How Does This Music Make You Feel? Exploring the Structural Dimensions of Affective Musical Experience

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Abstract

Music has a profound affective impact on individuals. This narrative review addresses the following question: is musical affect best described by categorical affective experiences (e.g., triumphant, nostalgic) or by continuous affective dimensions such as valence and arousal? This paper examines two prominent approaches to affective musical experience: categorical and dimensional. Empirical studies drawn from a variety of methodological traditions—including surveys, time-series analysis, physiological and neurological measures—are reviewed to assess their explanatory power. Participants from across cultures and historical contexts were included. Recent findings suggest that while valence and arousal capture general affective tone, they may not fully represent the complexity of music-induced affect. The categorical model demonstrates higher consistency among participants in labelling affective character of compositions, whereas continuous response methodologies show that the affective experience unfolds dynamically and resists reduction to a single discrete label. Studies increasingly support the view that categories such as triumphant, joyful, or tender provide a more precise and universally meaningful framework. As such, the categorical approach offers a more ecologically valid and nuanced taxonomy of the affective experience of music, especially when considering cross-cultural aspects.

Keywords: affective experience, music perception, discrete emotions, circumplex model

Introduction

Music plays a significant role in most people's lives, both in private and social domains, and has long been of interest to various branches of psychology. A recent study conducted on a representative sample of Serbian high school students (N = 922) showed that listening to music is one of the most common activities among young people (Pešić & Videnović, 2017). A qualitative analysis of students' responses revealed that music serves as an emotionally engaging activity. The most frequently cited effects included relaxation, mood regulation, and self-expression, illustrated by statements such as, "This song moves me" or "I listen to ballads because I haven't been feeling happy lately" (Pešić et al., 2014). These insights underscore music's role in shaping affective states and supporting reflection. Similarly, Herbert's (2012) phenomenological analysis revealed that music was most commonly used as a tool to modify one's emotional state, to create a sense of exhilaration, energy, and excitement in everyday situations, to distance oneself from certain aspects of personality or circumstances, or to foster relaxation. It also served as a means for mood expression, and a framework for exploring emotions and shaping future emotional experiences. Emotional responses to music include physiological effects such as chills, laughter, tears, or increased arousal (Cowen et al., 2020). Findings from studies employing subjective, behavioural, physiological, and neurological measures indicate that listeners predominantly respond to music affectively (Gagnon & Peretz, 2003; Mitterschiffthaler et al., 2007). Although a large body of research has explored the affective experience of music, there is still no consensus on its precise definition. The term "affect" is an umbrella term which covers various affective phenomena, including emotions, moods, and preferences (Juslin, 2019, p. 43). Some authors in the field of music psychology distinguish between emotions felt by the listener (felt emotions, e.g., "This music makes me feel happy") and emotions expressed by the music itself (perceived emotions, e.g., "The music is sad"). This paper defines it technically as the affective output arising from the encounter with musical stimuli that can be attributed to various implicit and explicit aspects of the musical input, as it refers both on listeners' responses and the affective qualities attributed to the music.

The core question addressed in this paper is: what is the taxonomic structure of the affective

experience induced by music? Is the affective musical experience, such as being moved or excited, rooted in discrete emotional states (e.g., basic, such as sadness, or domain-specific, such as triumphant), or is it more accurately described by broader affective dimensions, such as valence and arousal? The present paper provides a narrative review of two widely used approaches to musical affect: the categorical and dimensional approach. Both approaches acknowledge complexity and variation but differ in how they conceptualize affective experience. Juslin (2019) uses a metaphor comparing emotions to colours to explain the difference between categorical and dimensional approaches to emotion. In the categorical view, emotions resemble distinct colour categories: just as there are different shades of blue, there are shades of sadness. However, at some point, a clear shift to another category occurs, such as from blue to red or from sadness to anger. In contrast, the dimensional approach treats affective experience as varying along continuous scales, such as valence and arousal, similar to how colours vary in hue and intensity. These models were selected due to their prominence in the field, empirical support, and contrasting theoretical assumptions. While other models—such as BRECVEMA (Juslin, 2013) that depicts different mechanisms through which music evokes emotions in listeners, or framework proposed by Hunter et al. (2010), which addresses the complexity of mixed emotional experiences in response to music—offer valuable insights, the focus remains on models that directly engage with the question of affective structure. We aim to synthesize findings from diverse studies to better understand the nature of affective experience of music.

