Education Reform and Development, 2026, Volume 8, Issue 1
https://ojs.bbwpublisher.com/index.php/ERD
Online ISSN: 2652-5372
Print ISSN: 2652-5364

Psychological Regulation and Educational Applications of Multi-Emotional Music

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Abstract: This study explores the regulatory mechanisms of emotionally diverse music in mental health and educational contexts. Through its acoustic features, multisensory integration, and contextual associations, music elicits emotional resonance, enhances vitality, promotes calmness, and facilitates emotional release, helping individuals achieve psychological balance. In educational contexts, music alleviates student stress and enhances emotional resonance by leveraging multisensory coordination and physiological feedback mechanisms, thereby supporting emotional self-regulation. This study reveals music's positive role in promoting emotional well-being and its significant value for educational applications.

Keywords: Music; Mental health; Educational applications

Online publication: February 11, 2026

1. Introduction

Music is an art form that transcends time and culture. As an ancient saying goes, "Music is the movement of the heart," reflecting how music serves as a bridge between inner feelings and external expression. Through ordered tones and rhythms, music not only conveys complex human emotions but also embodies the fabric of social life. The earliest human music originated from fundamental emotional impulses, expressing core emotional experiences through variations in pitch and rhythm. As an emotional language, music plays a unique role in guiding and regulating emotions. In recent years, researchers have increasingly explored the mechanisms by which music influences emotions and how these mechanisms function in mental health and education. In-depth research in this area not only reveals the profound connection between music and emotion but also opens new possibilities for emotion management and psychological counseling.

2. Types of emotion-inducing music and their core regulatory functions

2.1. Classification and basic features of emotional music

With its unique tonal qualities and rhythms, music resonates with human emotions. The rise and fall of pitch,

the variation of tempo, and the layering of harmony form an emotional landscape imbued with implicit emotional codes and symbolic meanings. According to differences in acoustic characteristics and emotional effects, music embodies multiple emotional dimensions: it may be uplifting and luminous, profound and sustained, or intense and exhilarating [1]. Each type of music is not merely a simple sequence of sounds but a carrier of emotion that conveys distinct psychological regulatory functions and serves as an effective medium for emotional adjustment and psychological counseling.

2.1.1. Mood-enhancing music

Mood-enhancing music creates a positive and joyful atmosphere through lively rhythms and bright tonalities. This type of music can activate the brain's reward centers and promote dopamine secretion, thereby producing feelings of joy and satisfaction. In classical music, Mozart's Symphony No. 40 and Turkish March, with their leaping melodies and brisk tempos, instill a sense of vitality in listeners. In popular music, the works of Queen, as well as punk rock, utilize infectious rhythms and cheerful melodies to express and transmit positive emotions. Such music can effectively promote emotional receptivity and stimulate people's creativity and social engagement.

2.1.2. Psychological-balancing music

Psychological-balancing music, by contrast, features gentle timbres and slow, steady tempos to create a calm and tranquil atmosphere. This kind of music is widely used for stress reduction and emotional relaxation. Its low and stable melodic lines can effectively reduce cortisol levels, helping individuals relieve anxiety and soothe their mood. In classical music, Bach's Goldberg Variations is a typical work for stabilizing mental states; its harmonious melodies and consistent rhythmic structure are often used in meditation and deep relaxation. In popular music, Norah Jones's Come Away With Me, with its soft vocal timbre and soothing melodic flow, evokes a profound sense of serenity, making it highly suitable for stress management and relaxation training.

2.1.3. Emotion-resonating music

Emotion-resonating music employs low, somber tonalities and complex harmonies to reach the listener's emotional core, eliciting emotional resonance and facilitating emotional release. In classical music, Beethoven's Moonlight Sonata employs its profoundly expressive melodies and multi-layered structure to evoke deep emotional responses in listeners. In popular music, Adele's Someone Like You, with its low, rich voice and slow tempo, enables listeners to find emotional resonance, making it particularly useful for the management and release of sadness. Emotion-resonating music is often used in psychological healing, helping individuals accept and release their own emotions through the medium of music.

