

Aesthetic synesthesia and aesthetic education

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Abstract: *Aesthetic synesthesia refers to the phenomenon in which perception in the psychological process of aesthetic education transforms one type of stimulus into several types of stimuli with different properties, enabling the stimulation of one sense to be transformed into activities of multiple senses. It is an indispensable part of aesthetic activities, aiming to break the absolute boundaries of sensory information transmission, connect mutual information transmission and processing, form comprehensive and holistic feelings, enrich and strengthen aesthetic sensations, and enable the aesthetic subject to truly perceive the existence of beauty, thereby entering the aesthetic realm. An analysis of CNKI papers reveals that research on aesthetic synesthesia primarily focuses on secondary education and the field of arts. It mainly explores the formation basis, mechanisms, and applications of aesthetic synesthesia in different art fields and educational practices, revealing the complexity and multidimensionality of aesthetic synesthesia. However, there are still deficiencies in research on psychological mechanisms, specific manifestations of neural mechanisms, interdisciplinary research, applications in the field of digital art, and empirical research in educational practice. Future research should further integrate multidisciplinary achievements, deepen interdisciplinary research, explore and verify practical application value, and delve into neural mechanism research.*

Keywords: *aesthetic synesthesia, literature analysis, formation mechanism, practical application*

1. Introduction

The 20th National Congress of the Communist Party of China clearly proposed the strategic goal of building China into a strong country in education, talent, and culture, aiming to construct a Chinese path to modernization with coordinated development of material and spiritual civilization. Aesthetic education plays a special role in the construction of spiritual civilization, educating through the aesthetic process, involving aesthetic perception, aesthetic association, etc. Among them, aesthetic perception is the starting point of the psychological process of aesthetic education, which requires individuals to keenly capture aesthetic stimuli, connecting one feeling with several feelings to achieve synesthesia. Aesthetic synesthesia is an important component of aesthetic psychology and an indispensable part of aesthetic activities. It enables individuals to cross different sensory boundaries, transforming one sensory stimulus into multiple sensory resonances and experiences, deepening aesthetic feelings and enhancing aesthetic abilities.

Using articles indexed in CNKI as the statistical source, and conducting an advanced search with the keyword "aesthetic synesthesia", a total of 42 articles were retrieved for analysis as of May 24, 2024. The aim is to clarify the theoretical achievements of aesthetic synesthesia research in China, reflect on the deficiencies of existing research, anticipate future research trends, and provide references for further advancing the development of aesthetic synesthesia research.

2. Quantitative analysis of research literature on aesthetic synesthesia

Judging from the number and timing of article publications, from 1985 to 1996, related papers exhibited a stable trend. A slight increase occurred in 1998, possibly due to the promulgation of the "Decision of the CPC Central Committee and the State Council on Deepening Education Reform and Comprehensively Promoting Quality Education" in 1998, which incorporated aesthetic education into the scope of quality education, providing a policy precursor for its comprehensive implementation. Significant increases occurred in 2003, 2011, and 2021, possibly related to the aesthetic academic seminars held in those years, which provided a platform for the discussion of aesthetic-related issues and attracted the attention of scholars. Meanwhile, research related to "aesthetic synesthesia" is primarily concentrated in secondary education and the field of art disciplines.

3. Analysis of the main content of aesthetic synesthesia research literature

3.1 Research on the concept of aesthetic synesthesia

Synesthesia, also known as sensory substitution, is termed as synesthesia in general psychology. It is a phenomenon where one sense is interconnected with several senses, converting one type of stimulus into several types of stimuli during the aesthetic psychological process, thereby transforming a sensory stimulus into multiple sensory activities. In physiological psychology, each human sense has a specific appropriate stimulus, and various senses can only convert specific stimuli into corresponding neural impulses. These impulses are conducted along specific neural pathways to specific regions of the cerebral cortex, forming a specific sensation. In daily experience, synesthesia allows the senses of sight, hearing, touch, smell, and taste to communicate or interact with each other, and the domains of the eyes, ears, tongue, nose, and body can be seamless (Ye Lang 1999)[1]. It is an important psychological phenomenon in aesthetic perception, which becomes richer with the increase of the subject's appreciation behavior and aesthetic process, and can generate different feelings with the guidance of symbolic stimuli (Li Sha, 2020)[2]. The other senses triggered by synesthesia exhibit a unity of hallucinatory, non-realistic, and realistic qualities. In terms of form, they manifest as the displacement and communication of sensations, similar to synesthesia in psychology. They possess emotional characteristics, but in essence, they are comprehensive feelings generated through association and imagination. They represent the creative expression of human beings in aesthetics, incorporating rational elements, and embodying the unity of emotion and rationality[3]. There are two common types of synesthesia in aesthetic perception: one is synesthesia triggered by vision, where auditory, gustatory, and tactile sensations are transferred into the realm of vision, often occurring when appreciating plastic arts; the other is synesthesia triggered by hearing, where visual, tactile, and gustatory sensations are transferred into the realm of hearing, often occurring when listening to music.