The categorical approach to affective musical experience

According to the categorical approach, emotional episodes are experienced as categories, which are distinct from each other (Juslin, 2019). Within this approach, the best-known is the discrete emotions model that draws on Ekman's (1992) and Izard's (1992) theories of basic emotions as universal, biologically based categories suitable for categorizing emotional reactions. These emotions are considered to have specific neurophysiological underpinnings and are accompanied by distinctive subjective experiences, as well as recognizable facial expressions (Ekman, 1992). In the context of musical experience, these categories are often used to describe the perceived emotion expressed by the music, rather than the emotion felt by the listener. Schubert et al. (2012) used a discrete model of emotions to measure emotional responses continuously through a simplified user interface that displayed schematic facial expressions (emoticons) to represent emotions. The authors aimed to test the assumption that similar emotions are placed close to each other in semantic space, while opposing emotions are positioned further apart (Figure 1). They employed a circular checklist with emoticons corresponding to the following emotions, arranged clockwise: excited (1 o'clock), happy (3 o'clock), calm (5 o'clock), sad (7 o'clock), fearful (9 o'clock), and angry (11 o'clock).

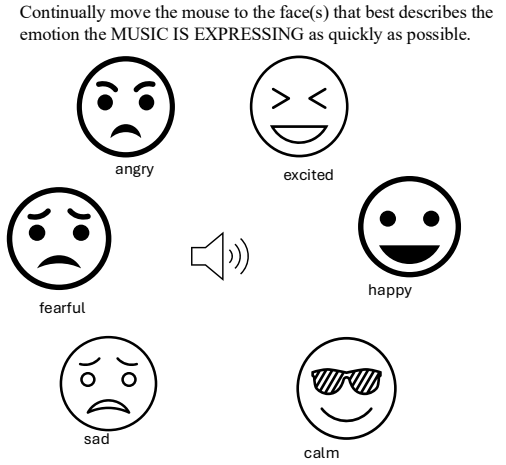

Figure 1. User interface display adapted from Schubert et al. (2012)

Participants listened to six short (max 20 seconds) musical excerpts composed for animated films, each intended to evoke one of six target emotions: angry, fearful, sad, calming, happy, or exciting. During each excerpt, participants continuously moved a cursor over an emoticon that best matched the emotion expressed (Figure 1) and then selected the dominant emotion at the end. Continuous tracking showed that the most frequently chosen emoticon often corresponded with the intended emotion, though some excerpts (e.g., angry, sad) elicited multiple dominant emotions over time. This suggests that musical emotions are often complex and cannot be reduced to a single discrete category. These emotional shifts appeared to be associated with changes in musical features, such as tempo, highlighting the dynamic nature of the music-induced affect. Final ratings

confirmed a clear pattern for each piece but also revealed individual variability. For instance, in the "angry" excerpt, 13 out of 30 participants chose "angry," while others selected "fearful," "excited," or showed indecision. These results suggest that individual differences, such as personality traits, emotional sensitivity, musical training, cultural background, or mood, may significantly influence how listeners perceive and interpret musical emotions.

Many authors note that discrete models are based on emotions that are evolutionarily adaptive and often linked to survival threat, or loss, (e.g., fear, anger, sadness, excitement). However, music rarely evokes such "raw" emotions; rather, it tends to elicit more "refined," music-specific, aesthetic, and complex emotional states that more accurately reflect the nature of musical experience (Zentner et al., 2008). Kate Hevner's (1936) pioneering study exemplifies this approach. She developed a checklist of adjectives—often reflecting mood- or evaluation-related descriptors—to assess affective experience of musical stimuli. Her instrument, depicted in Figure 2, known as the *Adjective Circle*, grouped related adjectives into clusters arranged in a circular structure. In her experiments, Hevner (1936) asked both lay listeners and trained musicians to listen to five well-known classical pieces and mark the clusters of adjectives that best described their affective experience. She found a high level of consistency in how different participants described their affective responses, suggesting a shared affective experience among listeners.

