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Exploring Bach's "Musical Game" World

—Analysis of Bach's "Goldberg Variations"

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Abstract: Johann Sebastian Bach (1685 March 21st – 1750 July 28th), born in Eisenach, Thuringia, Germany, was a German composer and keyboard player of the Baroque period. This paper focuses on the musical analysis of Bach's "Goldberg Variations" to explore Bach's "musical game" world from four aspects: historical background, counterpoint and fugue, musical analysis of "Goldberg Variations," and the essence of Bach's musical games. It aims to provide valuable insights for relevant researchers.

Keywords: Bach, Goldberg Variations, work analysis, music, game

1. Introduction

To ensure the rigor of the article's structure and logic, it is essential to define the concept of "musical game" in this context. This concept serves as a comprehensive summary of Bach's musical characteristics and style. Bach's keen perception of the relationship between music and numbers frequently triggers novel responses between musical notes. The intriguing quality of his works lies in the transformation of various musical elements. Bach organizes musical notes into different clusters or sets, then reassembles them. The entire creative process resembles a game, unearthing the potential of musical note composition while continuously stimulating the curiosity of those who wish to explore [1]. The purpose of this analysis of Bach's "Goldberg Variations," one of his representative works, is to personally experience the charm of Bach's "musical game" world and elucidate its essence and significance.

2. Baroque Music

The thoughts and creative style of composers are closely related to the era in which they lived. Therefore, in-depth analysis of the content of their works requires an understanding of the historical background of the Baroque era itself.

The Baroque period, an important stage in Western music history, began in 1600 (the year of the birth of opera) and lasted until 1750 (the year of Bach's death), spanning 150 years. "Irregular pearls" was the initial meaning of the Baroque, and this abstract term reflects two prominent features of Baroque art: complexity, signified by "irregularity," and splendor, represented by "pearls." Regarding the feature of "complexity," it is manifested in two aspects. On the one hand, the artistic works born

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during the Baroque period often combined religious and hedonistic elements. For example, the emergence of opera secularized religious music, expanding the lyrical content of religious lyrics beyond traditional biblical stories and legends. Representative features such as solos and recitatives gradually permeated this music, becoming essential components of religious music. Music transitioned from the church to court and urban life. In addition to opera, sacred dramas, passion plays, and other new art forms constantly emerged, confirming the innovative potential of traditional music. Therefore, the essence of "complexity" lies in collision—a unique collision of seemingly contradictory elements. Many seemingly contradictory things are continuously affirmed through these collisions. The boldness of Bach's "Goldberg Variations" in combining musical notes is, in itself, a resonance between his thoughts and the spirit of the times.

Regarding "splendor," it refers to the innovation in Baroque music, breaking away from the tranquility and harmony advocated by church music. Artists, with their rich imagination and initiative, expanded and explored the expressiveness and possibilities of music [2]. The replacement of modes by tonality is a confirmation of this innovation. Behind this change lies the subjective pursuit of composers in terms of harmonic features and the expressive power of music. As the church modes inherited from the Middle Ages gradually gave way to the major and minor modes developed on the basis of the triad, the foundation of music for the next three hundred years was laid. This clearly explains the uniqueness of Bach's "Goldberg Variations." Specific expressions of its innovativeness will be detailed in the following sections.

3. Counterpoint and Fugue

The "Goldberg Variations," as a composition in the genres of counterpoint and fugue, is a product of Bach's precise integration of musical notes and mathematical logic. Counterpoint[1], one of the traditional Western composition techniques, reached its zenith in Bach's hands s [3]. The origin of counterpoint, particularly the concept of "counterpoint," can be traced back to ancient Greece, where the philosopher Pythagoras discovered the mathematical relationships of consonant intervals, theorizing that "everything is number." Counterpoint applies these harmonic relationships in practice by organizing music based on consonant and dissonant intervals. Bach, often referred to as the "master of counterpoint," treated counterpoint as a "musical Rubik's Cube." In his works, musical notes could rotate freely between each other, creating various combinations. With twelve notes (generated by semitone arrangements) and dozens of rhythmic multiplications, the combinations that could be formed were almost endless. For instance, Bach's famous "Crab Canon" (BWV1072) (see Figure 1).

