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Analysis of the Theoretical Mechanism of Music Therapy Combined with CBT in Intervening Teenagers' School Aversion

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Abstract. The problem of teenagers' disinterest in learning has become a focus of attention worldwide in the fields of educational psychology and mental health. Behind this issue often lie emotional disorders such as depression and anxiety. The combined intervention of music therapy and cognitive-behavioral therapy (CBT) has shown promising results in clinical practice. Still, the theoretical mechanism underlying their collaborative effect has not yet been systematically explained. This article aims to deeply analyze the internal mechanism of the MT-CBT combined intervention for teenagers' disinterest in learning from a theoretical perspective. It integrates theories of emotion regulation, dual processing, embodied cognition, and attachment theory to construct a multi-dimensional theoretical explanatory framework. The research identified that the synergistic impact of music therapy and CBT is primarily evident in four dimensions: emotional level - music serving as the "non-verbal conduit" for emotional regulation; cognitive level - musical experience functioning as the "behavioural experiment" for cognitive restructuring; physiological level - rhythm acting as the "modulator" of the autonomic nervous system; relational level - music functioning as the "catalyst" for the therapeutic alliance. The theoretical framework proposed in this article can provide a conceptual basis for subsequent empirical research and offer theoretical guidance for school mental health practices.

Keywords: Music therapy, Cognitive behavioral therapy, School aversion, Adolescents, Theoretical mechanism

1. Introduction

Adolescent school refusal is a complex biopsychosocial syndrome involving cognitive, emotional, behavioral, and physiological dimensions [1]. Globally, mental health issues among teenagers are on the rise. According to data from the World Health Organization [2], more than one in five adolescents aged 15 to 19 experience mental distress. Although Cognitive Behavioral Therapy (CBT) is an evidence-based intervention, its application in adolescents faces three challenges: an immature prefrontal cortex that limits cognitive restructuring, resistance to verbal therapy, and difficulty with verbal approaches in accessing deep emotional experiences. Music therapy, as a non-verbal creative arts therapy, has emerged as a potential complement. Clinical evidence supports the

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effectiveness of combined music therapy and CBT (Hereinafter referred to as MT-CBT) [3]. Yet existing research primarily focuses on outcome validation, leaving the synergistic mechanisms largely unexplored. However, there are some gaps in the existing research: Firstly, most studies focus on clinical diagnoses of depression or anxiety disorders, while paying insufficient attention to "school refusal", a subclinical but widespread issue; Secondly, the research mostly stays at the level of effect verification, and does not delve deeply into the "mechanism" of the combined intervention of MT-CBT; Thirdly, there is a lack of path analysis based on the theory of emotion regulation, making it difficult to explain the core issue of "how music experience is transformed into cognitive change".This study aims to develop a theoretical framework to explain the synergistic mechanisms of MT-CBT in adolescent school refusal. It examines how music therapy compensates for and enhances CBT across four dimensions: cognitive, emotional, behavioral, and physiological. This study employs theoretical integration and logical deduction. By synthesizing literature on the psychopathology of school refusal, CBT mechanisms, and the neurophysiological effects of music therapy, this study develops a "compensation-enhancement" model based on the four-dimensional pathological framework. Theoretically, this study fills a gap in mechanism-oriented research on MT-CBT by providing testable hypotheses for future empirical studies. In practice, it provides a rationale for developing structured treatment manuals and optimizing a "bottom-up" intervention pathway—from physiological regulation to cognitive restructuring. Future research should adopt interdisciplinary approaches, utilizing physiological feedback technologies to identify optimal timing for integrating music therapy with CBT, thereby advancing mechanism-driven integrated interventions for adolescent school refusal.

2. Theoretical foundation: Construction of an integrative perspective

2.1. Emotional regulation theory: Core explanatory framework

Gross's theory of emotion regulation [4] provided the core explanatory framework for this study. This theory divides emotion regulation into five stages: situation selection, situation modification, attention allocation, cognitive change (cognitive reappraisal), and response modulation (expression suppression). Among them, cognitive reappraisal is considered an adaptive strategy, whereas expression suppression is associated with non-adaptive consequences.

The challenges in emotional regulation among school-refusing adolescents are evident in the aforementioned dimensions: during the attention allocation phase, they excessively concentrate on the perceived threats within the school setting; in the cognitive change phase, they struggle to reinterpret the circumstances; and in the response modulation phase, they either inhibit their emotions, resulting in physical manifestations, or their emotions become unmanageable, culminating in behavioural issues.

