

Cross-Cultural Perspectives of Synesthesia in Contemporary Musical Compositions

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Abstract.

Based on the sound-color correspondences, the term “synesthesia” indicates a certain sound or a specific harmony in association with a particular color, shape, or colorful pattern. The correlation between visual image and sound refers to the neurological condition of sensory fusion that is often observable in the musical composition. This study will investigate the cross-cultural perspectives to the synesthetic examples in the contemporary musical works, particularly in the compositions written by synesthetic composers such as Alexander Scriabin (1871-1915), Olivier Messiaen (1908-1992), and György Ligeti (1923-2006). The pertaining sources of the scientific theories concerning the subject of sound-color associations by different scholars will be discussed as well. It will aim to explore the cross-cultural aspects including psychological, theosophical, religious, and mathematical influences on synesthetic behaviors in contemporary music performance.

Keywords:

Synesthesia, Cross-Cultural Perspectives, Synesthetic Music

1. Introduction

The concept of cross-modal associations is originated from the ancient Greek and Roman civilizations, and the examination of multisensory integration in human senses spans to philosophical, scientific, and psychological aspects. The contemporary scientific view of

synesthesia extends to the fields of cognitive science and clinical neuropsychology that explore the further intact brain function. Interestingly the cross-modal associations in music compositions provide good relevant examples in light of sensory fusion. The following paragraphs will illustrate the current findings and how the cross-modal point of views influenced the sonorous and aesthetic ideas of the composers.

1.1 Current findings

There are many studies concerning the relationship between colors and sound. The perception of “synesthesia” was first mentioned in 1812 by the German physician Georg Sachs, depicting the simultaneous interaction between senses. The symptom of synesthesia is different from individual to individual. According to the English polymath Francis Galton (1822-1911), who formulated complex tables and introduced the cross-modal associations of synesthesia to the public in his 1883 book, *Inquiries into Human Faculty and Its Development*, there are several types of synesthesia including number-color, form-color, date-color, and sound-color.¹ Particularly, the most frequently discussed type of synesthetic examples in music literature is sound-color synesthesia. The perception of synesthesia was first defined and summarized by Édouardo Cornaz (1825-1911) as the term "hyperchromatopsia (perception of too many colors)".² Cornaz's work became the first monograph on synesthesia.³ Significantly, after then, psychologists have also shown a keen interest in the intersensory perception of both image and sound, and the relevant researches persist to the present.

¹ Francis Galton, *Inquiries into Human Faculty and Its Development*, 2nd Edition, (Macmillan, Publishers Ltd., 1892).

² Jörg Jewanski, Julia Simner, Sean A. Day, Jamie Ward, “The Development of a Scientific Understanding of Synesthesia from Early Case Studies (1849-1873),” *Journal of the History of the Neurosciences* (20):284-305, accessed July 6, 2020, doi:10.1080/0964704X.2010.528240.

³ Julia Simner, Edward Hubbard, *Oxford Handbook of Synesthesia*, (Oxford University Press, 2013), 372.

1.2 Theories of sound-color analogy

As sound and light are both produced by the vibration of objects that moves through a medium. Isaac Newton (1643-1727) stated in one of his letters in 1675, that he used sonic wavelength to measure the visible spectrum of color, and established a theoretical proposition which associates the seven colors of red, orange, yellow, green, blue, indigo, and violet with the seven basic degrees of the musical scale.⁴ Johan Wolfgang von Goethe (1749-1832) proposed a thesis concerning visual and aural sensations in his *Zur Farbenlehre (Theory of Color)*, published in 1810. In this work, Goethe declaimed his views of coloration's prototypical qualities, and his thesis emphasizes the mechanics of human vision other than a physical process. With Goethe's interpretation, the perceptual effects of colors are delivered through the examination of aspects including after-images, colored shadows, and complementary colors.⁵

Later, based on Goethe's theory, the Austrian philosopher and spiritualist, Rudolf Steiner (1861-1925), further developed the study of coloration to the research of spiritual science. He created a color wheel system by adding mental knowledge and psychological perspectives. Steiner's comprehension of human visual perception evolves a process of enhanced consciousness, which brings the interplay between semantics and sensory input, increasing the literal expression of each color. Steiner's color spectrum points out the direct relationship between colors and the human soul. His sound-color correspondences influenced the 19th-century Russian composer Alexander Scriabin, who utilized a color-light keyboard in his fifth symphony in light of synesthetic perception.⁶

⁴ Newton Isaac, *Opticks*. (New York: Dover Publications Inc, 1997).

⁵ Johann, Wolfgang von Goethe, *Theory of Color*. Translated by Charles Lock Eastlake. (London: John Murray, 1840).

⁶ Kenneth, Peacock. "Instruments to Perform Color-Music: Two Centuries of Technological Experimentation," *Leonardo* 21, no. 4 (1988): 397-406.

