Research on the Technique of Singing Legato in Piano Works Based on Computer Synesthesia Analysis

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Abstract. The word synaesthesia is derived from the ancient Greek word synesthesia. "Synesthesia" is composed of the ancient Greek word "SYN" (meaning together and simultaneously) and “AIST-HEIS” (meaning feeling and perception). That is to say, when we feel a system stimulation, the feeling of one or more other react system will be independent, to produce this kind of phenomenon is due to the system of multiple senses of the body, and this kind of linkage is also known as synesthesia activities, is the human common natural phenomena in the process of mental activity. Computer synesthesia analysis also plays an important role in piano works.

Keywords: Computer Technology, Synesthetic Analysis, Piano Works

1. Introduction

Synesthetic induction, as a natural psychological phenomenon in human psychological activities, has been studied by scientists for several centuries, but its early understanding and research are one-sided or vague. In the field of music aesthetics, it has been scientifically proved that synesthetic induction exists in reality and is universal, and even that some habitual languages in life are formed by synesthetic feelings after a long historical accumulation.

2. Development history of computer synesthesia analysis

2.1. Related concepts of synesthesia

In China, the discourse and research on the sense of relevance in the pre-qin period more than 2,000 years ago have been clearly recorded, and are often mentioned in the relevant papers of the later dynasties. As early as in the spring and autumn period and the warring states period, there was a record of the sense of hearing to the sound stimulation, the aural property of music and other sensory experience\(^1\). However, this description does not explicitly analyze the internal relationship between auditory attributes and other sensory emotional experiences, such as clearness -- timbre, size --
intensity, length -- time, sadness -- happiness, firmness -- firmness/tenderness, etc. A good tone cannot be achieved without the standard key touch mode, and the basic key touch mode is also the basis of piano tone, as shown in figure 1 below:

![Lifting fingers and sticking keys](image)

**Figure 1.** Four basic piano touch modes

Although there have been a lot of records and discussions on the synesthesia phenomenon that music attributes can produce experience on people's perception and emotion in various literature and philosophy works, there is no more systematic and clear monograph, and the word "synesthesia" has not been put forward explicitly\(^2\). Since the 20th century, with the study of music aesthetics in China more and more attention, the study of the discipline is increasingly rich and perfect, our country to this field of research is also gradually in-depth. In addition, a group of scholars have emerged to study synesthesia systematically.

2.2. *The performance of computer synesthesia in music*

Modern scholar qian zhongshu, in 1962 published "synesthesia", he will be the western term "synesthesia" into China's literary theory, the paper think that can be exchanged between the human nervous system, namely the popular said, hear, touch, taste, smell can produce synesthesia between facial features, the paper will be prose, poetry, psychology, proverbs, philosophy, and conducted a comprehensive analysis of traditional opera, especially the analysis of a large number of works of ancient runes, couplet of penetrating deep sleep phenomenon is made in this paper, to promote the phenomenon of synaesthesia research made great contributions and have far-reaching significant influence\(^3-4\).

With the development of music aesthetics in China, the research on synesthesia has been deepened. Zhao songguang's "on the iconicity of music", ye chuanhan's "music: the world it represents" and zhang qian's "a preliminary study on the psychology of music creation" clearly put forward the "isomorphic relationship of motion form", which expanded the research in this field to some extent. Professor zhou haihong's "music and the world it represents -- a psychological and aesthetic study of the relationship between music and sound and the objects it represents" demonstrated the corresponding rules of synesthetic induction through a comprehensive study of psychological activities, and comprehensively analyzed how music expresses the objects it wants to express through the intermediary link. This work not only enlightens the in-depth study of many important topics in the
field of music aesthetics, but also provides a scientific theoretical basis for the related phenomena in the field of music practice.

3. Application of computer synesthesia analysis in piano works

The research and discussion on synesthesia has been recorded in the western literary and art circles for a long time. For example in the western literature great literature in Homer's epic "like a cicada sitting on a tree in the forest, pouring down voice liliaceous", the poet gives the cicadas sing to the sight and smell of artistic conception, the lilies and pour a word to describe the songs move feeling, is the cry of the cicadas into colored, flow type, taste, etc.

Aristotle, the ancient Greek philosopher, showed in his "problem set" that some of the components of music have many similarities with human activities, so music can express human ideology and emotion, which has a lot in common with the modern scholars' understanding of "taking common movement as the intermediary"[5]. In 1880, Francis galton described synesthesia explicitly in the journal nature. Well-known neurologist Richard schafer said: "it's a good idea to be a neurologist. The phenomenon of synaesthesia, such as towick, has been studied in depth. Monteverdi used the "emotion theory" to express the "anger", "tenderness" and "humility" of human emotion with the three vocal areas of music, namely high, middle and low, and he believed that music consists of three types of language, namely "excited", "moderate" and "gentle", indicating the common phenomenon between the level of voice and emotion. In her book emotion and form, suzanne long points out that there is a "striking agreement" between people's emotional form and sound, which is "a tonal facsimile of their emotional life". Figure 2 below is an example of legato of piano works in computer synesthesia analysis:

![Figure 2. Example legato of a piano work in computer synesthesia analysis](image-url)
As shown in chart 2 movement, kirk in the music language through the analysis of the form of sound, music expression element basic summed up as "tension" pitch "time tension" tension "volume", think the tone and texture as the tension of "touches", and "comprises all music expression assembly", through the analysis of the basic elements of composition and sound form to explain the performance of music.

Music is the art of hearing, and the sense of hearing can lead to rich psychological activities, and then produce the aesthetic experience of music. The physical and structural elements of music can cause complex emotions and experiences. Therefore, the performance of music has certain rules to follow[6]. However, in the piano performance and teaching, many people are blind; they only rely on the intuition and spontaneous sensitivity to music to play. Although in excellent players, such intuition and instinct are also crucial, so through the definition of synesthetic induction, physiological basis and research status; The relationship with the creation, aesthetics and representation of music; The similarities and differences between synesthetic induction and association, and the physical and structural elements of music, as well as the analysis and research on the training of performance skills, are combined with the research on musical materials to understand the musical expression information conveyed by the works, and interpret it to the audience truly and accurately, so as to give the audience a correct and perfect auditory experience.

4. Conclusion

At present, there are a lot of researches on piano performance at home and abroad, but most of them are conducted from the perspective of playing technology or musical structure of works. Most of the researches on the musical performance of piano works are conducted from the perspective of historical documents, creation background and other aspects. Although these studies have some inspiration and help to improve the players' technical level and master the overall style of the works, they cannot solve the specific operation and details of music processing in performance.

Through the research on the status quo of synesthetic induction and its role and importance in piano teaching, this paper combines synesthetic induction with piano practice teaching, and studies how to cultivate students' synesthetic induction ability, so as to provide a new way of thinking for the theoretical research of piano teaching and enrich the methods of piano legato.

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