1 It consists of two or more simultaneous, related but differentiated voices, each of which is independent but harmonically unified into a whole, forming a harmonic relationship with each other, with counterpoint as the main compositional technique.

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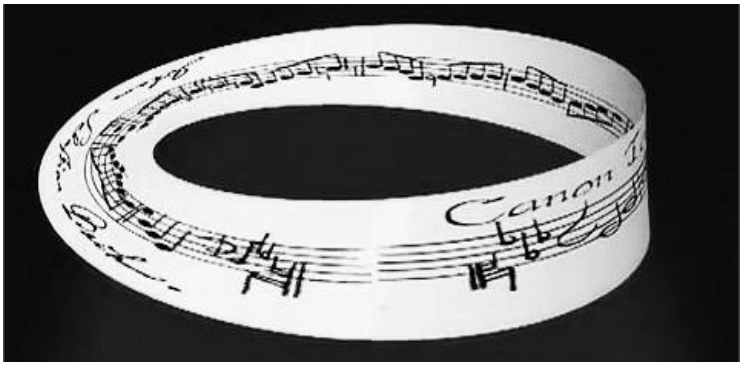

Figure 1: The “Bach big cycle” built by the crab Canon.

As evident from the musical notation, if we consider the center as the fixed point, we can observe an extremely regular rotational symmetry on both sides. The forward and backward rotations are identical, resembling an infinite Möbius strip. Consequently, many music enthusiasts refer to this work as the “Bach Universe” or the “Bach Cycle.”

Fugue[2], as the most complex form of counterpoint in contrapuntal music, initially meant “pursuit.” Bach often used a relatively simple melody as a motif, exemplified by a segment of his work, “Fugue (BWV858)” (see Figure 2).

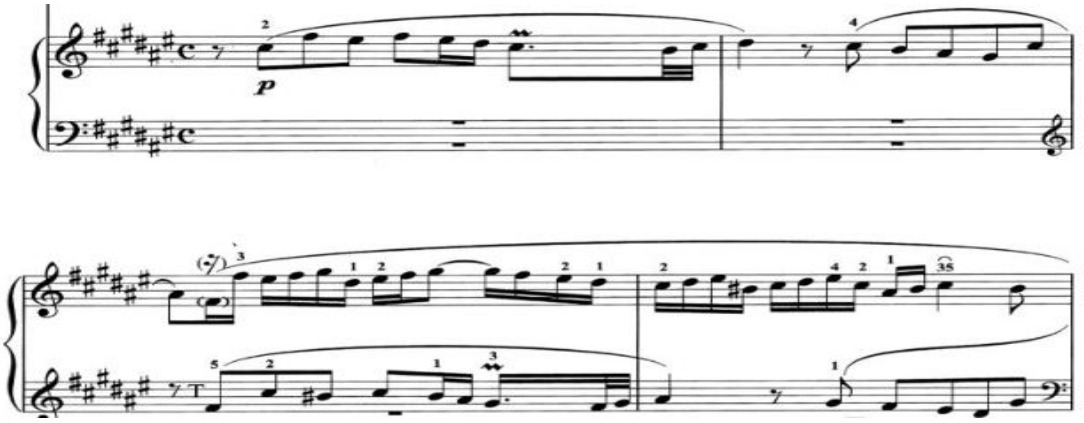

Figure 2: A vocal chase separated by two bars.

In the second section, the melody appears in the second voice, creating a chasing effect through staggered timing, but overall integration results in a completely new auditory experience. With the possibility of up to eight voices in a fugue, it is evident that ensuring the proper timing of eight voices while creating an excellent resonance effect poses a considerable challenge. However, Bach, far from being deterred, elevated this challenge to a form of “musical game,” highlighting his sensitivity to mathematical concepts and his profound composition skills.

4. Analysis of Bach’s Violin Work “Chaconne” (BWV1004)

In my view, Beethoven’s third movement of the Ninth Symphony composed his entire life, while Bach’s fifth piece, “Chaconne” from BWV1004, plays out the entire universe, as it holds infinite possibilities. Bach, with his exquisite ingenuity, develops thirty variations from a single theme, using

2 Its basic feature is the use of imitative counterpoint, so that a simple but characteristic theme appears once in each voice part of the piece in turn (the presentation part); and then enters an interlude developed from some of the motives in the theme, after which the theme and the interlude appear again and again in various new keys (the development part); until finally the theme returns to the original key (the reappearance part), and is often concluded with a coda.