2.2. Psychophysiological response mechanisms and application contexts of emotional music

2.2.1. Physiological and psychological response mechanisms of emotional music

As a distinctive form of emotional expression, emotional music exerts significant physiological and psychological effects [2]. Physiologically, emotional music can stimulate the central nervous system and activate emotion-regulating regions in the brain such as the amygdala and the mesolimbic system, thereby modulating physiological indicators including heart rate, skin conductance, and cortisol levels [3]. For example,

pleasurable music can increase heart rate variability and stimulate dopamine secretion, inducing feelings of pleasure and satisfaction, whereas soothing music helps reduce cortisol levels and alleviate stress and anxiety [4].

On the psychological level, music can influence emotional experience through different melodic, rhythmic, and harmonic structures. Studies have shown that the arousal dimension of music (such as tempo and pitch height) and its emotional valence (whether the tonality is perceived as positive or negative) can elicit multi-dimensional emotional responses. For instance, high-arousal music typically produces stronger emotional contagion, while low-arousal music is more suitable for deep emotional resonance. This multi-modal processing characteristic of musical emotion further demonstrates its function in regulating psychological states, enabling music to generate more individualized emotional responses according to the needs of different listeners [5].

2.2.2. Application contexts and emotion-regulation effects of emotional music

Based on its pronounced regulatory effects at both physiological and psychological levels, emotional music has been widely applied in various contexts. In daily life, mood-enhancing music (such as upbeat popular music) is often used to elevate mood, enhance vitality, and stimulate creativity. Through lively rhythms and bright tonalities, this type of music activates the brain's reward centers, helping to alleviate negative emotions and improve mental well-being.

In contexts requiring emotional catharsis and psychotherapy, calming music (such as classical music) is widely used for stress reduction, meditation, and anxiety relief. Its steady melodies and low registers can effectively reduce individuals' feelings of anxiety and create a peaceful and relaxed atmosphere, and it has become an important component of therapeutic music interventions. For example, in psychotherapy, psychologically balancing music (such as Bach's Goldberg Variations) is often used to help patients relieve psychological stress and guide their emotions through a stable tempo, thereby achieving inner calm [6].

In addition, emotion-resonating music (such as low, deeply expressive music) serves a unique function in emotional release and resonance. This kind of music evokes emotional resonance through complex harmonies and low, somber tonalities, allowing individuals to release suppressed emotions under the guidance of music. Clinically, by listening to resonant music, individuals can better identify and accept their own emotions; for example, sad music is used to alleviate depressive symptoms, achieving psychological healing through emotional catharsis.

3. Practical strategies for music-based emotion regulation in educational settings

The emotion-regulating function of music in education is not limited to superficial affective guidance; rather, it serves as a multidimensional tool for emotional experience and cognitive enhancement. By leveraging acoustic features, multisensory input, psychophysiological feedback, and memory activation, music can assume multiple roles in educational contexts—such as emotional stimulation, stress relief, and resonance facilitation—thereby optimizing students' learning states and emotional development [7]. In practical terms, these functions can be embedded in everyday teaching activities, classroom management, and counseling interventions, positioning music not merely as an auxiliary resource but as an integral component of comprehensive emotional education. When systematically and purposefully applied, music-based strategies can help construct a more supportive learning climate, diminish emotional obstacles to learning, and foster students' long-term emotional competencies.

3.1. Mechanistic model of music-based emotion regulation

As an art form that transcends cultures and resonates deeply with the human psyche, music exerts its emotion-regulating function through a series of complex mechanisms. These mechanisms extend beyond isolated acoustic cues but also encompass multisensory integration, bidirectional psychophysiological feedback, and memory associations. These mechanisms interact dynamically with individual characteristics such as personality, prior experiences, and current emotional states, thereby producing diverse regulatory outcomes in educational settings. The following section analyzes in depth the mechanistic model of music-based emotion regulation from five core dimensions [7], providing a theoretical basis for the design and implementation of practical strategies in schools and other learning environments.