The MT-CBT combined intervention can exert its effects in multiple aspects: Music activities help redirect attention - immersing oneself in music temporarily removes oneself from the source of anxiety; Music experience provides new emotional evidence for cognitive reappraisal - experiencing a sense of control in music, thereby challenging the negative belief of "I am powerless"; Music expression replaces emotional suppression - expressing emotions through musical instruments to reduce somatic symptoms.

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2.2. Dual-processing theory: Explaining the mechanism of cognitive change

Kahneman's dual-process theory [5] provides an important perspective on the cognitive mechanisms underlying MT-CBT. This theory distinguishes between two information-processing systems: System 1 for rapid, automatic, and intuitive processing, and System 2 for slow, controlled, and analytical processing.

Traditional CBT mainly acts on System 2 - by conducting logical analysis and rational debate to change cognition. However, the negative beliefs of adolescents with learning difficulties are often deeply rooted in System 1, characterized by automation and emotional load. Simply relying on System 2 to intervene makes it difficult to reach the root cause. The advantage of music therapy lies in its ability to act on both systems simultaneously: The music experience directly activates System 1 - bypassing language defense and directly acts on the limbic system, evoking emotional memories and physical sensations; then, under the guidance of the therapist, these experiences enter System 2 for reflection and reconstruction. This "experience-reflection" dual-processing path first relaxes System 1 through music and then reshapes System 2 through CBT.

2.3. Embodied cognition theory: Explaining the connection between the body and the mind

The embodied cognition theory [6] posits that cognition is embedded in the body and that thinking is influenced by the body's state and its interactions with the environment. This theory provides significant support for understanding the uniqueness of music therapy.

The cognitive model of disinterest is not only a belief in the mind, but also a physical "curling up" - the physical postures of teenagers with disinterest often manifest as head-down, hunched back, and tenseness. This physical state, in turn, reinforces the cognitive model of helplessness and retreat. Rhythmic activities, improvisation, body percussion, etc., in music therapy directly act on the physical level. When teenagers strike forcefully in the drum circle and stretch their bodies in rhythm, changes in body posture convey signals to the brain, such as "I can control" and "I have strength". This is a "bottom-up" intervention approach, which complements the "top-down" cognitive approach of CBT.

2.4. Attachment theory and therapeutic alliance

The attachment theory underscores that a stable attachment relationship is fundamental to an individual's mental health development [7]. The growth experiences of adolescents with learning difficulties often lack sufficient secure bases, which makes it difficult for them to trust others and feel safe in new environments.

Music therapy has unique advantages in establishing therapeutic alliances. McFerran [8] noted that music can serve as a "transitional object," connecting the inner and outer worlds and the therapist and the client. When teenagers play music together with the therapist, they establish a non-verbal "synchronization" experience. The attachment theory underscores that a stable attachment relationship is fundamental to an individual's mental health development.

3. The theoretical model of the synergistic effect of MT-CBT

Based on the above theoretical integration, this paper proposes a four-dimensional theoretical model for the combined intervention of MT-CBT for adolescent school dropout:

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3.1. Emotional level: Music as the "non-verbal channel" for emotional regulation

School-rejecting teenagers often suffer from alexithymia - the inability to recognize and express their emotional states. The first step in emotional regulation is emotional awareness, and music provides a unique channel for this.

Theoretical mechanism: Music directly acts on the limbic system (particularly the amygdala), bypassing the language cortex to evoke emotional experiences [9]. When teenagers, under the guidance of a therapist, choose a song that "represents their mood", they are actually identifying and naming the emotions - "It turns out that my irritability sounds like heavy metal". This "music-emotion" mapping lays the foundation for subsequent emotional regulation.

Intervention approach: In the initial stage of MT-CBT, the therapist uses activities such as music listening and emotion mapping to help adolescents build an emotional vocabulary and enhance their emotional awareness. This process corresponds to the "attention allocation" stage of emotion regulation theory, guiding attention towards emotional experiences without becoming overly immersed.

3.2. Cognitive level: Music experience as a "behavioral experiment" for cognitive reconstruction

One of the core techniques of CBT is "behavioral experimentation" - designing specific activities to test the validity of negative beliefs. Music therapy provides abundant experimental materials for this purpose.

Theoretical mechanism: According to the dual-processing theory, beliefs formed by System 1 are difficult to change through logical refutation. New emotional experiences are needed to "overwrite" the old automatic associations. When disinterested teenagers experience "I can create music" and "I can cooperate with others" during improvisational performances, these experiences directly challenge the core belief of "I can do nothing well". This "experiential evidence" is more powerful than verbal persuasion.

