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# A Comparative Study of Perspectives in Musical Structural Features and Emotional Stimuli

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EASTERN KENTUCKY UNIVERSITY

A Comparative Study of Perspectives in  
Musical Structural Features and Emotional Stimuli

Honors Thesis

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By

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A Comparative Study of Perspectives in  
Musical Structural Features and Emotional Stimuli

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Music psychology has become increasingly popular in music research given the ability of music to evoke strong emotions. However, there are not many studies that have investigated the mechanisms that induce these emotions. One of the characteristics of recognized composers in Western Art Music is their ability to manipulate musical devices in a way that will evoke an emotional state within the listener. This study looks into theories and perspectives regarding the influence of music upon emotions (such as the Doctrine of ethos) while analyzing certain musical structural features and their impact on emotional expression. By comparing musical works and theories from different periods it is possible to say that although each period focuses on specific compositional styles, composers employed similar musical features or devices in order to convey a certain emotion. Musical structural features analyzed included the suprasegmental and segmental. The suprasegmental features consist of foundational musical structures such as melody, rhythm, and tempo. Segmental features comprise the acoustic structures such as pitch, duration, and amplitude. Musical features such as tempo, rhythm, mode, melody, and dynamics are considered the primary elements when depicting or conveying an emotion. Tempo is found to be the most important element among all the musical

structural features that affects emotional expression, followed by mode and melody in Western Art Music. This study culminated in a one-hour piano and organ recital performed on May 3<sup>rd</sup>, 2017, which comprised pieces from Baroque, Classicism, Romantic, and Impressionism.

*Keywords and phrases:* music structural features, emotional stimuli, Doctrine of ethos, Doctrine of Affections, Ancient Greece, Baroque, Western Art Music, music and emotions.

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## Introduction

Whenever humans gather for any reason, music is there. Music has accompanied major social events throughout the history of humankind. Music is and was always part of the fabric of everyday life. Many researchers argue that music, in a primitive form, pre-dates the emergence of language itself. <sup>1</sup> A fact frequently observed is that music is recognized as a universal language of humankind. There is a vast source of available knowledge on the influence of music on human behavior. Evidences of studies specifically aimed to the comprehension of this topic dates back to Antique Greece, with Plato and Aristotle discussing the *Doctrine of Ethos*.

Music psychology has become increasingly popular in music research given the ability of music to evoke strong emotions. However, there are not many studies that have investigated the mechanisms that stimulate these emotions. Great composers are

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<sup>1</sup> Merker, Bjorn, Iain Morley, and Willem Zuidema. 2015. "Five fundamental constraints on theories of the origins of music." *Philosophical Transactions Of The Royal Society B: Biological Sciences* 370, no. 1664: 1-11. Academic Search Complete, EBSCOhost (accessed October 30, 2016).

commonly recognized by his/her ability to manipulate musical devices in a way that will evoke an involuntary emotional state within the listener. His or her music must have a purpose, a subsequent emotional appeal that will communicate to the listener. Great music has the power to evoke strong and constructive emotions. Despite the years apart, successful composers from different historical periods (in Western Art Music) manipulated similar musical devices when depicting a certain emotion. Musical features such as tempo, rhythm, mode, melody, and dynamics are considered the primary elements when depicting or conveying an emotion.

## The Greek Heritage

Although the performance of the repertoire based in this research does not comprise pieces from antiquity, the strong impact of ancient music in the Western Art Music tradition are reason enough to begin this discussion. By closely examining ancient music, it is possible to observe the development of ancient practices into Western music. Therefore, it will help to enhance the understanding of musical features that elicited specific emotions in the posterior periods to be discussed.

The deepest roots of Western Art Music are found in the civilizations of antiquity. To begin with, the noun “music” comes from *Muse*, a Greek terminology denoting any of the nine daughters of Zeus and goddesses of the creative realm of art, literature, and science.<sup>2</sup> The strongest influence in music comes from Greek writings, which became the basis for European music’s views. Perspectives pertaining the influence of certain musical structures on emotions were first documented through the writing of Greek philosophers in the fourth century B.C. The matter of the power of music to influence character (ethos) entered into the Sophists’ discussions.<sup>3</sup>

Doctrine of ethos was the prevailing concept, which defended the direct effect of music upon human emotions and behavior. This thought emerged from the Pythagorean view of music, which stated that the same mathematical laws that controlled the visible and invisible world were also applied to the musical system of rhythm and pitch. Music

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<sup>2</sup> K. Marie. Stolba, *The Development of Western Music: a History* (Boston, Mass.: McGraw Hill, 1998), 3.