3.2. Acoustic cues and emotional encoding

The emotion-regulating effect of music stems primarily from its unique acoustic components. Basic acoustic cues such as melody, rhythm, pitch, and mode convey emotions through distinctive patterns of emotional encoding. For example, fast tempos and bright modes tend to elicit feelings of vitality and pleasure, whereas low-pitched, slow melodies are more likely to induce tranquility or sadness. Changes in dynamics and timbre can further refine these emotional nuances, rendering the expressed affect more nuanced and multifaceted. Such acoustic encoding not only endows music with a universal capacity for emotional expression but also confers a degree of cross-cultural validity. Serving as the foundational layer of emotion regulation, acoustic cues convey complex emotional states to listeners in an intuitive manner, thus establishing the affective foundation for subsequent multidimensional regulation [8]. In educational practice, teachers can deliberately select and adjust these acoustic features to shape classroom atmosphere and guide students' emotional orientation.

3.3. Multisensory integration

Music influences emotion not through auditory channels alone; rather, its emotion-regulating effect is amplified through multisensory coordination. The integration of auditory information with visual, tactile, and other sensory inputs enriches emotional experience and creates a more immersive affective state [9]. For instance, during a concert, the combination of music, stage design, facial expressions, and bodily movements collectively amplify emotional responses. Similar effects can be achieved in classroom settings, where background music, images, and teacher gestures interact to shape students' perceptions and feelings. Empirical studies have shown that such multisensory integration activates emotional regions of the brain and enriches musical emotional experiences. This mechanism not only applies to interactive settings such as performances and teaching but also enhances the efficacy of emotion regulation in educational contexts and emotional development [10]. Consequently, multisensory integration offers a practical framework for designing learning activities that simultaneously address cognition and emotion.

3.4. Interactive feedback between psychological and physiological processes

The impact of music on emotion regulation transcends subjective psychological experience and is further reinforced through physiological feedback mechanisms. For example, soothing music can lower heart rate and activate the parasympathetic nervous system, thereby inducing relaxation; in contrast, intense music tends to increase heart rate and activate the sympathetic nervous system, eliciting excitement and arousal.

These physiological responses in turn shape individual emotional experience, creating a continuous feedback loop between bodily states and psychological feelings. This bidirectional feedback between psychological and physiological processes provides a profound neurophysiological basis for music's regulatory effects on emotion, making it suitable for use in emotion management and stress-relief settings. In educational environments, appropriately selected music can thus help students recover from tension, sustain optimal levels of alertness, and improve overall learning efficiency. Through physiological feedback, music-based emotion regulation transcends superficial mood adjustment and becomes an effective tool for promoting mind–body equilibrium and supporting students' long-term mental health.

4. Memory and contextual association

Music thus functions as an affective memory catalyst with dual regulatory potential: it can either reactivate positive emotional states to counter current negative affect, or provide a safe context for processing difficult emotions through controlled re-exposure. This dual functionality has significant applications in psychological intervention and emotional education. In therapeutic contexts, music facilitates self-reflection by providing emotional distance from traumatic or distressing memories while maintaining affective connection. It enables emotional release through externalization of internal states, and supports the development of adaptive emotion-regulation patterns by strengthening associations between specific musical characteristics and desired emotional outcomes. Moreover, the predictability and controllability of musical stimuli make them particularly valuable tools for individuals learning to modulate their emotional responses across varying situational demands.

4.1. Context-based musical emotion regulation in educational settings

Research demonstrates that music constructs authentic emotional contexts, enhancing students' emotional and cognitive engagement through what can be termed "affective scaffolding" [11]. This concept extends traditional notions of instructional support by recognizing that emotional states fundamentally shape learning readiness, information processing depth, and memory consolidation. In classroom settings, carefully selected music rapidly establishes the instructional emotional tone, creating what environmental psychologists describe as "affective affordances"—environmental features that invite particular emotional responses and behavioral patterns.