1.3 Psychological properties of colors

The psychological properties of colors have permeated literature before "synesthesia" was proposed. It is believed that Pope Innocent III (1198-1216) systematized the main usage of the colors, red, green, white, black, and violet, for the common practice of the liturgical seasons by the 12th century.⁷ Gradually, the scope of the color system in the liturgy expanded beyond the five traditional colors mentioned above. Each color is symbolic of specific emotional effects and ideas.⁸ The respective color expresses a certain character and the visual awareness of many colors denote a man's emotional response to the reasons for the liturgical year. The further application of the coloration, particularly for the five traditional colors, is often seen on religious occasions. For example, a red vestment is worn on Passion Sunday, Good Friday, and the Feast of Martyrs to express Christians' passionate love for Christ as the red color symbolizes fire and blood, implying the creation of a new-born life, originating from the Myth of Prometheus. Having a very different property, the complementary color of red is the green color, which speaks of the hope and vitality of nature, as it is the color of the springtime, representing ocean waters and also natural plants. Identically, the Bishop or the priest wears a green vestment in the Office and Masses of the Ordinary Cycles, which signifies the time between the liturgical seasons of celebration, indicative of a consistent faith for eternal life. Moreover, the white color represents portrays the purity and integrity of life. The representative example of a presentation of white is observable in a children's choir. In contrast to the white color, the color of black stands for a mourning sense that is specifically worn in Masses for the dead. Furthermore, violet is an ancient color, symbolic of the sovereignty of Christ. Thus, it is a significant liturgical color utilized during the seasons of penance, Advent and Lent, to express

⁷ Randy Stice, *Understanding the Sacraments of Initiation: A Rite-Based Approach*, (Chicago: Liturgy Training Publications 2017), 35.

⁸ *Ibid.*, 35-37.

man's confession of sins. Its alternate color is blue, which in some ancient rites is used to honor the Blessed Virgin Mary. Observing the examples above, the arousal potential and the psychological importance of colors exist in the overall environment, particularly on spiritual occasions. The relation between the coloration and its surroundings reflects the human response to the prototypical quality of visual perception. The psychological effect of colors is therefore influential and utilized in the artworks.

2. Synesthetic Examples in the Contemporary Musical Compositions

A great number of contemporary composers and artists with synesthetic experience reinforced their capacities and enriched the artistic expression in compositions. For example, Alexander Scriabin (1871-1915), Olivier Messiaen (1908-1992), and György Ligeti's (1923-2006) works show contrasting formal procedures of visual delineations.

2.1 Theosophical perspectives of Scriabin's synesthetic examples

Scriabin's fifth symphony, *Prometheus, Poem of Fire*, Op.60 (1908-1910) reveals his experience of the synesthetic embracing of music, color, sound, light, and fire simultaneously together. This piece presents the relationship between certain spiritual states and specific musical keys. According to the present theorists, Irina Vanechkina and Bulat Galejev, who built up a circle of diagram called "Musico-Chromo-Logo Schema" to indicate the sound-color correspondences and spiritual characters in *Prometheus*, the work possesses many spiritual features and emotional intent inspired by the Russian occultist and philosopher, Helena Petrovna Blavatsky (1831-1891), who introduces the knowledge of the theosophical theory of color and sound. In the work of *Prometheus*, Scriabin related the key of C to the color of red,

suggesting the character of “Human Will” and the starting point on the earth.⁹ Furthermore, the color green correlates to the key of A, associated with the theosophical idea of “Self-Consciousness”, which is equivalent to humankind’s mind.¹⁰ Moreover, Scriabin particularly annotated a part for a color keyboard which remarkably translated the notation into color-light rather than sound.¹¹ The color keyboard was a color organ designed specifically for the performance of *Prometheus*, originally called *clavier à lumières* or *Luce*. It was played like a piano but projected just color-light on a screen in the concert hall, without any sound, acting as a color-keyboard to project incandescent lights in a circle-of-fifths correspondence to the twelve key signatures. Through the numerous color indications, the entire work presents the many culminations of human will, human consciousness, creativity, and humanity.

2.2 Religious perspectives of Messiaen’s synesthetic examples

As a devout Catholic, many aspects of Messiaen’s synesthetic works show the spontaneous nature of sound-color response as well as the self-conscious discipline inspired by the religion. Messiaen utilized the terminology “stained-glass chord” in his book *La technique de mon langage musical (The technique of my musical language)* (1944).¹² He described the perception of color as “sound-complex”, which means that each coloristic indication contains parts of the dominant color, additional colors, and a stimulated colored shape that visually presents a

⁹ Blavatsky, Helena. *The Secret Doctrine: The Synthesis of Science, Religion, and Philosophy*. (Theosophical University Press Online Edition, 1888), 648.
https://www.anthroweb.info/fileadmin/pdfs/secret_doctrine.pdf (Accessed July 10, 2020), 648.

¹⁰ Ibid.

¹¹ Grove Music Online, Oxford Music Online, <http://www.oxfordmusiconline.com> (Accessed Oct. 8, 2019).