<sup>3</sup> Ibid.

was constructed in relation to the same mathematical principles by which the universe had been created. Thus, they believed music relates directly to the universe as macrocosm and microcosm. Ancient philosophers believed that the harmony of the human soul was reflected in numerical relationships. Therefore, because music had the power to impact this orderly system, it also had the power to penetrate the soul and rebuild its internal harmony.<sup>4</sup>

Plato and Aristotle explained extensively this concept and defended the Greek political and social systems, which were linked with music. Both philosophers believed that education (reflected in gymnastics) should discipline the body and music, the mind. The importance of music in ancient Greece is reflected in writings about society, such as Aristotle's *Politics*. According to Aristotle, music was capable of imitating and, consequently, capable of affecting one's character and behavior.

“[Melodies] contain in themselves imitations of ethoses; and this is manifest, for even in the nature of the harmoniai there are differences, so that people when hearing them are affected differently and have not the same feelings in regard to each of them, but listen to some in a more mournful and restrained state, for instance the so-called Mixolydian, and to others in a softer state of mind, for instance the relaxed harmoniai, but in a midway state and with the greatest composure to another, as the Dorian alone of the harmoniai seems to act, while the Phrygian makes men divinely suffused; for these things are well stated by those who have studied this form of education, as they derive the evidence for their theories from the actual facts of experience. And the same holds good about the rhythms also, for some have a more stable and others a more emotional ethos, and of the latter some are more vulgar in their emotional effects and others more liberal. From these considerations therefore it is plain that music has the power of producing a certain effect on the ethos of the soul, and if it has the power to do this, it is clear that the young must be directed to music and must be educated in it. Also education in music is well adapted to the youthful nature; for the young

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<sup>4</sup> Donald Jay. Grout, J. Peter Burkholder, and Claude V. Palisca, *A History of Western Music* (New York: W.W. Norton & Company, 2014), 13.

owing to their youth cannot endure anything not sweetened by pleasure, and music is by nature a thing that has a pleasant sweetness.”<sup>5</sup>

Aristotle noted that words could not explain exactly what potency music was capable of expressing, but it was clear that the various types of rhythms, melodies, and timbers impacted a person’s emotions, behavior, and character in different ways. Long exposure to a particular modal tunings roused the specific features of that mode in the nature of the listener.

Although Plato’s *Republic* is considered to be one of the most influential works in political theory and philosophy, it also refers remarkably to music and its importance. The *Republic*’s text refers to the organization of a utopia where music would build harmonious characters and calm human behaviors, along with gymnastic in which would promote healthier bodies. In Plato’s perspectives, music and gymnastics were fundamental elements that together promoted an equilibrium between soul and body. He also stressed the importance of balancing these two elements, since too much gymnastics could make one violent, uncivilized, while too much music could evoke weakness and irritability. In Plato’s utopia the educational system should be carefully regulated by the government and should comprise the balance of music and gymnastics.<sup>6</sup>

Besides, not all structural music form was recommended for an individual to listen. Music that evoked immoral states of mind disfigured a person’s character. Leaders and rulers should avoid melodies that evoke softness and indolence. Dorian and Phrygian

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<sup>5</sup> Aristotle. *Politics*, translated by Harris Rackham (Harvard University Press, 1932), 29.

<sup>6</sup> Plato, G. R. F. Ferrari, and Griffith. *The Republic*. (Cambridge University. Press, 2000).

were modes (or *harmoniai*) that promoted courage and temperance, therefore these were the modes mostly endorsed in Plato's writings.

Much of these thoughts continued in later Western music. Aspects of Greek musical thought influenced posterior periods, such as the next period to be discussed – the Baroque. In the Baroque period, musicians revived Greek perceptions and merged them to their contemporary concepts. This created new approaches to musical composition, such as rhetorical devices, chromaticism, opera, and new techniques to for emotional stimuli.

## The Imperfect Pearl

*“The ultimate purpose of the various minglings and linkings of tones achieved by art is, by means of their various impact on the sense mechanisms of hearing, to absorb a listener’s whole heart, to keep occupied all the heart’s powers, and to nourish its inner well-being through the purification of passions and affections.”*

Christoph Nichelmann

One of the most prominent facet of the seventeenth-century art, music or literature is its emphasis on dramatism. During this period, artists focused on the dramatic effect, urging the public to respond emotionally rather than with unmoved appreciation. As result, a theory in musical aesthetics emerged and became widely accepted among composers. The theory, known as the Doctrine of the Affections (*Affektenlehre*), noted that music is capable of evoking a variety of specific emotions within the listener. The doctrine defended that by making use of the proper standard musical procedure or device, the composer could create a piece of music capable of producing a particular involuntary emotional response in his/her audience.<sup>7</sup>