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only the violin to perform all the rules of music. Therefore, I have chosen this piece from among Bach's many works, hoping to understand the creative rules behind this work through a musical analysis of the work itself. My aim is to enter Bach's "musical game" world and explore the craftsmanship behind his music. Following the principle of progressing from the shallow to the deep, I will start with an explanation of the concept of "Chaconne." The first step in forming a surface understanding is deemed necessary.

The term "Chaconne" originally referred to a dance, the chaconne, which originated in Spain in the late 16th century. It gradually evolved into an independent instrumental piece. This musical form repeated themes multiple times on a fixed bass or fixed harmonic basis, earning it the name "fixed bass variation." During the Baroque era in which Bach lived, it was a very popular music form. The pinnacle of late Baroque chaconne development is represented by Bach's "Chaconne," numbered BWV1004. This work was composed around 1720, during Bach's tenure as the Kapellmeister of the Cöthen court (1717-1723).

Regarding the background of the composition of the "Chaconne," opinions have varied over time. The most widely circulated story connects it to Bach's first wife, Barbara—Maria Barbara Bach, the deeply beloved wife of Bach, passed away in 1720. This was a significant blow to Bach, and faced with the vast expanse of life and death, he had no words to express his grief. Eventually, his heavy sorrow transformed into a string of musical notes.

In 1994, German scholar Helga Thoene's research further substantiated this claim. She discovered that this composition concealed letters corresponding to Bach's own name and that of his wife, Maria Barbara Bach. These letters corresponded to the names of the notes, forming a hidden melody within the chaconne [4].

Delving further into the level of creative thinking, one can discover that Bach developed thirty variations from just eight bars of the main theme. To fully illustrate this argument, I have included the first page of Bach's manuscript for the "Chaconne" (see Figure 3) and will analyze it from both a harmonic and variation perspective.

4.1. Harmonic Analysis

The first eight bars of the "Chaconne" constitute the main theme of the entire work. The harmonic progression is I-V-VI-V, and the entire composition unfolds around this fixed harmonic progression.

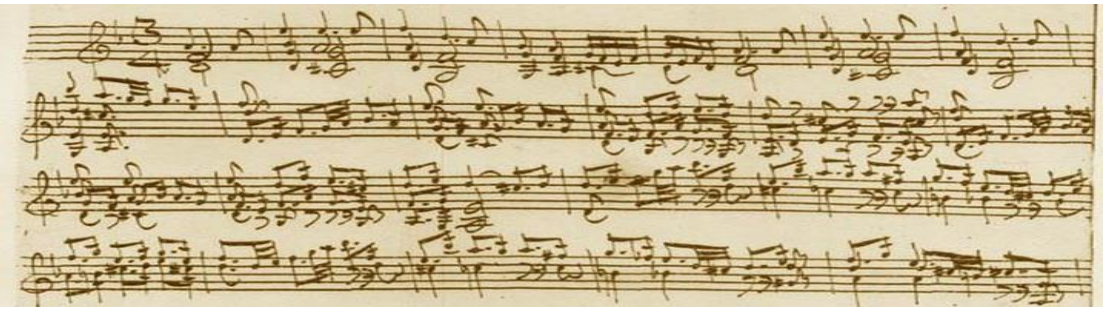

Figure 3: The opening theme of the "Goldberg Variations".

According to the score, the harmonic structure of this A major "Chaconne" is overall straightforward and easily discernible, with no significant complexity in the harmony. In the first bar, the tonic A major starts with the I chord (A-C#-E-A), and after two beats, it transitions to the V chord with a sixth (E-G#-B). Following the harmonic progression, the V chord with a sixth transitions back to the original position after the second bar, so the original position of the I chord transitions to a raised D, creating the first inversion of the diminished third chord—D-F#-A. The nature of this diminished third chord depends on the first chord of the third bar. In addition, the second chord in the