Students thus experience both the informational and affective dimensions of content simultaneously rather than sequentially. Music facilitates students' access to the affective dimensions embedded in curricular materials, creating what can be described as "emotional congruence" between the learner's internal state and the material's implicit emotional content. This congruence enhances comprehension through multiple mechanisms: it improves attentional allocation toward emotionally relevant information, strengthens encoding specificity by creating distinctive retrieval cues, and promotes deeper semantic processing through increased personal relevance. Memory consolidation benefits from the additional emotional encoding that occurs when information is processed within affectively rich contexts, as emotional arousal enhances hippocampal-dependent memory formation.

Concurrently, students develop metacognitive awareness of how situational factors shape emotional responses and subsequent cognition. Through repeated exposure to varied musical-instructional pairings, learners begin to recognize patterns in their own emotional reactivity and develop a more sophisticated

understanding of emotion-cognition interactions. Context-based musical applications thus foster multiple competencies simultaneously: emotional regulation skills through practice in managing induced affective states, empathy through shared emotional experiences with peers, and integrated cognitive-affective development through learning experiences that honor the inseparability of thinking and feeling in authentic educational contexts.

4.2. Multisensory integration in musical emotion regulation

Multisensory integration represents a sophisticated approach to emotion regulation that combines music with visual and kinesthetic inputs to create what researchers term "cross-modal emotional experiences." This approach transcends simple additive effects—where multiple sensory inputs merely sum their individual impacts—to produce synergistic outcomes wherein coordinated multisensory stimulation generates qualitatively distinct emotional experiences. The theoretical rationale rests on understanding that human emotional processing evolved to integrate information across multiple sensory channels simultaneously, as natural emotional elicitors (such as social interactions or environmental threats) typically provide multimodal information.

In practical implementation, educators can strategically integrate music with visual or kinesthetic materials that align with the content's emotional tone and instructional objectives. For example, when teaching historical events with significant emotional weight, combining period-appropriate music with photographic or video documentation creates a temporal and emotional context that enhances both factual learning and empathic understanding. In literature instruction, playing music that mirrors the emotional arc of a narrative while students read can deepen their connection to characters' experiences and improve their ability to identify subtle emotional nuances in text.

Embodied activities provide particularly powerful opportunities for multisensory emotional regulation by anchoring emotional experiences through physical engagement. When students physically enact emotional states—through gesture, dance, or dramatic expression—while experiencing congruent musical stimulation, they create what psychologists call "somatic markers": bodily states that become associated with specific emotions and facilitate future emotional recognition and regulation. These markers strengthen the connection between internal emotional experiences and external regulatory strategies, supporting the development of embodied emotional intelligence.

In specialized subjects such as literature and art appreciation, emotionally congruent music serves as an interpretive lens that enhances students' grasp of aesthetic and affective dimensions often implicit in creative works. By experiencing how musical elements like dissonance, resolution, tempo changes, and dynamic contrasts create emotional trajectories, students develop transferable analytical skills for recognizing similar patterns in visual art, poetry, and narrative structure. Multisensory integration thus enhances both domain-specific conceptual understanding and broader affective competencies, including aesthetic literacy, emotional granularity (the ability to make fine-grained distinctions between emotional states), and empathic resonance with diverse emotional expressions across cultural and artistic contexts.

4.3. Physiological feedback mechanisms in music-based regulation

Music influences emotion through physiological feedback mechanisms that provide a biological substrate for regulatory effects, operating through what neuroscientists describe as the "brain-body loop" [12]. This bidirectional communication system between the central nervous system, emotional processing and peripheral

physiological responses creates opportunities for intervention at multiple points in the emotion-generation sequence. Understanding these mechanisms reveals how music can serve as a non-invasive tool for modulating the physiological underpinnings of emotional states, offering advantages over purely cognitive or behavioral interventions in contexts where direct emotional regulation is difficult or inappropriate.

