



A Review of Research on the Effects of Piano Performance Styles on Emotional Perception and Narrative Imagination

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Abstract

Background and Aims: Piano performance is an interpretive process, and expression parameters shape the listener's emotional experience and construct meaning. This review summarizes the research results on the relationship between performance styles and emotional perception and narrative imagination, and also identifies key trends and gaps.

Methodology: Narratively integrate the review. Use WOS, Scopus, GS, CNKI, ProQuest, etc. First, screen the relevance of the research and the clarity of the methods. Then, carry out a comprehensive analysis through theme analysis.

Results: Evidence shows that the performance style has an impact on narrative imagination through the mechanism of emotion. The experimental clues guide the richness of images, the coherence of plots, and the sense of immersion, and individual and cultural factors play a moderating role in these associations. Most studies rely on self-reports for measurement and lack multimodal evidence.

Conclusion: An interdisciplinary framework is proposed linking expressive performance, emotional perception, and narrative meaning. Future research should strengthen multimethod measurement and cross-cultural validation to improve ecological and applied value.

Keywords: Piano Performance; Musical Emotion; Emotional Perception; Narrative Imagination; Musical Imagery; Embodied Cognition; GEMS

Introduction

Piano performance is not just about reproducing notated music, but a process of creative interpretation. Performers use parameters such as speed, dynamics, timbre, and clarity to reshape the intent of emotion and aesthetics (Palmer, 2006). Previous research shows that even with the same score, differences in performance styles can greatly affect listeners' emotional and psychological responses (Juslin & Sloboda, 2010).

In music psychology, emotion is a key mediator between acoustic stimuli and the subject's meaning construction. Juslin and Västfjäll proposed a multi-mechanism framework in 2008: music



emotion comes from the interaction of emotional contagion, cognitive appraisal, and associative memory processes. Neuroimaging studies show that different playing strategies activate different nervous systems, are associated with emotional regulation and reward processes, and provide biological evidence for the influence of playing styles on emotions (Koelsch 2014).

Recently, research has shown that musical experience is not only the arousal of emotions but also involves complex imagination and narration. Gagné and McAdams (2017) mentioned that musical emotions can often arouse visualizable images and help represent coherent narratives. Schmidt and Vines (2013) found that when listeners are listening to expressive piano performances, they often interpret them in a story-like way, and this narrative imagination is greatly influenced by emotional reactions.

Traditional emotion models lack the ability to capture musical emotions. In 2008, Zentner et al. proposed GEMS. This system depicts the emotional states induced by music and also distinguishes between perceived and felt emotions. Subsequent research has confirmed that GEMS can distinguish the emotions of different performance styles (Zentner & Scherer, 2008).

There is a growing interest in interdisciplinary studies regarding performance experience, emotional perception, and musical imagery. However, there are limitations in the existing literature. First, many studies focus on isolated experience parameters, such as rhythm/dynamics, and do not consider their interactive impact on the overall performance style (Palmer, 2006). Second, most studies on musical narrative imagery are theoretical, and few people attempt to integrate performance style, emotional medium, and narrative structure into a unified analytical framework (Schmidt & Vines, 2013). In addition, individual difference variables, including musical training, emotional empathy, and cultural experience, are not sufficient in the interpretation model (Leman, 2008).

In research in China, academic concerns mostly lie in technical analysis and teaching applications; there are deficiencies in systematic research on the mechanism of the listener's psychological process (Su 2022; Kusiak 2025). Specifically, there are few studies that fully test how the emotional medium connects the piano playing style and the narrative image.

This revision has 3 specific objectives. First, the system identifies the main research trends in this field, such as theoretical perspectives, method applications, and core theme focuses. Second, it clarifies the unsolved problems by sorting out theoretical gaps, method limitations, and under-explored application contexts. Third, it proposes a comprehensive conceptual framework, elaborating on the relationships among performance styles, emotional media, and narrative images, including clear components and interaction paths, to guide future empirical research.