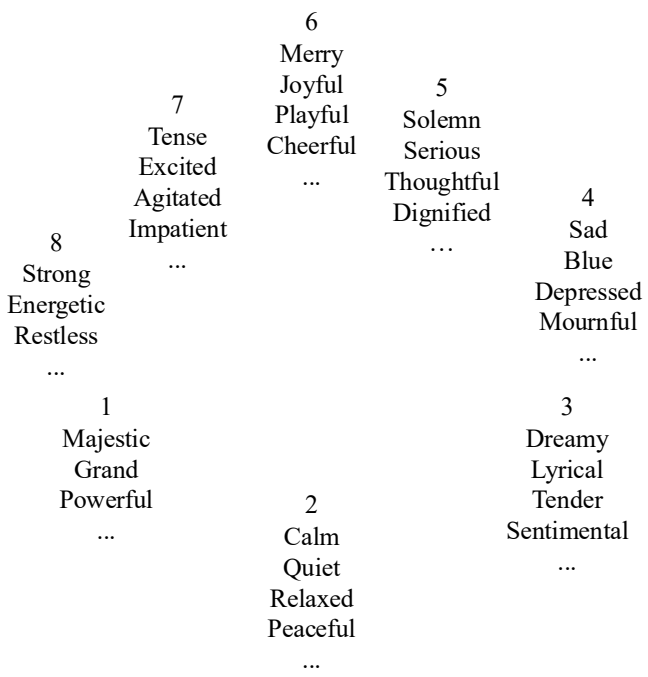

Figure 2. Adjective Circle adapted from Hevner (1936)

Schubert (2003) updated Hevner's (1936) original descriptors by adding words from Whissell's (1989) dictionary of affect and grouping them according to their position in a two-dimensional emotion space (valence and arousal). Affective descriptors were grouped into nine clusters within a two-dimensional circumplex space, which can be seen in Figure 3. Words with similar meanings were placed close together, for example, the cluster containing "bright, cheerful, joyful," was positioned adjacent to "playful, light-hearted" and further from "dark, depressive, sorrowful." That same year, Fabian and Schubert (2003) used this checklist in a study in which musically trained participants selected up to three words from the checklist that best reflected the character of each of 34 different performances of the same musical piece. Allowing the selection of three words acknowledges that the character of a performance can vary, and that multiple contrasting emotions may be expressed simultaneously. In addition, participants rated various performance features: tempo, articulation, dotting, and loudness. Using clustering techniques, five distinct and varied musical characters were evoked consistently across the performances (each cluster represented by the word bright, playful, delicate, majestic, or agitated). Each of the musical features made statistically significant contributions to distinguishing between character clusters.

For example, Cluster A (cheerful, bright) was rated as significantly faster and louder than Cluster C (graceful, gentle), which was perceived as slower and softer. Similarly, Cluster I (tense, agitated) was associated with high intensity and fast tempo, in contrast to Cluster G (majestic, sacred), which was rated as slower, contributing to its dignified character. These findings imply that the affective musical experience may be meaningfully organized around variations in basic musical features, which systematically predict membership in distinct affective categories.

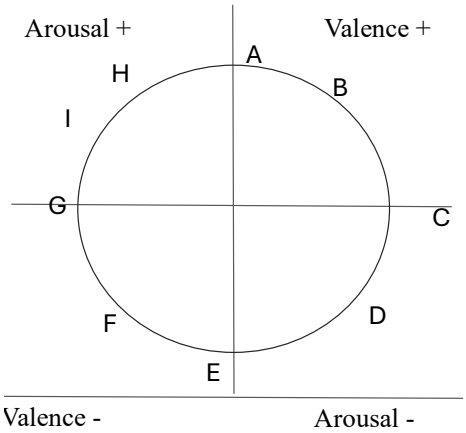

Figure 3. Adapted scheme of the revision of Hevner's checklist (Schubert, 2003)

Dimensional approach to affective musical experience

In parallel with the previous approach, there is an ongoing quest to identify a smaller number of dimensions that can optimally describe the space of affective experience. This line of research began in the 1960s with the pioneering work of Osgood et al. (1957), who established the conceptual and methodological framework for the dimensional approach through the semantic differential. This method was designed to measure people's affective (connotative) meaning of words by using pairs of opposing adjectives (e.g., pleasant–unpleasant, strong–weak). Participants rate a stimulus such as a word (e.g., snake, laugh) or a piece of music by marking a position along a 7-point scale between each pair.

Bad -3___-2___-1___0___1___2___3 Good

Figure 4. Example of a semantic differential scale (Osgood et al., 1957).

