and improving interpersonal adjustment. Data show that, after ten Orff-based group intervention sessions, the experimental group's Interaction Anxiousness Scale score fell from 55.58 to 46.78, while its total Social Avoidance and Distress Scale score fell from 21.14 to 8.15. Anxiety, depression, obsessive-compulsive symptoms, and other SCL-90 factor scores also decreased significantly and differed significantly from those of the control group, indicating simultaneous improvements in anxiety and related cognitive and social difficulties. Individual music therapy is more targeted and is suitable for in-depth intervention with moderate to severe anxiety. It has particular advantages in addressing individualized and deeply rooted emotions, but relevant

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school-based practice and empirical evidence remain limited, and the original literature provides no clear data on the magnitude of its specific effects on academic anxiety. Lightweight everyday interventions produce more limited immediate emotional improvement, their main value lies in prevention and routine regulation. They can reduce the incidence of anxiety and relieve mild daily stress, and their low cost and broad reach make them the foundation of a three-tier school prevention system. These models are complementary rather than interchangeable: everyday intervention provides prevention, group intervention addresses common mild-to-moderate difficulties, and individual intervention responds to severe cases. Together, they constitute a complete school-based intervention system.

### 5.2. Variables related to intervention design

Program design is a core determinant of effectiveness, with musical characteristics, intervention duration, and intervention format being the most important variables. In terms of musical characteristics, slow-tempo music at 60–72 beats per minute is more likely to induce relaxation, whereas excessively fast rhythms may increase tension. Music aligned with students' preferences can activate reward circuitry more effectively and improve intervention outcomes. In terms of duration, group interventions delivered twice weekly for a total of ten sessions have demonstrated significant effects, and approximately 1.5 hours per session appears optimal. Everyday listening interventions are better suited to brief, frequent exposure, which is more effective than infrequent, concentrated sessions. In terms of format, active participation through performance, movement, and composition produces more comprehensive effects and can simultaneously improve social functioning. Listening-based intervention has a lower threshold for participation and is better suited to everyday settings and self-directed intervention [9].

### 5.3. Variables related to individual students

Individual differences among students also influence intervention outcomes. Four categories of factors are central. First, the severity of anxiety matters: mild anxiety is suited to lightweight everyday intervention, moderate anxiety to group-based intervention, and severe anxiety to individual therapy, potentially combined with professional medical care. Second, musical preferences and prior musical experience are important. Students who are more receptive to music tend to benefit more from intervention. Most university students have limited musical foundations—only 3% can read numbered musical notation and 0.2% can play an instrument proficiently—so activities should minimize technical demands, emphasize experience, and avoid worsening anxiety through frustration. Third, age and educational stage affect suitability: high school students respond well to engaging, enjoyable activities, whereas university students can undertake more in-depth group exploration. Fourth, active participation is important. Students who participate voluntarily tend to achieve better outcomes, and intrinsic motivation can be strengthened by allowing them to choose music and activity formats.

## 6. Limitations and directions for optimizing music therapy in school settings

### 6.1. Common limitations of current research and practice in school-based music therapy

After reviewing outcomes and influencing factors, it is necessary to consider the field's overall development. School-based music therapy currently faces several common limitations in both

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research and practice. At the research level, three shortcomings are especially evident. First, study populations lack specificity. Most studies focus on social anxiety or test anxiety, whereas relatively few examine music therapy specifically for academic anxiety. Many conclusions are transferred from other forms of anxiety, and more direct empirical evidence is needed. Second, research samples are clearly limited. Existing empirical studies often use small samples from a single school. For example, one study of Orff-based group therapy recruited only 48 students from one university, limiting the generalizability of its findings. Third, long-term follow-up is insufficient. Most existing studies measure only short-term outcomes before and after intervention and lack follow-up data at three and six months, making it difficult to verify whether the effects are sustained [10].

In practice, barriers to wider implementation center on two issues. First, there is a serious shortage of qualified professionals. Music therapy programs in China remain small, and the supply of trained personnel is limited. Most schools have no full-time music therapist, while existing school counselors generally lack professional training in music therapy, making standardized intervention difficult. Second, no standardized intervention system has been established. School-based music therapy currently consists mainly of scattered practical experiments and lacks standardized intervention programs and outcome-evaluation criteria tailored to different educational stages and levels of anxiety. As a result, the quality of practice varies considerably.