Review Methodology

This research uses the narrative integration review method to systematically integrate the existing research on piano performance styles, emotional perception, and narrative imagination. There are both qualitative and quantitative studies, ensuring comprehensive coverage of theoretical and empirical evidence.

1. Literature Search Strategy

Search relevant literature from major academic databases: "ScienceNet", "Elsevier Scopus Database", "Google Scholar", "China National Knowledge Infrastructure (CNKI)", "ProQuest Dissertations". The retrieval period is from January 2000 to December 2025. The key terms are the following combinations.

"piano performance style," "musical expression," "musical emotion," "emotional perception," "music imagery," "narrative imagination," "music cognition," and "performance interpretation."

The word "wine" in English and the word "wine" in Chinese are both considered to be helpful for cross-cultural communication.

This review takes the genre of music tracks as a conceptual boundary, and the selected studies include program music and absolute music; the differences between them in terms of non-musical implications and the narrative itself are recognized. When relevant, this distinction is an analytical aspect of interpreting emotional and narrative responses, so as not to confuse the meaning construction processes with different structures.

2. Inclusion and Exclusion Criteria

This study meets the inclusion criteria.

Focus on playing the piano or related musical instruments.

Query the emotional, imaginative, or cognitive responses related to music.

Provide empirical data or theoretical frameworks.

Published in peer-reviewed journals, academic monographs, or doctoral/master's dissertations.

If the study falls into the following situations, it will be excluded:

Reviews of articles or non-academic reports, etc.

The description of the method is not clear enough.

Focus on music creation rather than performance analysis.

There is a situation of duplication in the publication.

Evaluate according to the type of music material; many studies tend to elaborate on the characteristics of the music library, enabling different studies to be conceptually comparable.



3. Screening and Selection Process

To improve the transparency of the method, the rigor of the method is judged by the clarity of the research design, the data collection method, and the analysis method. Studies with deficiencies or irreproducibility are excluded. The summary of the included studies presents the basic characteristics of the key evidence.

Initially, about 312 records were obtained through the search. After de-duplication, the relevance of the title or abstract was screened. Then, the full text was reviewed to check whether the method was rigorous and whether the theme was relevant. If there were differences during the screening process, they were resolved through discussion and consensus.

Finally, 22 studies were included in the qualitative synthesis.

4. Data Extraction and Analysis

In each selected study, key information was extracted, including publication year, research design, sample situation, performance parameters, emotion measurement tools, and main findings.

Using theme analysis to identify recurring patterns, theoretical viewpoints, and method trends. The research is categorized into themes such as performance deployment mechanisms, emotion regulation models, narrative integration processes, and individual difference factors.

5. Reliability and Validity Control

Two reviewers respectively selected the literature and extracted data to ensure the reliability of the review. For the problem of inter-rater reliability, the differences were resolved through discussion.

If you triangulate among different methods, contexts, and cultures, the validity will be enhanced.

Performance Styles and Emotional Expression

In the research on music performance, emotional expression is mediated by the performer's manipulation of expression parameters. In piano performance, tempo, dynamics, timbre, articulation, and pedals are the core parts for shaping style and conveying emotion (Palmer, 2006; Juslin & Sloboda, 2010).

1. Expressive Parameters and Stylistic Formation

Early performance psychology research shows that experimental time arrangements and dynamic changes are the basic carriers of musical emotions. Palmer proved in 2006 that changes in the metronome speed system can enhance the intelligibility of emotions and the participation of listeners. Juslin and Sloboda believed in 2010 that experimental micro-changes in time and intensity are the key clues to emotional interpretation.

Flexible rhythm is the key to shaping perceptual expressiveness. The romantic performance tradition often uses free rhythm and flexible phrasing to increase the dramatic nature of lyricism. Classical interpretation emphasizes the stability of rhythm and the clarity of structure. Dynamic contrast enhances emotional engagement, which is associated with a wider dynamic range and higher emotional arousal (Scherer & Zentner, 2001).