Intervention approach: In the mid-term cognitive restructuring phase, the therapist formulates structured musical exercises as behavioural studies. For example, for the belief "I can't control anything", the teenager is appointed as the band conductor; for the belief "No one understands me", the other members are guided to improvise and cooperate with his performance. After the music activity, the therapist prompts reflection: "What happened just now? Does this align with your original thoughts? What does this indicate?"

3.3. Physiological level: Rhythm as the "regulator" of the autonomic nervous system

The somatic symptoms of school refusal are the physical manifestations of anxiety. Rhythm, as the core element of music, plays a unique role in physiological regulation.

Theoretical mechanism: There is an "entrainment" effect between human physiological rhythms (heartbeat, breathing) and external rhythms. When individuals are exposed to regular rhythmic stimuli, their physiological rhythms gradually synchronize with it [10]. Slow and stable rhythms can lower heart rate and respiratory rate, activating the parasympathetic nervous system; rapid and forceful rhythms can increase arousal levels and activate the sympathetic nervous system. This "physiological regulation" creates an appropriate physical and mental state for cognitive regulation.

Intervention method: In the anxiety management training, the therapist first guides teenagers to reduce their physical reactions through slow exercises (such as deep breathing accompanied by

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soothing music), then conducts cognitive restructuring in a relaxed state. This reflects the principle of somatic cognition: first adjust the physical state, then change the cognition.

3.4. Relationship level: Music as the "catalyst" for group therapy

The quality of group therapy is one of the most crucial factors determining the effectiveness of psychological treatment [11]. For adolescents who are resistant to adults and dislike school, establishing a trusting relationship is particularly challenging.

Theoretical mechanism: Music interaction activates the mirror neuron system and reward circuits in the brain. When the therapist and the teenager play together, the prefrontal cortex and limbic system form synchronous oscillations, establishing the neural basis for interpersonal connection [9]. At the same time, the dopamine release from music-making links the therapeutic process with a pleasurable experience, reducing resistance to the treatment.

Intervention approach: In the initial stage, the therapist adopts a "following rather than guiding" stance, accompanying the teenager's musical expression - no matter how chaotic it may be. This unconditional acceptance is conveyed through music and establishes the initial trust. In the subsequent stage, this trust relationship becomes a "safe base", enabling the teenager to dare to confront more challenging cognitive tasks.

4. Integration and dialogue of theoretical models

The four aforementioned levels do not operate independently but are interwoven and progressively linked:

Temporal progression: During the initial phase of intervention, emotional and relational factors prevailed, emphasising connection and awareness through music; in the subsequent phase, cognitive elements began to surface, utilising musical experiences to confront beliefs; in the final phase, the emphasis shifted to behavioural modification and consolidation, implementing new cognitive frameworks within the educational setting.

Interaction at the mechanism level: Physiological regulation creates a suitable physical and mental state for cognitive changes; secure relationships enable teenagers to dare to try new cognitive strategies; emotional awareness provides materials for cognitive restructuring; cognitive changes, in turn, promote the flexibility of emotional regulation.

This model engages in dialogue with existing theories: It broadens the applicability of Gross's emotion regulation theory by integrating musical experiences into the repertoire of emotion regulation strategies; it establishes a validation pathway at the intervention level for dual processing theory; it translates the theoretical principles of embodied cognition into concrete therapeutic techniques; it elucidates the specificity of music therapy in relational treatment through the lens of attachment theory.

5. Conclusion

This article systematically analyzes the internal mechanism of music therapy (MT) combined with CBT in addressing adolescent school dropout through a theoretical perspective, proposing a four-dimensional theoretical model: the emotional level, where music serves as a non-verbal emotional channel; the cognitive level, where music experience acts as a behavioral experiment; the physiological level, where rhythm functions as a physiological regulator; and the relational level,

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where music acts as a relationship catalyst. The four dimensions work together to promote psychological transformation.

The theoretical contribution of this model lies in: integrating resources from multiple disciplines, revealing the intrinsic logic of the synergy between MT-CBT, transcending the "patchwork" understanding, and providing testable hypotheses for empirical research. The intervention design should follow three principles: an integrated rather than a piecemeal approach, hierarchical progression, and individualized matching. In the school context, it can be applied to prevention (incorporating mental health courses), early intervention (such as drumming rhythm training, choir), and case intervention. Future research needs to examine the neural basis, develop measurement tools, conduct comparative studies, and explore individual difference factors.

The integration of MT and CBT is essentially a dialogue between art and science, experience and cognition, body and mind, providing a more comprehensive solution for understanding and intervening in teenage school dropout issues.

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