By statistically analysing these ratings utilizing factor analysis, researchers can reduce complex reactions into a smaller number of interpretable dimensions. Osgood and his colleagues identified three stable and culturally invariant dimensions: the evaluation factor (e.g., good–bad, beautiful–ugly), the potency factor (e.g., strong–weak, large–small), and the activity factor (e.g., fast–slow, young–old). These factors represented the dimensions of a hypothetical semantic space.

The model presented by Osgood et al. (1957) has demonstrated significant heuristic value in music. Subsequent studies employed the semantic differential method and factor analysis to identify the fundamental dimensions of experience. Different researchers found from three to five somewhat different dimensions of affective experience of music. Nordenstreng (1969) identified four factors, which he labelled as softness, colourfulness, relaxation, and magnitude. Wedin (1972) found three bipolar factors: tense-energetic, bright-sombre, and ceremonial-trivial. Trkulja and Janković (2012) identified the factors of affective valence, arousal, and cognitive evaluation, which collectively accounted for 60% of the variance in the affective music experience. A similar percentage of variance was explained by Živanović et al. (2018) through five factors: aesthetic experience, affective tone, tension, content-fullness, and structure. Despite differences in terminology and the number of dimensions identified, the findings reveal a recurring underlying structure in the affective experience of music. Most of the identified dimensions can be grouped into three broad and widely recognized component categories: **valence, arousal,** and **cognitive evaluation**. For instance, *softness* and *colorfulness* (Nordenstreng, 1969), *bright–sombre* and *ceremonial–trivial* (Wedin, 1972), and *affective tone* (Živanović et al., 2018) correspond to **valence**, capturing the emotional pleasantness or tone of the experience. Dimensions such as *relaxation* (Nordenstreng, 1969), *tense–energetic* (Wedin, 1972), and *tension* (Živanović et al., 2018) align with **arousal**, referring to the level of activation or intensity. Finally, *magnitude* (Nordenstreng, 1969), *ceremonial–trivial* (Wedin, 1972), *cognitive evaluation* (Trkulja&Janković, 2012), and dimensions such as *aesthetic experience*, *content-fullness*, and *structure* (Živanović et al., 2018) reflect various aspects of **cognitive or symbolic appraisal**, including the perception of complexity, meaning, and formal organization in the music. Thus, despite methodological and terminological differences, a consistent triadic framework—valence, arousal, and evaluation—emerges across studies of affective musical experience.

Another version of dimensional approach

to affective experience is the circumplex model proposed by James Russell (1980). Originally proposed to capture the general structure of affect, the model was later adapted to musical contexts. Russell (1980) employed somewhat different procedure than Osgood. Starting from adjectives commonly used to express affective experiences, he employed multidimensional scaling (MDS) of participants' ratings of affective states. This statistical technique is used to visualize the similarities or dissimilarities between items, in this case, adjectives describing affective states, by placing them in a geometric space (usually two- or three-dimensional). Participants rate the perceived similarity of emotion-related adjectives (e.g., happy vs. excited, sad vs. angry). MDS takes these ratings and plots each adjective as a point in space. The closer two points are, the more similar the affective states are perceived to be. Russel discovered that these adjectives naturally arranged themselves in a circular (circumplex) pattern in a two-dimensional space defined by: 1) valence (pleasantness-unpleasantness) and 2) arousal (activation-sleepiness). According to this model, all affective states can be mapped in this two-dimensional space. The horizontal dimension (pleasantness-unpleasantness) spans from one extreme (e.g., agony), through a neutral point (the organism's adaptation level), to the opposite extreme (e.g., ecstasy). The vertical dimension (arousal) ranges from sleepiness, through various stages of alertness, to frenetic excitement. Affective states are arranged circularly, each falling at a unique combination of valence and arousal. Russell (2003) termed the combination of these two dimensions as core affect, defined as a neurophysiological state of awareness accessible through the simplest raw (non-reflective) feelings present in moods and emotions. While core affect exists within the individual (e.g., "Ana feels anxious"), Russell (2003) refers to the perception of pleasant/unpleasant and activating/deactivating properties of a stimulus as the perception of affective quality. Consequently, a subject attributes affective quality to the stimulation (e.g., "There is a disturbing scene on the street"). It begins with a specific stimulus, and denotes its ability to alter core affect. The perception of affective quality is a "cold" process that can become "heated" if it leads to a change in core affect. These simple processes, either independently or in combination with information related to behaviour processing and planning, explain the myriad of manifestations we term as emotional.