Tone, color, and pronunciation method contribute to emotional communication. Legato playing with gentle key touch will produce a warm and intimate feeling. Staccato playing with impactful key touch will produce a feeling related to tension and restlessness. The use of pedals changes the color of sound resonance, thereby affecting the emotional atmosphere and space perception (Gabrielsson & Lindström, 2001).

These parameters are in a state of dynamic interaction, and the comprehensive style overview is not a feature of isolated experiments. Contemporary research gradually attaches importance to the view of multi-dimensional interaction.

2. Emotional Coding and Perceptual Processing

From a psychological perspective, the performance style belongs to the coding system, transforming the performance expression intention into perceptible signals. The multi-mechanism model proposed by Yousilin and Vastiar in 2008 assumes that emotional reactions are generated by mechanisms such as emotional contagion, cognitive evaluation, and associative memory.

Neurocognitive research supports such a coding framework. Koelsch (2014) found that strong dynamic contrasts and irregular rhythms activate the limbic system and reward brain regions, and stable rhythms can enhance prefrontal regulation related to calm emotions.

Embodied cognition research shows that listeners' physical reactions, such as rhythm synchronization and motor simulation, can strengthen emotional perception. Leman (2008) pointed out that the synchronization of the body with the music rhythm can enhance emotional immersion and style sensitivity.

3. Genre-Based Stylistic Traditions and Emotional Profiles

History and style traditions shape the unique emotional qualities of piano performance. The classical style emphasizes balance, clarity, and restraint, often bringing a sense of stability and solemnity. The romantic style focuses on strong emotions, subjectivity, and free expression, fostering intense lyrical and passionate expressions. The modern and contemporary styles often explore ambiguity, fragmentation, and experiential soundscapes, evoking feelings of curiosity, tension, and uncertainty.

Empirical research shows that listeners associate style categories with specific emotional patterns (Zentner et al., 2008; Vines et al., 2006). This finding highlights that the style - emotion association has an essence of cultural embedding.



4. Individual Differences in Emotional Sensitivity

The personality of an individual has a moderate impact on the emotional response to the performance style. Music training makes people more sensitive to perceiving subtle differences and can decode more different emotions (Leman, 2008; Grabócz, 2015). A high level of empathy can promote the infection of emotions, and then enhance the immersive experience (Juslin & Västfjäll, 2008).

In cross-cultural research, cultural background forms the framework for emotional interpretation. The stylistic conventions of specific musical traditions will influence listeners' emotional expectations and evaluation criteria.

Theories and Measurement of Musical Emotion

Understanding the emotional arousal in music requires a framework of integrated theoretical approaches. In recent decades, music emotion research has shifted from general emotional models to music - specific theoretical measurement systems, reflecting an increasing recognition of the complexity of emotions evoked by music.

1. General Emotion Theories and Their Limitations

The research on emotions in early music relies on general psychological models. There are basic emotion theories and dimensional emotion models. The basic emotion theory expounds limited universal emotions. For example, happiness, sadness, fear, and anger belong to situations that is biologically innate (Kimber, 2014). The dimensional model, such as Russell's circular model, uses the valence and arousal continua to conceptualize emotions (Russell, 1980).

Although these frameworks are useful analytical tools, there are obvious limitations in applying them to musical contexts. The emotions evoked by music often have subtle aesthetic characteristics, such as nostalgia, transcendence, tenderness, etc., and basic or dimensional categories cannot cover all of them (Zentner et al., 2008). Therefore, researchers are gradually beginning to doubt the ecological validity of the general emotion model in music research.