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third bar is a dominant seventh chord, and the preceding diminished third chord is a secondary dominant chord. In the fourth bar, the parts undergo slight changes compared to the previous three bars, with the first part (F#-E-D) and the lower part (D-C#-B) forming a counterpoint. The inner part has an A-G#-A, and in the first beat of the fourth bar, the IV chord, with a passing tone of E, reaches the third beat with the inner part's A sustained to G#, creating a suspension, a common technique in Bach's music. The fifth bar returns to the I chord, with the second and third beats featuring a chord of E-A-B, with A being retained from the previous section, serving as a suspension. The following chord is E-G#-B, resolving in the sixth bar. Overall, this creates a straightforward progression of either I-IV-V or I-V-I. Occasionally, there may be a secondary dominant or similar chords, but these do not undermine the overall rigor and simplicity of the "Chaconne" harmony.

4.2. Variation Techniques Analysis

As a type of variation-based polyphonic music, in comparison to the analysis of harmony, the focus of this musicological analysis is placed on the variation techniques, which constitute over 70% of the entire composition. Through Bach's ingenious craftsmanship, the texture of the voices becomes richer, with these variations predominantly based on the initial eight measures of the main theme. The composition is divided into three parts based on the different styles and emotions expressed through the variation techniques (see Table 1).

Table 1: Variation technique presentation.

Part I	Part II	Part III
D minor	D major	D minor
Theme-15	16variations-24variations	25variations-30variations

The first part extends from the main theme to Variation 15, set in the key of D minor, characterized by solemnity, gravity, and a sense of lamentation, evoking a feeling of sorrow and determination. This section occupies half of the entire composition. The second part spans from Variation 16 to Variation 24, transitioning to the bright and joyful key of D major. It seems like a recollection of the good things in life, filled with joy and happiness, building up to a climax. The third part, from Variation 25 to Variation 30, returns to D minor and summarizes and reiterates the main theme and variations, concluding the composition. As Fukuda Jinichi once remarked, "Chaconne is like a human life; it begins with weeping, then life takes its rocky path, full of dramatic changes, joys, triumphs—transposed to a higher key—then aging, sorrow..." [5].

In summary, as an unaccompanied violin composition, Chaconne is a work that embodies Bach's "cosmic worldview"[3] to the fullest extent. Its rich and precisely executed variation techniques are masterful, transcending the barriers of time. This piece has been adapted by later musicians into various instrumental versions, such as cello, guitar, and piano. Brahms even adapted it into an exercise for the left hand alone. Different versions and adaptations in different eras have expanded the richness of the original Chaconne. They all derive from Bach's "musical game," further broadening his musical universe.

3 Bach's "cosmology": Bach made music like mathematics, reflecting the beauty of the objective world. Bach's music expresses a self-consistent system with a sense of balance, revealing the hidden structure of nature from a musical point of view, and the objectivity of this composite natural law is sublimated into a "cosmic view" under the auspices of his profound compositional techniques.

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5. Bach's "Musical Game": Implications and Significance

5.1. Emotions and Inspiration in Bach's Works

In my perspective, when listening to Bach's vocal works, Passions, or Cantatas, which carry explicit themes and moods, one may perceive subtle emotional fluctuations. However, most of his works beyond these examples are challenging to precisely perceive in terms of emotions. In his daily life, Bach was introverted, and his emotional range was rather limited, expressing his feelings in a calm, mild, and reserved manner. This fundamental disposition of Bach contrasts starkly with Beethoven's "waterfall of emotions."

Bach's meticulous compositional techniques, which downplay emotional expression, raise an intriguing question: what was the source of Bach's inspiration? His expertise in mathematics and counterpoint led to the perception that he had more in common with scientists than with musicians. The philosophical question of the connection between music and emotions has a long history, starting from Aristotle's idea that "music can purify the soul." As history unfolded and humanity's appreciation for human emotions grew, the belief that "music and human emotions are inseparable" became widely accepted. During the Romantic era, emotions were elevated to the status of motives in some compositions. It can be said that Bach, as a composer who pushed numerical and emotional expression to their extremes, deviated somewhat from this convention.

It is essential to emphasize that although Bach's masterful compositional technique results in the utmost precision of logical lines in his music, it is the surging emotions and inspirations that constitute the most precious elements within its core. As the most renowned organist of his time, Bach could perform improvisations continuously for hours without repetition. This particular skill is subtly reflected in the melodic compositions of "The Art of Fugue," where elements of improvisation such as embellishments and suspensions frequently appear. Thus, it can be observed that Bach's flow of creativity was almost a constant presence.