Baroque composers pursued musical features in order to evoke the *affections*—emotions such as joy, love, anger, excitement, fear, etc. Composers believed that undergoing a variety of affections through a musical piece could potentially create a

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<sup>7</sup> Rogerson, Brewster. "The Art of Painting the Passions." *Journal of the History of Ideas* 14, no. 1 (1953): 68-94.

better balance of humors, which promoted psychological and physical health. This concept can be traced to ancient perspectives of music's impact in psychological and physical health. Aristotle's theory regarding how this happens was discussed in his

*Politics*:

“Rhythm and melody supply imitations of anger and gentleness, and also of courage and temperance, and of all the qualities contrary of these, and of the other qualities of character, which hardly fall short of the actual affections, as we know from our own experience, for in listening to such strains our souls undergo a change.”<sup>8</sup>

A variety of musical structures, features, and their affective counterparts were compiled and described by such 17th- and 18th-century theorists as Johann Mattheson. Mattheson became an important source of information regarding German music from the 18<sup>th</sup> century. Among his scholarly writings, *Der Vollkommene Capellmeister* (“*The Perfect Chapelmaster*”, 1739), stands out as he discusses compositional approaches based on the Doctrine of the Affections. Mattheson states that joy is elicited by large intervals, sadness by small intervals; fury may be aroused by a roughness of harmony coupled with a rapid melody; obstinacy is evoked by the contrapuntal combination of highly independent melodies.<sup>9</sup>

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<sup>8</sup> Aristotle, and Jonathan Barnes. *Complete Works of Aristotle, Volume 2: The Revised Oxford Translation*. Princeton: Princeton University Press, 2014.

<sup>9</sup> Mattheson, Johann, and Gordon J. Kinney. 1978. *The Complete Chapelmaster : Basic Guidance in All Those Matters of Which Anyone Must Possess Knowledge, Skill and Perfection Who Wants to Direct a Chapel with Honor and Usefulness*. Ch. III.

## The Acoustical Depiction of the Internal World

*“[...] a listener assumes the role of relaxed spectator, an observer who deigns to judge the likeness or unlikeness of a depiction. A listener is not himself exposed to the affections that are musically represented, nor does a composer offer up his agitated inner experience in any sounding testimony for which he expects a listener’s shared feeling, his ‘sympathy.’ A composer is more like an artist who paints someone else’s emotions than a person who exhibits his own.”<sup>10</sup>*

Carl Dahlhaus

Often, when discussing the interpretation of a piece, musicians alternatively use words such as ‘expression’ or ‘mood’. The word ‘mood’ implies a complex of feelings in which a listener is immersed. Similarly, the word ‘expression’ implies a subject behind the work, narrating himself/herself in the musical ‘language of feeling.’ Kurt Huber in *Der Ausdruck musikalischer Elementarmotive* (The Expression of Elementary Musical Motives) states that listeners involuntarily attribute an impression of something serious, sad, or joyful given the flow of rhythm, texture, dynamic, instrument, etc. <sup>11</sup>

Several researches have appointed that the capacity to recognize emotions in music begins to develop in early childhood and progresses significantly throughout

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<sup>10</sup> Carl Dahlhaus and William Austin, *Esthetics of music* (Cambridge: Cambridge university press, 1995), 20.

<sup>11</sup> Ibid., 17.

development.<sup>12</sup> Cross-cultural studies have also appointed that factors such as cultural influences can also affect the way a person perceives emotion in music.<sup>13</sup>

The capability of perceiving a music evolves a multiplicative function of contextual features, listener, performance, and structural features of the piece where:

- Contextual features = Event, location.
- Listener features = Stable disposition, Current motivation, Musical expertise.
- Performance features = Performer state of mind and skills.
- Structural features = Suprasegmental and Segmental features.

As previously mentioned, structural features consist of two parts—suprasegmental and segmental. The suprasegmental features consist of foundational musical structures such as melody, rhythm, and tempo. Segmental features comprise the acoustic structures such as pitch, duration, and amplitude.<sup>14</sup>

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<sup>12</sup> Dowling, W. J. (2002). "The development of music perception and cognition". *Foundations of Cognitive Psychology: Core Reading*: 481–502.

<sup>13</sup> Thompson, William Forde & Balkwill, Laura-Lee. *Handbook of Music and Emotion: Theory, Research, Applications. Chapter 27: Cross-Cultural Similarities and Differences*. (Oxford University Press, 1993), 757.