2. Music-Specific Emotion Theories

In order to solve the problem of restricting scholars from constructing a music-specific theoretical framework, Juslin and Sloboda emphasized in 2010 that music emotion comes from auditory features, performance intentions, and listener interpretation. Based on this, Juslin and Västfjäll proposed the BRECVEMA model in 2008. This model found that a variety of psychological mechanisms are the basis for music-induced emotions, such as brainstem reflexes, rhythm synchronization, evaluation conditioning, emotional contagion, visual imagery, episodic memory, musical expectation, and aesthetic judgment.



Zentner et al. (2008) believed that musical emotion is a unique emotional domain with aesthetic and reflective characteristics. Their research emphasizes the distinction between perceived emotion (the emotion conveyed and recognized by music) and experienced emotion (the emotion personally experienced), which is a key difference in current research.

From a neurocognitive perspective, Koelsch (2014) showed that music-related emotions involve auditory, limbic, and reward networks. Strengthening music emotion is a multilevel phenomenon integrating perceptual, affective, and cognitive aspects.

3. Measurement Instruments for Musical Emotion

The development of reliable measurement tools is crucial for empirical research. Early studies used self-report rating scales and adjacent item lists modified from general emotion scales. However, the sensitivity of these tools to music-specific emotional states is limited.

Zentner et al. (2008) proposed GEMS, which is an important progress in methods. GEMS identifies 9 core emotion categories related to music: surprise, transcendence, tenderness, nostalgia, calmness, power, pleasant activation, tension, and sadness. This has been widely verified across different cultures and music genres.

In addition to self-report, researchers use physiological indicators (such as heart rate variability, skin conductance, and electroencephalography) to capture implicit emotional responses (Leman & des Forêts, 2012). Neuroimaging techniques (including functional magnetic resonance imaging and positron emission tomography) help people explore the neural correlates of musical emotions (Koelsch, 2014).

Facial expression analysis and behavior measurement methods, such as action trajectories, also provide supplementary evidence about emotional engagement and embodied reps.

4. Methodological Challenges and Future Directions

Although methods are continuously advancing, there are still some challenges. First, self-report measurement will encounter social desirability bias and different personal interpretations; second, the lack of emotional specificity in physiological signals still needs to be carefully interpreted; third, the cross-cultural equivalence of emotional scales has not been well established.

Narrative Imagination and Musical Meaning Construction

Narrative imagination is the core mechanism by which listeners transform musical experiences into meaningful mental representations. Listeners actively construct story-like mental structures from emotional cues, musical features, and personal experiences, rather than passively receiving auditory stimuli. This makes music a symbolic medium for meaning construction.

1. Conceptual Foundations of Musical Narrative

Early aesthetic and semiotic theories regarded music as an abstract art without clear narratives. Subsequently, cognitive and psychological research challenged this point, pointing out that listeners often endow instrumental music with narrative meanings (Gagné & McAdams, 2017).

Schmidt & Vines (2013) stated that musical narrative originates from the dynamic interaction of structural elements, expressive performance, and emotional interpretation. For example, musical elements such as melodic contour, harmonic progression, rhythmic tension, and form development provide implicit narrative cues, guiding listeners to unfold their imaginations.

From the perspective of construction, narrative imagination is a process of positive meaning construction. In this process, the audience combines sensory input with memory frames and cultural narratives (Leman, 2008).

2. Emotional Mediation and Imagery Formation

Emotion regulation, narration, imagination, emotional reaction, organization, image generation, and the development of plot. Gagné & McAdams (2017) proposed that emotional states can transform auditory patterns into visualized psychological scenes.

Empirical research shows that lyrical or gentle emotions lead to romantic or reflective narratives, while tension or anxiety often triggers conflict or suspense plots (Schmidt & Vines, 2013). Calm emotions usually contribute to the structure of linear or coherent narratives.

Visual imagery is the core of musical narration. Emotional threads trigger a network of associated images, enabling listeners to construct a coherent psychological realm containing characters, scenes, and events.

3. Cognitive and Embodied Mechanisms

The imaginative power of narrative relies on various cognitive processes, such as the distribution of attention, working memory, the simulation of scenarios, and the processing of predictions. Listeners continuously update emotional and musical information, thereby dynamically revising the representation of the narrative.