Aesthetic synesthesia, as explained in the Aesthetics Dictionary (Zhu Liyuan, 2014), refers to "sensory displacement" and "sensory involvement". It is a psychological phenomenon in which a single sensation is transferred or compounded into other sensations, forming an overall perception, triggered by the direct stimulation of the current object in aesthetic appreciation. Zhao Lingli (2016) posits that aesthetic synesthesia arises from the establishment of a special connection between two senses (such as sight and hearing) or multiple senses in **life** and aesthetic practices[4]. Lisa (2020) posits that aesthetic synesthesia is a psychological process that occurs during aesthetic sensory activities, where "two or more sensations arise simultaneously when one sense is stimulated, or a psychological phenomenon where one sensation is transferred to another sense". Aesthetic synesthesia is one of the forms of aesthetic psychology, initially proposed by Mr. Qian Zhongshu in his article "Synesthesia". Under certain conditions, the senses of sight, hearing, smell, taste, and touch can all be transferred to each other. Among them, the most common is the synesthesia between sight and hearing, and there can also be interconnections between sight and hearing, as well as between touch, smell, and taste. Aesthetic synesthesia is influenced by experience and is continuously strengthened through long-term aesthetic activities (Li Sha, 2020). It can be divided into sensory synesthesia, representational synesthesia, and multiple synesthesia (Qin Guangwen, 2000)[5].

3.2 Research on the value of aesthetic synesthesia

Synesthesia is the most important psychological phenomenon in aesthetic activities, and it is one of the fundamental distinctions between aesthetic perception and general perception (Zhao Lingli, 2016). For aesthetic educators to truly develop their aesthetic perception ability and truly perceive the existence of beauty that is different from general perception, they must break the absolute boundaries of sensory information transmission from various sources and connect mutual information transmission and processing. The perception of the psychological process of aesthetic education must reach the level of synesthesia (Zhao Lingli, 2016).

The perception of the psychological process of aesthetic education must reach the level of synesthesia (Zhao Lingli, 2016). Although when facing a thing, only certain appropriate stimuli can be given to the senses, in the psychological process of aesthetic education, the educatee must mobilize all sensory organs to accept this stimulus, thus forming a richer and more vivid three-dimensional impression in the mind than the objective thing. Synesthesia can transcend the single feeling and perception of aesthetic objects, forming a comprehensive and holistic experience that enriches and strengthens aesthetic sensibility. It can enhance creativity in beauty, especially in improving artistic expression and appeal.

3.3 Research on the mechanism of aesthetic synesthesia

3.3.1 The formation basis of aesthetic synesthesia

The formation of aesthetic synesthesia lies in the similarity and resemblance of aesthetic objects and the interconnection of various senses of the aesthetic subject (Tan Guangwen, 2000). The objective foundation of aesthetic synesthesia lies in the similarity and commonality in nature and form between the currently perceived things and those previously perceived. The transfer of sensation is built upon the foundation of the commonality of things. Only when one sensation shares certain common characteristics with another sensation in aesthetics can synesthesia occur.

3.3.2 The psychological basis of aesthetic synesthesia

The psychological foundation of aesthetic synesthesia is that the accumulated experience and stored information from life and aesthetic practice, when stimulated by the aesthetic qualities of current objects, not only evoke excitement in the same sensory receptors and related areas, but also stimulate other sensory receptors and related areas of the brain. The generation of synesthesia is based on the psychological mechanism of synesthesia. Synesthesia refers to a psychological phenomenon in which one sense is accompanied by another sense. Synesthesia enables the sensory system to break through the general experience of perception when perceiving things, resulting in mutual transfer. The generation of simultaneous perception requires similarities between senses. Therefore, the creative imagination of the creative subject is utilized to promote the mutual transformation and integration between different senses (Xie Lingxiang, 2008)[6].

Therefore, in guiding students' aesthetic perception, aesthetic education must first consciously prompt the educatee to break down the barriers between various senses and establish special connections between various sensory skills, thereby acquiring the ability to transform appropriate sensory stimuli into information that can be processed by multiple senses. Touching one sense will inevitably activate the psychological activity ability of all sensory functions, namely aesthetic synesthesia ability.