5.2. Rationality and Nature in Bach's Music

When discussing the debate between the rationality and sensibility of music, it can be viewed as an expression of the autonomy theory versus the heteronomy theory. Advocates of autonomy theory argue that the beauty of classical music is abstract, similar to the beauty of mathematics, aligning with Bach's construction of a rigorous musical framework. On the other hand, many proponents of the heteronomy theory[4], who cherish the notion of expressive beauty in art, express their perplexity, questioning, "Isn't art a means of expressing human emotions? Clearly, art is a form of sensual beauty."

Faced with this issue, the autonomy theory resonates with the author. Throughout the history of human civilization, whether on the banks of the Yellow River in the East or in the Hellenic civilization of the West, music held a significant position. People in every civilization implicitly believed that the order and rules inherent in music could educate the human soul and explore the laws of the universe. The ancient Greek philosopher Plato affirmed the authority of music education above all other forms of education.

Returning to the question of whether Bach's compositions are formalistic and devoid of sensibility, the author holds a distinct perspective. Bach's inner emotional surges are constant (as discussed

4 The author's note: Autonomy theory posits that the expression of emotions is not the content of music; the beauty of music exists independently of emotions. It emphasizes a form of musical aesthetics that affirms the "purity" of art itself. Heteronomy theory, on the other hand, argues that what constrains the laws and rules of music comes from outside of music, namely human emotions. Emotion constitutes the content of music. The nature of emotions not only shapes the sound, structure, and overall development of a musical work but also determines its form. Heteronomy theory underscores the significance of the content of music and posits that only by expressing the content of the spirit through sound can music truly become art.

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earlier), making it impossible to categorize his work as purely rational or not. However, music itself possesses a distinct attribute—rationality. The historical development of music can serve as evidence; from a macroscopic perspective, the status of music has diminished from ancient times to modern times, often closely related to the increasing emphasis on its emotional attributes. Once music becomes emotionalized, its purpose becomes more evident. It may at times serve as a tool for expressing devotion in religious music, at other times as the instrument of nobility or courtly entertainment emphasizing capital and amusement, and still other times as the elixir of romanticism, stirring emotions. Furthermore, in contemporary popular music, it frequently becomes a lucrative industry catering to the masses. Music itself is not inherently right or wrong but rather a product of the cumulative impact of its purposes, no longer "pure" in essence.

The charm of contemporary popular music often derives from the audience's anticipation of the chorus melody. Therefore, when the music is about to reach its climax and is abruptly halted, a profound sense of disappointment often ensues simply because the music at that moment did not satisfy the listener's ears and emotions. In contrast, Bach's compositions, exemplified by their intricate complexity, may not appear to have many anticipatory melodies on the surface. However, they construct an auditory architectural beauty as a whole.

6. Conclusion

In Bach's musical world, the effectiveness of emotional expression in music becomes subtle due to his restrained and rigorous compositional techniques. However, if one were to categorize his music as purely rational, it would be a superficial understanding. People may marvel at Bach's complex and precise counterpoint techniques in "Chaconne," but it is the emotions and ingenuity concealed behind the variations that are the key to the enduring appeal of this work. Considering Bach's life experiences, such as the loss of his wife and the vicissitudes of his existence, it becomes apparent that his reserved and restrained expression was the best choice for the introverted Bach. Therefore, in portraying sadness, Bach adopted an introspective approach in "Chaconne." Using a rigorous musical framework, he constructed a metaphorical representation of human life. He might have uttered a lament for the unpredictability of life, but ultimately, he arrived at the realization that "perhaps this is how life is." Between these seemingly extreme points lies a profound emotional depth, and it is precisely this complex and hidden emotional fluctuation that forms the core of "Chaconne."

In Bach's eyes, every note is akin to a brick, constructing a solemn architectural structure in the minds of the listeners through their ears. This structure aligns with the subconscious human inclination towards rules and satisfies the need for emotion deliberately. Bach's use of versatile and well-placed compositional techniques, along with the subtle fluctuations of emotion, breathes ultimate life into somber notes. It constitutes Bach's world of "musical games."

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