The body's participation contributes to the immersion of the narrative. The synchronization of rhythm and the resonance of movement make the experience more real and enhance the listener's sense of presence in the imagined story world (Leman, 2008).

Neural cognitive evidence shows that narrative imagination has coordinated activities among the auditory cortex, the default mode network, and memory-related regions, thereby facilitating self-referential and imaginative processes.

4. Individual and Cultural Modulation

Individual differences and cultural frameworks can have an impact on the construction of narrative meaning. Listeners with musical training have a better structural awareness in integrating

coherent narratives. High emotional empathy can help deeply identify with the imagined protagonist emotionally.

Cultural narratives and symbolic systems form an interpretive dialogue. The Western classical tradition often loves to mention narratives of development and purpose, while the Eastern aesthetic tradition may lean towards cycles and contemporary structures. These cultural models carry narrative expectations and endow meaning attributes.

5. Measurement of Narrative Imagination

In methodology, narrative imagination is evaluated by self-report scales, open narrative descriptions, and qualitative interviews. Recent research uses multi-dimensional tools to measure vivid imagery, coherent plots, and immersion.

Combining the content used for narrative reports with text analysis techniques can systematically evaluate the structure of themes and emotions.

Integrated Mediation Models and Theoretical Synthesis

This framework treats piano performance as a multi - layer system, which contains dynamically interconnected situations of expressive encoding, emotional mediation, and narrative construction. The performance encoding layer transforms style parameters into perceptual cues, the emotional mediation layer transforms cues into emotional expressions, and the narrative construction layer integrates emotional reactions into a coherent meaning structure. This process is not strictly linear, and there is cyclic feedback, so narrative input can change subsequent emotional perception. Regulatory factors such as musical training, empathy, and cultural background play roles in various stages of the system.

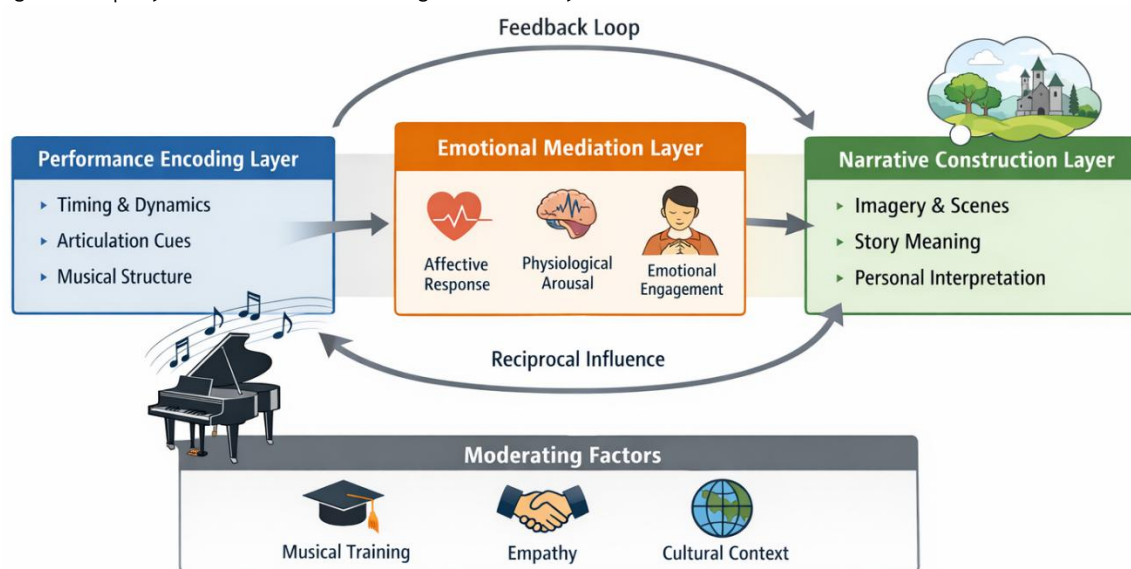


Figure 1 Integrated Conceptual Framework

1. Emergence of Mediation-Based Frameworks

In early research, the linear relationship between expression parameters and emotional responses was often examined. However, increasing evidence shows that emotional perception is a key mediator connecting performance characteristics with creativity and outcomes (Juslin & Västfjäll, 2008; Schmidt & Vines, 2013).