3.3.3 Neural mechanism of aesthetic synesthesia

The neural mechanism of aesthetic synesthesia is a complex process involving multiple regions and neural pathways such as the cerebral cortex and superior colliculus. The neural mechanism of aesthetic synesthesia can be summarized as an excitation generalization process in the cerebral cortex, which occurs alongside neural activity in various parts of the brain (Ran Xianghua, 2009)[7]. When a certain sense is stimulated by a corresponding object, it will affect the neural pathways and different regions that are responsible for the perception of the other senses.

Meanwhile, the superior colliculus, located in the upper part of the midbrain, serves as a crucial region for the exchange of information such as vision, hearing, and somatic sensation, and plays a significant role in the generation of synesthesia. Research indicates that cells in the superior colliculus are capable of integrating information from different sensory channels and unifying them, enabling different sensory perceptions to influence each other (Ran Xianghua, 2009).

3.4 Research on the application of aesthetic synesthesia

3.4.1 Research on the application of aesthetic synesthesia in the field of art disciplines

Architecture and music. Architecture creates rhythm and mood through volume, layout, proportion, etc., while music shapes images through sound. Both share lyrical and expressive qualities, process and fluidity, as well as a sense of rhythm and rhythmic beauty in expressing emotions and artistic conception (Zhang Fan et al., 2005)[8].

Music and calligraphy, despite belonging to the auditory and visual arts respectively, share profound intrinsic connections (Liu Keping, 2003)[9]. Music evokes inner emotions through rhythm, melody, and other elements, while calligraphy expresses rhythm and rhythmic beauty through dots, strokes, shapes, and lines. The two complement each other under the influence of aesthetic synesthesia.

Dance and calligraphy. Dance is an intangible art form that unfolds over time, while calligraphy is a tangible art form that manifests in space. Both share similarities in their external expressive elements and internal experiential connotations (Zhang Han, 2013)[10]. Dance showcases the passage of time through human body movements, while calligraphy expresses relative eternity through lines unfolding in space. Both exhibit significant synesthesia phenomena in terms of movement and stippling, rhythm

and rhythm, style and script. Both emphasize the beauty of imagery, the beauty of movement, the beauty of aura, and the ability to convey emotions, reflecting the synesthesia of inner meaning experience.

3.4.2 Research on the application of aesthetic synesthesia in the field of education and teaching

Wang Xing et al. (2019) believe that in different types of junior high school art classes, using visual, auditory, tactile, and other interesting methods can arouse students' interest in thinking about problems, thereby achieving the goal of good teaching[11].

Applying the theory of aesthetic synesthesia in Chinese language teaching involves introducing elements from specialized courses into Chinese language education, achieving a seamless integration of various art forms and language. Through students' imagination and association, this enhances their aesthetic abilities and artistic perception (Pan Hua, 2011)[12].

Wang Zhanfeng (2023) believes that by extracting the synesthesia elements of things and integrating them into the teaching context, aesthetic awareness can be conveyed more efficiently and deeply in the information exchange between teachers and students. At the same time, it can construct an information conveyance mechanism in the process of dynamically optimizing aesthetic education, balancing the information gap between educators and students[13].

Li Liru (2012) explored the role of synesthesia in educational and teaching activities such as awakening sensory organs, cultivating overall perceptual abilities, and achieving the unity of knowledge, emotion, and behavior[14].

Aesthetic synesthesia, as a unique way of perception and expression, plays a significant role in literary theory, psychology, and various artistic fields. It not only reveals the diversity and complexity of human perception of the world but also provides important theoretical guidance and practical basis for artistic creation and educational practice.

4. Deficiencies and Development Paths in the Study of Aesthetic Synesthesia

4.1 Strengthen interdisciplinary research

Aesthetic synesthesia involves multiple disciplines such as psychology, physiology, rhetoric, and art studies. Future research should strengthen interdisciplinary cooperation and communication, integrate theories and methods from different disciplines, and delve into the generation mechanism, manifestation, and practical application of aesthetic synesthesia in artistic creation, aesthetic education, and other fields, so as to comprehensively and deeply understand the essence and characteristics of aesthetic synesthesia.

4.2 Explore and verify practical application value

Current research primarily focuses on the psychological mechanisms and expressive characteristics of aesthetic synesthesia, with less attention paid to its practical applications in artistic creation, aesthetic education, and cultural heritage. Future research should delve deeper into the potential value of aesthetic synesthesia in these areas, validating its practical effects through empirical research, providing new inspiration and methods for artistic creation, and offering scientific theoretical foundations and practical guidance for aesthetic education.