Music thus supports sustained development of emotional self-regulation with implications extending beyond immediate behavioral management to long-term psychological well-being. By providing accessible, low-cost, and stigma-free tools for managing emotional challenges, music-based interventions may reduce reliance on less adaptive strategies such as avoidance, rumination, or substance use. Furthermore, the positive emotional experiences associated with successful self-regulation through music can enhance self-efficacy beliefs, creating virtuous cycles wherein students increasingly trust their capacity to manage emotional challenges and thus engage more readily with situations that previously provoked anxiety or avoidance.

4.4. Individual differences in musical emotion regulation

Individual differences significantly moderate music-based regulatory outcomes, introducing complexity that requires moving beyond one-size-fits-all approaches to develop genuinely personalized intervention strategies. The sources of this variation are multiple and interact in complex ways: personality traits shape both baseline emotional reactivity and preferences for particular regulatory strategies; musical preferences reflect cultural socialization, exposure history, and identity construction; cultural background influences both the semantic associations attached to musical parameters and the social acceptability of various emotional expressions; and current affective states alter perceptual processing in ways that modify emotional responses to musical stimuli.

Conversely, introverted students, who exhibit lower baseline arousal seeking and greater punishment sensitivity, benefit from softer music characterized by slower tempos, lower volumes, and simpler musical structures that promote reflection without overstimulation. Their preference for lower-stimulation environments extends to musical choices, and music that exceeds their optimal arousal range may produce discomfort or anxiety rather than the intended regulatory benefits. For introverted learners, appropriately selected music supports focused attention by minimizing environmental distractibility, facilitates deeper processing through reduced cognitive load, and provides a calm backdrop that allows internal focus—all regulatory outcomes that align with their preferred cognitive styles and emotional management strategies.

Beyond the extraversion-introversion dimension, other personality characteristics influence musical emotion regulation effectiveness. Individuals high in trait anxiety show greater physiological reactivity to musical tempo variations and may require more gradual transitions when using music to shift arousal levels. Those high in openness to experience demonstrate greater appreciation for complex, unconventional musical styles and may engage more deeply with music that violates expectations or explores unusual emotional territory. Conscientious individuals may prefer structured, predictable musical selections that support goal-directed activities, while those high in neuroticism may benefit particularly from music-based interventions that target mood stability and stress reduction.

Repeated exposure enables students to identify situation-appropriate musical strategies through both explicit instruction and implicit learning. Teachers can support this development by making the emotion-regulation functions of musical choices explicit through metacognitive discussions: “Notice how this music helps you focus” or “Pay attention to how different types of music affect your energy level.” Over time, students develop personalized “emotion regulation playlists”—curated collections of music they have discovered effectively support their own regulatory needs across various situations. This personalization

process enhances both the effectiveness of the interventions (as students select music genuinely suited to their preferences and needs) and their sense of agency and self-efficacy in managing emotional challenges.

This facilitation of autonomous emotion regulation enhances adaptive capacity across contexts by providing students with portable, accessible tools they can deploy independently whenever regulatory needs arise. Unlike strategies requiring specific environmental conditions or interpersonal support, music-based self-regulation can be implemented in diverse settings using widely available technology. Students who have developed musical emotion-regulation skills can apply them during homework completion, before athletic competitions, in social situations that provoke anxiety, or during any circumstance requiring emotional adjustment. This portability and accessibility make music-based strategies particularly valuable for supporting students' emotional functioning beyond direct teacher supervision, contributing to genuine competence development that extends throughout adolescent development and into adulthood.

5. Conclusion

The relationship between music and emotion is complex and profound, offering unique regulatory pathways for mental health and education. This study reveals how multi-emotional music modulates emotions through mechanisms such as acoustic characteristics, multisensory integration, physiological feedback, and memory associations, providing scientific support for emotional management and psychological counseling. Different music genres convey distinct emotions through their rhythmic and acoustic properties, eliciting varied responses in cognitive and emotional processing. While music's value in emotional regulation has been preliminarily validated, the influence of cultural and individual differences on emotional responses warrants further investigation. Future research integrating diverse methodologies to explore personalized applications of music-based emotional regulation will deliver more precise support for mental health and educational fields.

Disclosure statement

The author declares no conflict of interest.

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