<sup>14</sup> Scherer, K. R.; Zentner, M. R. "Emotional effects of music: production rules". *Music and Emotion: Theory and Research*: 361–387.

## Musical Structural Features and Emotions

Table 1  
Structural Features and Associated Emotions

Structural Feature	Definition
Tempo	The speed of the music
Rhythm	The pattern of regular or irregular pulses
Mode	The type of scale
Melody	The succession of single tones
Dynamics	The amplitude of a sound

Typically, music has a constant tempo to it, commonly measured in “beats per minute”. It has been observed that music lies in the range of 50-200 beats per minute, which relates to the extreme range of human heartbeats. Music with the tempo varying in the range of 60-80 beats per minute, commonly elicits calmness and relaxation. Less than 60 bpm is considered very depressed, or relaxed. A piece with the tempo above 100 bpm will evoke excitement, agitation.<sup>15</sup>

The rhythm can qualify the nature of the piece, with more movement, or less movement to it or a combination or alternation of both. A consistent rhythm commonly

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<sup>15</sup> Watanabe K. "Heart Rate Responses Induced by Acoustic Tempo and Its Interaction with Basal Heart Rate." *Scientific Reports* 7 (2017): 43856.

elicits happiness, while irregular pulses can represent emotions such as anxiety, uneasiness.

A melody consists primarily of two elements—pitch and rhythm. Chromatic melodies or even melodies that belong to a minor scale are commonly seen as darker than a musical line belonging to a major scale. Melodies that contain low pitches are often associated with seriousness, sadness, or even majesty, or vigor. Low pitched, with octave leap downwards often evoke sadness, melancholy. High pitched melodies are commonly assimilated with happiness, grace, serenity. A rising melody, especially with octave leap upwards evokes happiness, excitement. Composers from different historical periods have used melody mirroring the emotions of speech. As already mentioned, Mattheson stated in his *Der Vollkommene Capellmeister* that joy is elicited by large intervals, while sadness by small intervals.<sup>16</sup>

The amplitude of the sound also impacts the way the listener perceives emotions on music. Small sound waves are usually associated with sadness, melancholy, but also with serenity or tenderness. Moderate intensity is often associated with happiness, pleasantness. Large sound waves can evoke excitement, triumph while very loud, to distortion levels can depict anger.

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<sup>16</sup> Mattheson, Johann, and Gordon J. Kinney. 1978. *The Complete Chapelmaster : Basic Guidance in All Those Matters of Which Anyone Must Possess Knowledge, Skill and Perfection Who Wants to Direct a Chapel with Honor and Usefulness*. Ch. III.

## Structural Features Associate with Joy

Composers from different periods in history used similar compositional approaches in order to portray passions (in the case of Baroque composers) or their own emotional experiences and states (Classical or Romantic composers, for instance). One of the reasons why most Baroque composers portrayed passions rather than depicting their selfhood in music, is because majority of them composed with the purpose to serve the church. Therefore, these composers sought to portray an overall emotion that related, for instance, to a passage from the bible, or a sacred event. Composers from the late Classical period began to become more independent from patrons, or churches, which allowed them to express their own emotional state, or ideas. These eventually led to a cult of originality in the Romantic period.

Dieterich Buxtehude was a German Baroque composer whose main instrument was the organ. Buxtehude wrote a variety of vocal and instrumental pieces, and his style exerted a strong influence in several composers from his period (including J.S. Bach) and from posterior periods, such as Brahms. For the identification of musical devices that portray passions used by Baroque composers, Buxtehude's Prelude, Fugue and Chaconne in C Major, BuxWV 13 is selected for analysis.

In the Baroque period composers used specific musical devices to portray passions. Buxtehude uses several musical features which convey an overall emotional state of joy and excitement in his Prelude, Fugue and Chaconne in C Major, BuxWV 137. The piece begins with a lengthy pedal full of energy. The composer also required a full organ sound, resulting in a powerful amplitude of sound. The tonal language of this piece

(C major) is very consistent throughout the three sections of the work and the tonality of C major which is a tonality known to evoke joy and simplicity. The tempo of the piece oscillates between sections, beginning with a moderato tempo in the prelude and concluding with a presto in the Chaconne. Buxtehude used several musical structural features that consistently evokes joy.<sup>17</sup>

Almost a 150 years after Buxtehude composed his Prelude, Fugue and Chaconne in C Major, Claude Debussy wrote Deux Arabesques: Andantino con moto, which features some of the same musical devices used by Buxtehude to elicit the same emotion of joy. Debussy was a French composer who, along with Maurice Ravel, became one of the leading composers of Impressionist music. His compositions are noted for its sensory content and for the common use of nontraditional tonalities.