Later researchers applied the Circumplex Model of Affect to music, adapting Russell's (2003) method to a certain extent. They used musical excerpts instead of emotion adjectives, asking participants to rate how each piece of music made them feel using affective adjectives (e.g., happy, tense, calm, sad). By applying multidimensional scaling (MDS) to these ratings, researchers mapped the emotional qualities of music in a two-dimensional affective space. The results showed that musical emotions also organize themselves around the valence–arousal dimensions, forming a circumplex structure similar to that found in verbal emotion ratings. This approach reinforces the idea that affective experiences, whether verbal or musical, share a common psychological structure.

North and Hargreaves (1997) tested the hypothesis that the emotions expressed by musical stimuli are associated with their pleasing and arousing qualities. One group of participants rated pop music tracks on valence and arousal dimensions and the other on eight different emotions. The results aligned closely with the circumplex model. Multiple regression analysis showed that ratings of liking and arousal were significant predictors of the ratings of each emotion expressed by the music. Factor analysis revealed that the dimensions of liking and arousal potential emerged from participants' emotion ratings, aligning with the circumplex model. Excerpts located in different quadrants of the circumplex (based on liking and arousal potential) were rated consistently with the emotions associated with each quadrant. For example, excerpts in Quadrant 1 (high liking, low arousal) were rated as relaxing and peaceful.

The dimensional model has also been subjected to cross-cultural investigations. Egermann et al. (2015) compared subjective and psychophysiological emotional responses to music among participants from two distinct cultures: the Mbenzele Pygmies from the Congolese rainforest, who had no exposure to Western music, and Canadians unfamiliar with Congolese music. Participants listened to 19 excerpts (8 Pygmy and 11 Western), and rated them on valence and arousal dimensions, alongside measurements of peripheral physiological activation and facial expressions. While Pygmies subjectively placed all Pygmy music in the upper right quadrant, rating it as attractive and arousing, Canadians' ratings of Western music covered the range from arousing to soothing and from positive to negative valence. Canadians perceived their music as more arousing than Pygmies did. However both groups exhibited correlated responses, with stimuli rated as highly arousing by Canadians also eliciting high

arousal and physiological responses from Pygmies. Increased tempo, spectral centroid, and pitch height raised both skin conductance and subjective arousal in both groups, indicating a universal sensitivity to these features. However, facial expressions correlated with subjective ratings of valence and arousal only among Canadians, suggesting cultural influences on expressive responses. A significant finding of this research is that there was no similarity between respondents from different cultures in the subjective assessment on the dimension of valence, nor in terms of psychophysiological reactions to Congolese music, implying that while arousal may reflect a more universal acoustic processing, subjective meaning and cultural interpretation can vary significantly.

The integrative approaches

In recent decades, authors have made efforts to capture aesthetic and music-evoked emotions beyond traditional discrete and dimensional taxonomies. One of the most famous is the Geneva Emotional Music Scale (GEMS), developed by Zentner et al. (2008). GEMS is a conceptual and instrumental framework for measuring emotions evoked by music. While majority of earlier research focused on perceived emotions—what listeners believe the music expresses—GEMS is based on emotions actually felt by the listener. Authors show that these two types of emotions often diverge, especially for negative emotions, which are more frequently perceived than truly experienced. Researchers showed that standard basic emotions (e.g., Ekman's set: happiness, sadness, anger) were not suitable enough for music. They began by compiling over 500 affective terms drawn from psychology, music theory, and everyday language. These were refined to a core list of 45 emotion descriptors, which participants used to rate their emotional responses to a wide variety of musical excerpts. Participants gave self-reports of how often they had felt given feelings in their past experiences of listening to music from their preferred genres. Data were collected from large and culturally diverse samples and across multiple genres (e.g., classical, jazz, rock, Latin, techno). Using exploratory and confirmatory factor analyses, the researchers identified nine robust and recurring emotional categories that consistently emerged in music-induced affective experience. These include wonder, transcendence, tenderness, nostalgia, peacefulness, power, joyful activation, tension, and sadness. The GEMS model was directly compared with both the discrete emotion approach (e.g., happiness, sadness, fear) and the dimensional model (valence and arousal). Participants rated musical excerpts using all three frameworks. The authors then conducted exploratory and confirmatory factor analyses, as well as intersubject correlation analyses, to evaluate which model most effectively captured the variance in emotional responses. The last analysis correlated each listener's ratings with the ratings of all of the other listeners in the sample across the excerpts. The average consensus for each of the terms from the three different checklists was computed using the ICC. The results demonstrated that the GEMS model accounted for a greater proportion of variance and yielded more differentiated, nuanced emotional profiles than the other two models. While the dimensional model often produced uniform ratings clustered around similar quadrants (e.g., high valence/high arousal), and the discrete model lacked the specificity required for aesthetic emotions, GEMS reflected the richness and complexity of emotions elicited by music. These findings support the view that affective experience of music is best captured by a domain-specific, categorical framework (Zentner et al., 2008).