In the mediation model, the performance style first acts on the audience's emotions, and then triggers imagery, narrative construction, and meaning attribution. Empirical research shows that when the emotion variable is statistically analyzed, the direct impact of the performance style on the narrative result is greatly weakened, which indicates that there is partial or complete mediation.

2. Moderation and Individual Difference Mechanisms

Recent models, in addition to mediators, also include moderator variables to regulate the strength and direction of psychological pathways. Music training, emotional resonance, cultural background, and familiarity with the music are the main moderator variables (Leman, 2008; Juslin & Sloboda, 2010).

Well-trained listeners are more sensitive to expression cues, can distinguish emotions more powerfully, and integrate narratives better. Highly empathetic people have amplified emotional contagion, thus leading to a more profound immersive experience. Cultural schemas also shape interpretation norms and evaluation criteria.

Findings support moderated mediation frameworks. Emotional processes differ across listener groups.

3. Multilevel and Dynamic Interaction Models

Contemporary theories regard music experience as a multi-layered dynamic system. In terms of perception, acoustic features and performance parameters form sensory patterns. In terms of emotion, the patterns are transformed into emotional signals. In terms of cognition, emotions drive narrative interpretation and the construction of symbolic meanings.

Dynamic system theory suggests that the levels interact recursively rather than sequentially. Emotional reactions affect the focus of attention, and the focus of attention then changes the perceptual process and updates the narrative. This feedback loop can explain individual differences and situational fluctuations.

Neural cognitive models show collaborative activities. In expressive music listening, the collaboration among the auditory, limbic, default mode, and executive networks is involved. (Koelsch, 2014).



4. Toward an Integrated Conceptual Framework

Reviewing the literature, a comprehensive medical framework containing 4 core parts can be proposed.

Perf Enc Layer: exp params from styl pro.

The lyrics of emotional mediation transform emotional reactions into acoustic patterns for psychological marking.

Emotional threads trigger imagery and also the construction of plots.

Regulate pathway strength by adjusting factors at the level of layers, individuals, and cultures.

This framework integrates perception, emotion, cognition, and sociocultural aspects to give a comprehensive explanatory structure.

5. Theoretical Contributions and Synthesis

This integrated model advances existing research in several aspects. First, it emphasizes systemic interaction and goes beyond methods based on reductionist parameters. Second, it clarifies the function of emotions as a key transformative mechanism. Third, it incorporates the heterogeneity of the audience into the explanatory framework.

Unify different theories such as performance studies, affective neuroscience, embodied cognition, and narrative psychology to build a coherent foundation for future interdisciplinary research.

Research Gaps and Future Directions

Although substantial progress has been made in understanding the relationships among piano performance styles, emotional perception, and narrative imagination, existing research still exhibits several structural and methodological limitations. Addressing these gaps is essential for advancing theoretical integration and empirical rigor.

1. Fragmentation of Performance Parameter Research

Many studies focus on isolated performance parameters (speed, dynamics, pronunciation), omitting interaction/synergistic effects. This reductionist approach limits the ecological validity of research findings because real - world performances involve complex multidimensional coordination. Future research needs to use holistic modeling techniques to grasp the characteristics of comprehensive styles.

2. Limited Cross-Cultural and Contextual Diversity

At present, the evidence mainly comes from the Western classical music tradition and edited urban pop music. The universal generalizability of the existing models is still limited. It is

necessary to explore how cultural schemas affect emotional communication and narrative construction through cross-cultural comparative research and context-sensitive design.