### 6.2. Pathways for optimizing professional systems of school-based music therapy

The limitations identified in current research and practice can be addressed through four strategies for optimizing school-based music therapy systems. First, talent development and capacity building should be strengthened. Universities should expand music therapy programs and focus on training applied professionals for school settings. Specialized music therapy training should also be provided to school counselors and music teachers to improve frontline educators' basic intervention skills and ease the shortage of professionals. Second, a standardized, tiered, and categorized intervention system should be established. Standardized programs, operating manuals, and evaluation criteria should be developed for primary schools, secondary schools, and universities and for mild, moderate, and severe anxiety, thereby enhancing professionalism and replicability. Third, artificial intelligence should be integrated to improve accessibility. AI-enabled music-healing technologies can support the development of lightweight school-based intervention platforms [6]. Personalized music recommendations and adaptive therapeutic soundscapes can help offset shortages of trained staff and expand intervention coverage. Wearable devices and other technologies can also enable quantitative outcome evaluation, moving school-based music therapy from experience-based practice toward data-driven practice. Fourth, interdisciplinary collaboration mechanisms should be established. Music teachers, school counselors, and school physicians should work together. Where resources permit, schools can partner with medical institutions and university music therapy programs. A referral pathway linking schools, professional organizations, and hospitals should provide continuity of support for students with severe anxiety.

## 7. Conclusion

Four core conclusions can be drawn from the preceding analysis. First, underpinned by dual physiological and psychological mechanisms, music therapy demonstrates unique suitability for school-based interventions targeting academic anxiety. Its advantages of low participation resistance, flexible delivery formats, high safety, and non-invasiveness directly address many limitations of conventional school psychological interventions. Second, music therapy alleviates

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academic anxiety through three interconnected pathways: it directly reduces anxious responses at the physiological and emotional levels, interrupts the vicious cycle of negative academic thinking through participatory musical activities, and fosters interpersonal support via structured group environments. Third, schools can establish a three-tiered intervention system: individual therapy delivers targeted intervention for students with severe anxiety, Orff-based group therapy provides accessible support for those with mild to moderate anxiety, and lightweight daily interventions offer universal prevention and routine emotional regulation for all students. The three models complement one another to form a complete intervention pathway. Fourth, the effects of music therapy are shaped by multiple factors. Musical style, intervention duration, anxiety severity, and students' willingness to participate all influence final outcomes, so implementation must prioritize personalization and contextual suitability.

This study also has clear limitations. Direct empirical evidence focusing specifically on music therapy for academic anxiety remains relatively scarce, and some conclusions are extrapolated from related studies on social anxiety and general stress interventions; their specificity for academic anxiety requires further validation. Future research can advance in three directions. First, targeted empirical studies on academic anxiety should be conducted using randomized controlled trials to evaluate the effects of different intervention models and build a robust body of localized evidence. Second, researchers should explore the integration of artificial intelligence with school-based music therapy, and develop digital intervention tools adapted to campus settings. Third, long-term follow-up frameworks should be established to examine the durability of music therapy's effects on academic anxiety and its maintenance mechanisms, so as to promote the standardized and evidence-based development of school-based music therapy.

## References

[1] Wan, Y. (2013). An experimental report on Orff-based group music therapy as an intervention for social anxiety among university students. *Huangzhong (Journal of Wuhan Conservatory of Music)*, (2), 154–166, 184.
[2] Yin, H. J., & Li, T. (2012). The role of music education in building a "harmonious campus" from the perspective of music therapy. *Northern Music*, (8), 57.
[3] Wu, L. (2022). Skillful use of music therapy to alleviate stress among high school students. *The Road to Success*, (2), 67–69.
[4] Shen, J. (2003). A review of music therapy and related psychological research. *Psychological Science*, (1), 171–172.
[5] Zheng, Y. Z., & Chen, J. J. (2004). The definition and formation of music therapy and its development in China. *Explorations in Music (Journal of Sichuan Conservatory of Music)*, (3), 91–94.
[6] Liu, H. (2025). Theory and practice of artificial-intelligence-enabled music healing. *Art of Music (Journal of the Shanghai Conservatory of Music)*, (5), 163–173.
[7] Zhou, W. M. (2007). Physiological research on music therapy. *Musicology in China*, (1), 117–121.
[8] Li, X. Q., Xu, X. F., & Wang, H. R. (2016). A study of group music therapy as an intervention for social anxiety among adolescents. *Journal of Zunyi Normal University, 18*(5), 134–136.
[9] Zhang, M. (2018). Advantages of music therapy interventions for university students' mental health. *Art Education*, (20), 119–120.
[10] Zheng, Q. Q., & Luo, Y. X. (2019). A study of music-therapy group counseling as an intervention for social anxiety among university students. *Journal of Changchun Normal University, 38*(10), 197–200.