4.3 In-depth research on neural mechanisms

The neural mechanism of aesthetic synesthesia is a complex process involving multiple regions and neural pathways such as the cerebral cortex and superior colliculus. Currently, research on the neural mechanism of aesthetic synesthesia is still in its infancy. Future studies should further explore the neural basis of aesthetic synesthesia and reveal its physiological mechanisms of generation and operation. This will help us gain a deeper understanding of the essence and characteristics of aesthetic synesthesia, while also providing new ideas and methods for the interdisciplinary integration of neuroscience, psychology, and aesthetics.

5. Conclusion

Aesthetic education plays a special role in the construction of spiritual civilization. It conducts education through the aesthetic process, in which aesthetic perception is the starting point of the psychological process of aesthetic education. It requires the realization of aesthetic synesthesia, enabling people to truly perceive the existence of beauty that distinguishes itself from ordinary things, thereby entering the aesthetic realm. By analyzing papers from CNKI, it is found that research on aesthetic synesthesia primarily focuses on secondary education and the arts. Existing studies mainly explore the foundations and mechanisms of aesthetic synesthesia, as well as its applications in different artistic fields and educational practices. These studies reveal the complexity and multidimensional nature of aesthetic synesthesia. However, there are still deficiencies in interdisciplinary research, applications in the field of digital art, empirical research in educational practices, and specific manifestations of neural mechanisms. Future research should further enhance interdisciplinary research, explore and verify practical application value, delve into neural mechanism research, and more comprehensively understand and apply the essence and characteristics of aesthetic synesthesia. This will provide richer theoretical support and practical guidance for human aesthetic activities and artistic creation, while also offering new ideas and methods for the cross-integration and development of aesthetics, psychology, neuroscience, and other fields.

References

- [1] Ye Lang. *Modern Aesthetic System* [M]. Beijing: Peking University Press, 1999.170.
- [2] Li Sha. *On the similarities and differences between "synesthesia" and "synaesthesia"* [J]. *The Voice of the Yellow River*, 2020(14):112-113.10.
- [3] Zhu Liyuan. *Aesthetics Dictionary* [M]. Shanghai: Shanghai Dictionary Publishing House, 2014.86-87.
- [4] Zhao Lingli. *Promoting the Value of Life - New Perspectives on Contemporary Aesthetic Education* [M]. Beijing: Peking University Press, 2016.136.
- [5] Qin Guangwen. *On Aesthetic Synesthesia* [J]. *Journal of Changde Normal University (Social Sciences Edition)*, 2000, (04): 54-56.
- [6] Xie Lingxiang. *On the generation of simultaneous perception and its significance in artistic experience* [J]. *Journal of Henan Radio and Television University*, 2008(02):48-49.
- [7] Ran Xianghua. *Research Perspectives on the Psychological and Neural Mechanisms of Aesthetic Education* [J]. *Psychological Science*, 2009(2): 401-403.
- [8] Zhang Fan, Xu Xiuping. *A Brief Discussion on the Aesthetic Synesthesia between Architecture and Music* [J]. *Journal of Jinhua Vocational and Technical College*, 2005, (02): 89-91+114.
- [9] Liu Keping. *Flowing Lines, Solidified Notes: A Comparative Study of Aesthetic Synesthesia between Music and Calligraphy* [J]. *Journal of Huaibei Vocational and Technical College*, 2003, (02): 50-52.
- [10] Zhang Han. *Aesthetic Synesthesia between Chinese Dance and Calligraphy Art* [J]. *Studies in Culture and Art*, 2013, 6 (01): 63-66.
- [11] Wang Xing, Wang Yuan. *"Exploring the Application of 'Aesthetic Synesthesia' in Junior High School Art Courses"* [J]. *Research on Art Education*, 2019, (02): 138-139.
- [12] Pan Hua. *On the Application of Aesthetic Synesthesia in Chinese Language Teaching in Art Colleges* [J]. *Grand Stage*, 2011, (03): 210-211.
- [13] Wang Zhanfeng, Kang Yu. *Exploration of Aesthetic Education Curriculum Construction Based on Synesthesia Design* [J]. *Research on Art Education*, 2023, (10): 140-142.
- [14] Li Liru. *Exploring Synesthesia-Based Teaching in Humanistic Quality Education in Higher Vocational Colleges* [J]. *Journal of Anhui Vocational and Technical College of Electrical Engineering*, 2012, 17 (02): 120-123.