3. Insufficient Longitudinal and Developmental Perspectives

Most studies use cross-sectional or short-term experimental designs (failing to capture the dynamic emotions and image processing that change over time). Longitudinal studies are needed to observe how listening expertise, emotional sensitivity, and narrative ability develop during the developmental stages.

4. Methodological Homogeneity and Measurement Constraints

There are cases of method innovation, but many studies still rely on self-report tools. The integration of physiological, behavioral, and neural measurements is relatively limited, thus affecting the comprehensive understanding of relevant situations. Future research needs to first focus on the application of multimodal measurement frameworks and ecological assessment.

5. Underdeveloped Individual Difference Models

Although individual hosts can be found, theoretical models rarely clearly explain how multiple individual factors work together. More complex statistical methods, like latent profile analysis and multilevel modeling, may show heterogeneity patterns.

6. Limited Application-Oriented Research

The research is mostly at the theoretical or laboratory level. The impacts in aspects such as music education, performance training, therapeutic interaction, and digital music technology have not been fully explored. There is a need to strengthen translational research that connects theory with practice.

7. Future Research Directions

Future research needs to proceed in this direction, according to many gaps.

Build a comprehensive computational model for expressive performance.

Carry out cross-cultural and cross-genre comparative studies.

Research long - term lifespan.

Build measurement systems using various methods and multiple senses.

Build personalized music experience frameworks.

Promote interdisciplinary cooperation among psychology, neuroscience, education, and artificial intelligence.

These guidelines can help with in-depth theoretical integration and also promote practical innovation.



Discussion

The review points out that the influence of piano performance style on narrative images mainly relies on emotion to convey meaning, not just the characteristics of structure or acoustics, among other aspects. This is consistent with the view in music psychology that regards emotion as the core of musical meaning (Juslin & Västfjäll, 2008; Zentner et al., 2008). The current synthesis research goes further, showing that emotion not only accompanies the audience but also helps organize the audience's narrative understanding of the performance.

Palmer conducted research on separate rhythm, dynamics, and performance techniques in 2006. The research reviewed here shows that these performance dimensions are often synergistic. When actually listening, the flexibility of rhythm, the form of dynamics, and the touch are not isolated signals. The combination of them makes it easy to form a stable emotional direction and can support vivid and coherent narrative images. The research results support a more comprehensive view of musical experience, which is consistent with the views of Juslin and Sloboda in 2010.

The difference between the perceived emotions and the felt emotions in the comments is relatively important (Zentner et al., 2008). Listeners may label a performance as sad, calm, or tense, but narrative imagination is more related to individuals' experience of emotions. This may explain why similar performances may trigger different narrative reactions even if listeners make similar emotional judgments.

The research results are consistent with the constructivist research in music cognition (Leman, 2008). Narrative meaning does not simply exist in music. It arises from the interaction of performance cues and listener factors. Music training, empathy, and cultural background will affect the formation of emotional responses and the development of narrative interpretation.

Conclusion

This review expounds the connection between piano playing styles and emotional perception and narrative imagery. The research finds that playing styles do not directly and independently shape narrative responses. On the contrary, their influence is mostly regulated through emotional experiences, and individual and cultural factors also restrict how narrative meanings are formed.

The review also shows that existing research has paid more attention to separate expressive parameters than to their combined operation in actual listening. In addition, although emotion models have provided useful explanations for music-induced affect, they have not fully explained how emotional response develops into narrative interpretation. On this basis, the present study



proposed an integrated framework linking performance cues, emotional mediation, and narrative construction.

Generally, this research integrates the emotional process and narrative meaning into the analysis structure to assist the current research. It also puts forward that future work needs to strengthen the multi-modal method, pay more attention to the differences in playing styles, and expand applied cross-cultural research in related fields such as piano performance and music education.

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