A recent study by Cowen and colleagues (2020) examined the best model for describing the affective space of musical experience across cultures – discrete categories or dimensions. The 2,700 participants from the USA and China rated 2,168 musical stimuli. Participants either selected from 28 emotion categories (e.g., joyful, scary, dreamy, triumphant) derived from prior research on music and vocal emotion (e.g., Zentner et al., 2008; Juslin & Laukka, 2004; according to Cowen et al., 2020), or rated the same excerpts on 11 affective scales (e.g., valence, arousal, dominance, certainty) based on dimensional theories of emotion appraisal (e.g., Smith & Ellsworth, 1985; Barrett, 2006; according to Cowen et al., 2020). Using Principal Preserved Component Analysis (PPCA), the authors identified 13 distinct dimensions of subjective experience that were consistently preserved across cultures. These dimensions corresponded to specific emotion categories, such as amusing, calm, energizing, sad, and triumphant. The interrater agreement rates for categories varied, with an average of 42.3%, where some music samples were labelled very consistently with categories including "energizing" (up to 89% of subjects), "triumphant/heroic" (83%), "amusing" (79%), "annoying" (79%), "scary/fearful" (76%), and "joyful/cheerful" (74%). Furthermore, the cross-cultural signal correlation was calculated by correlating the

mean responses by Chinese participants with those by US participants and dividing by the explainable variance in responses from each culture. Specific categories such as "joyful," "sad," and "triumphant" were more consistently recognized across U.S. and Chinese participants than broad affective dimensions like valence and arousal. Notably, 18 out of the 28 affective categories showed higher cross-cultural signal correlation than valence, and 16 showed higher correlation than arousal. This suggests that discrete affective labels are more universally applicable in the context of music. Regression analyses showed that category judgments better predicted affective scale ratings across cultures than vice versa, suggesting that valence and arousal may be inferred from more specific emotional experiences, rather than serving as their foundational components. These findings challenge traditional dimensional models that posit valence and arousal as the core building blocks of emotional experience (e.g., Russell, 1980), and instead support a category-first approach. According to Cowen et al. (2020), music evokes rich, specific emotional states that are cross-culturally robust, and at may serve as the psychological basis from which broader affective evaluations are constructed.

Conclusion

The attempt to define the taxonomic structure of affective musical experience, whether in terms of dimensional models (valence and arousal) or categorical models, has produced important and sometimes contrasting insights. Using dimensional models in music realm, such as Russell's (1980) circumplex model, has demonstrated that musical emotions can be broadly mapped along bipolar axes of valence and arousal, with empirical support from studies like North and Hargreaves (1997). These models can be efficiently used for summarizing affective tone and intensity and have shown cross-cultural consistency in arousal responses (Egermann et al. 2015). However, evidence from more recent and methodologically diverse studies suggests that categorical models offer a more accurate and musically relevant taxonomy. Zentner et al. (2008) showed that GEMS, a music-specific categorical model, better explains emotional responses to music than basic emotions or valence–arousal models. Egermann et al. (2015) found that arousal responses are more universal, while valence ratings are culturally shaped, suggesting limitations of dimensional models in capturing the full complexity of affect. Most compellingly, Cowen et al. (2020) demonstrated that discrete affective categories such as "triumphant," "scary," or "joyful" exhibit higher cross-cultural consistency and predictive power than dimensional ratings. Nearly a century after Katherine Hevner's pioneering research, large-scale cross-cultural analysis reaffirms the categorical approach as a more nuanced, precise, ecologically valid, and universally meaningful framework for understanding the taxonomy of the affective experience of music.

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