¹² Olivier Messiaen, *Technique of my musical language (Technique de mon langage musical)*. Translated by John Satterfield. (Paris: Alphonse Leduc, 1944), 10.

moving state.¹³ It refers to the strong impression from his personal spiritual experience of seeing the stained glass in the chapels.¹⁴ Subconsciously, his intuitional behaviors in musical works reflected the religious motivation. For example, some of his works such as *Visions de l'Amen* (1943) and *Vingt Regards sur l'enfant-Jésus* (1944) have faithful titles. Besides, the composition *Visions de l'Amen* has seven movements. The symbolic prime numbers such as three and seven represent the Christian Trinity, and can consequently be seen as being similar to the figure of Christ. The number seven can be interpreted biblically as representing the Sabbath. Furthermore, Messiaen developed an innovative symmetrical concept from an initial fragmental element to the fundamental basis of his non-diatonic musical vocabulary. The shaping and the construction of symmetrical structures such as the octatonic scale and modes of the limited transposition in Messiaen's music are mystical symbols of the Catholic faith. In Catholicism, the concept of symmetry is often related to God's creation of the world. The symmetrical structure is a well-known and distinctive feature in Catholic cathedrals. The shape of the Christian cross possesses the conceptualization of symmetry, while it also suggests the Holy Trinity. Messiaen's musical analogy of visual effects in these pieces is rich in both rhetorical and symbolic expression. The integration of Messiaen's musical components, as well as color, is interestingly following his religious ideal goal of "the charm of impossibilities" ("le charme des impossibilités"), by which he sought to convey as extensive formulas as possible in order to exhibit an enchantment of a colorful landscape.¹⁵

2.3 Cross-cultural perspectives of György Ligeti's synesthetic examples

¹³ Leslie Dianne Dukes, "An exploration of Olivier Messiaen's piano style and application of color in 'Le baiser de l'Enfant-Jésus' and 'Le courlis cendre'," DMA thesis, The University of Arizona, 2019, 73.

¹⁴ Olivier Messiaen, *Traité de Rythme, de Couleurs, et d'Ornithologie*, Tome VII, p. 7. (Paris: Alphonse Leduc, 1971).

¹⁵ Olivier Messiaen, *Technique of my musical language*, 13.

As a self-proclaimed synesthete, Ligeti is both a sound-color and a grapheme-color type of synesthete.¹⁶ He received inspiration from the fine arts, as well as contemporary digital works. His capacity for musical experiments spanned to the electronic music field, which occupied the main output of his later musical productions.

Because of the discovery of Einstein's Special Theory of Relativity, the traditional law of time altered, and most of Ligeti's works experiment with the perpetual deformation of time by constant meter changes and the innovative rhythmic displacement. With a similar rhetorical emphasis on the experiment of a time frame, Ligeti also expanded and contracted the textual density of composition to various degrees.¹⁷ Moreover, Ligeti reflected the grapheme-color and sound-color expression through employing the actual title chosen for some of his works such as the piece, *Continuum* (1968) and *White on White* (2001). The sonorous effects of dissonant and distorted sound in his piano work "Désordre" also present the symbolic sign that has a strong tie to the suggestive piece title.¹⁸ It is noteworthy to notice that several features including the blurring sound and the fractal design of melodic lines in Ligeti's electronic music reflect the environmental fact at Ligeti's lifetime. The Impressionist style of paintings, as well as the discovery of the topology in mathematics, influenced Ligeti's compositional approach, leading him to the structural irregularity and roughness.¹⁹

3. Conclusion

¹⁶ The grapheme-color type of synesthesia means the numbers or letters take certain colors for a synesthete.

¹⁷ Andrew Charles Hannon, "Expansion and Contraction in Movements I and VII of György Ligeti's Hamburg Concerto," DMA thesis, The University of South Carolina, 2014, 8.

¹⁸ Bianca Țiplea Teș, "Sounds, Lines, and Colors: Synesthetic Codes in Ligeti's Music," *Lucări de Muzicologie*, 2013, 83.

¹⁹ David, Isgitt. "An Analysis of Periodic Rhythmic Structure in the Music of Steve Reich and Ligeti," MM. thesis, University of North Texas, 2020.

In summation, the cross-cultural phenomena in contemporary music covered a wide range of multisensory interactions. The synesthetic behaviors in contemporary musical language evolve the stimuli of religious devotion, social background as well as psychological motivations. The synesthetic formations the composers implement extend to most of their modernist techniques and provide listeners with the possibility to access and comprehend their visual perception, as well as the mental states behind the musical content. It is interesting that the cultural and social influence leads the composers to important synesthetic musical discoveries, and, very possibly, vice-versa. It is my hope that this article may be a helpful source for the futuristic examination of the cross-cultural perspectives of synesthesia, which leads to a new path to make the perception of synesthesia more comprehensible to the non-synesthetes.

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