Most of Debussy's compositional style revolves around avoiding evidently delineated harmonic progressions, rhythms, and melodies in order to arouse a certain mood or atmosphere. Although Deux Arabesques: Andantino con moto belongs to his early compositional period (where he still influenced by the Romantic style) this piece already presents certain hints of his developing Impressionistic style.

In the end of the B section of Debussy's first Arabesque, Debussy makes use of the same musical devices Buxtehude used in his piece. As a result, both pieces elicit joy. The end of the B section, when it is transposed to the key of C major, is the only section

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<sup>17</sup> Buxtehude, Dietrich. *Prelude, Fugue and Chaconne in C Major*, BuxWV 137. Historical Organ Recitals, Vol. I. (New York: G.Schirmer, 1917).

that shares similarity with the work of Buxtehude. Debussy's piece constantly oscillates in mood and rhetoric. By comparing both pieces, we can see that Debussy transposed the end of the B section to C major, which is the same tonality that Buxtehude used to evoke a happy emotion. Debussy also noted the dynamic to be played *forte* and *risoluto* (resolute, determined). He also made use of large intervals and the harmony is simple and clearly delineated. In addition, this section has the most consistent rhythm in comparison with other sections in the piece, which requires *rubato* or *strigendo*. Consequently, this small section in the piece poses a joyful and exciting emotional state.



Fig. 1 Debussy, Claude. *Deux Arabesques: Andantino con moto*, L. 66<sup>18</sup>

<sup>18</sup> Debussy, Claude. *Deux Arabesques: Andantino con moto*, L. 66. Claude Debussy: Piano Music 1888-1905 (New York: Dover Publications, 1974).

## Recital Pieces

On May 3<sup>rd</sup>, 2017, I performed a one-hour recital at Eastern Kentucky Brock Auditorium with pieces from different historical periods on piano and organ. However, one of the pieces (Piano Concerto No. 23 in A, K.488 by A.W. Mozart) was excluded from this recital and presented in a previous performance since the auditorium did not have a second piano (for the orchestral part).

### Baroque:

- Prelude, Fugue and Chaconne in C Major, BWV 137 by Dieterich Buxtehude
- Chorale Prelude Wachet auf, ruft uns die Stimme, BWV 645 by J.S. Bach

### Classical:

- Piano Concerto No. 23 in A, K.488 by A.W. Mozart

### Romantic:

- Prelude Op. 23 No. 5 by Rachmaninoff
- Novelletten Op. 21 No. 1 by Schumann
- Danse Macabre Op. 40 by Saint Saëns and arranged by Ernest Guiraud.

### Impressionism

- Deux Arabesques: Andantino con moto by Debussy
- Valse Romantique, L.71 by Debussy
- Antiphon V Op. 18 by Marcel Dupré

### Late 19<sup>th</sup> and Early 20<sup>th</sup> Century Brazilian Music:

- Odeon, Brazilian Tango by Ernesto Nazareth

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Fig. 2. Cibele Moura, Recital Program. Eastern Kentucky University School of Music, 2017.



## PROGRAM

Valse Romantique, L.71 ..... Debussy

Deux Arabesques: Andantino con moto ..... Debussy

Novelletten Op. 21 No. 1 ..... Schumann

Antiphon V Op. 18 ..... Marcel Dupré

Prelude and Chaconne in C Major, Bux WV 137 ..... Dieterich Buxtehude

Odeon, Brazilian Tango ..... Ernesto Nazareth

Prelude Op. 23 No. 5 ..... Rachmaninoff

Danse Macabre Op. 40 by Saint Saëns, arranged ..... Ernest Guiraud  
Four Hands Piano with Dr. Bernardo Scarambone



Fig.3. Cibele Moura, Recital Program. Eastern Kentucky University School of Music, 2017.

## Conclusion

The deepest roots of Western Art Music are found in the civilizations of antiquity. The strongest influence in music comes from Greek writings, which became the basis for European music's views. Thoughts and theories from this time such as the Doctrine of ethos continued in later Western music influencing periods such as the Baroque and creating new approaches to musical composition, such as rhetorical devices, chromaticism, theories such as Doctrine of Affections, which helped to improve the compositional process for emotion stimuli.

By comparing musical works and theories from different periods it is possible to say that although each period focuses on specific compositional style, composers. Musical features such as tempo, rhythm, mode, melody, and dynamics are considered the primary elements when depicting or conveying an emotion. Tempo is, indeed, found to be the most important element among all the musical structural features that affects emotional expression, followed by mode and melody in Western Art Music.

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