

Short Commentary

The Mental Healing Function of Artistic Engagement: From the Neuroaesthetic Perspective

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Abstract

Neuroaesthetics provides a new perspective for exploring the healing process of artistic engagement, including artistic creation and aesthetic appreciation. The engagement in the arts, through regulating the activity pattern of specific brain networks, in addition to achieving immediate emotional release and positive emotional reinforcement, can also promote deep self-integration and construction of meaning. Through neuroplasticity, it can induce long-term improvement in psychological resilience, and thus reveals its multidimensional and multilayered therapeutic essence at the neural level.

Keywords: Artistic engagement, Mental healing function, Neuroaesthetic

In the face of the mental health challenges in contemporary society, artistic engagement is increasingly valued for its potential healing function. However, the underlying neurobiological mechanisms and the transcendent therapeutic logic of this seemingly intuitive experiential phenomenon have yet to be systematically explored. Neuroaesthetics, an emerging interdisciplinary field, is dedicated to investigating the neural underpinnings of aesthetic perception and creation, as well as their emotional and cognitive effects. This field provides a new perspective for exploring the mental healing process of engagement in the arts. It explores the dynamic interaction of key brain networks during engagement in the arts and further systematically argues for its healing process that promotes mental health.

The Neural Mechanism of Artistic Creative Process

Artistic creation is a kind of specialized creation. The Genevieve Model suggests that the general creative process includes two stages whose are Generative process and Exploration process. In the generative process, individuals generate useful components related to creativity and combine them together to form pre-creative structures, and in the exploration process, individuals interpret pre-creative structures, select and verify the generated artistic ideas. The brain network dynamic model illuminates that the neural basis of the creative idea generation and exploration process involves the dynamics of the brain's default network and executive control network interaction. Here we review recent work on the neural substrates of artistic creativity. A lot of studies demonstrate that the generation of artistic creative ideas involves the separate function of the prefrontal cortex, while the exploration of artistic creative ideas is related to the cooperation of the executive network and the default network. In the generative process, the separate function of the prefrontal cortex is extensive inactivation of the dorsolateral prefrontal cortex (DLPFC),

which is responsible for executive control, and activation of the medial prefrontal cortex (MPFC), which is responsible for generating new artistic creative ideas. Activation of the default network contributes to the generation of artistic creative ideas, and the inactivation of the executive control brain region reduces its inhibitory effect on the generation of artistic creative ideas. In the exploration process, the executive network and the default network are cooperated to generate and maintain the internal creative thinking, evaluate and select the generated artistic creative ideas. However, the activation of caudate nucleus, the deactivation of the default mode network and the activation of the limbic network during the artistic creative process indicate that beyond the dual-process highlighted by the Genevieve model there is a higher level of artistic creative integration stage. At this stage, the artist has a peak creative and holistic experience and enters a flow state.

The Neural Process of Aesthetic Pleasure

The aesthetic objects arouse aesthetic pleasure that is specific and intense. The Pleasure-Interest Aesthetic model (PIA) suggests that aesthetic processing is a dual-process including the automatic process for sensory pleasure and the control process for aesthetic interest pleasure. Here we review recent work on the neural substrates of aesthetic pleasure. A large body of studies demonstrates that the orbitofrontal cortex is automatically activated by the objects of aesthetic appreciation. The orbitofrontal cortex which is responsible for automatic emotion regulation and reward processing of pleasure is generally activated in aesthetic activities and it is the neural basis of the automatic processing for sensory pleasure. Different modes of functional connectivity with the striatum support different aspects of aesthetic processing: the release of endogenous dopamine in the caudate nucleus is concentrated in the early aesthetic stage, and

then gradually decreases during the in-depth process of aesthetic experience, while the release of endogenous dopamine in the nucleus accumbens gradually increases during the in-depth phase. This is evidence for the PIA model. However, additional brain circuitry is engaged such that the default mode network (DMN) is activated and the lateral prefrontal cortex is deactivated when the aesthetic flow experience occurs, indicating that beyond the dual-process highlighted by the PIA model there is a higher level of aesthetic flow pleasure. The automatic processing for sensory pleasure and the control processing for aesthetic interest pleasure are different from the aesthetic flow pleasure. Aesthetic flow pleasure is not the satisfaction of the needs of the senses, but the high-level pleasure which is liberated from the spirit; it is the experience of the soul gaining strength and courage and it is related to a clear self-consciousness. Therefore, aesthetic flow pleasure is independent of the automatic processing for sensory pleasure and the control processing for aesthetic interest pleasure. The extended PIA model shows that aesthetic pleasure includes three levels of sensory pleasure, aesthetic interest pleasure, and aesthetic flow pleasure. They are generated respectively in three stages of aesthetic appreciation: automatic processing, controlled processing, and integration and sublimation.

The Mental Healing Function of Artistic Engagement

The therapeutic effects of artistic engagement are mainly reflected in the regulation of brain's "inhibitory gate" and reinforcement of positive experience. In the process of creation, deactivating the prefrontal executive control center (particularly the DLPFC) during the generative phase can effectively alleviate the excessive rational scrutiny and cognitive inhibition in daily thinking. This neural "release" state provides participants with a safe container to express their inarticulate inner emotion, unstructured thoughts, and even traumatic memories. When these contents are materialized in the form of lines, colors, sounds, movements, or words, they become an intense emotional catharsis. Concurrently, the activation of the medial prefrontal cortex (MPFC) during the creative process, as a core node of the default mode network (DMN), facilitates associations and emotional processing related to the self. On the aesthetic process, automatic processing of sensory pleasure during creation (activation of OFC) and controlled processing of interest pleasure during appreciation provide immediate positive emotional reinforcement and cognitive motivation. This positive reinforcement mechanism can activate brain's reward pathway and further effectively improve participants' emotion, suppress negative emotion, and sustainly stimulate their intrinsic motivation to participate in the arts.

Moreover, the deep healing power of participation in the arts comes from the fact that viewing and creating arts works significantly activates the DMN and the integrative functions it supports. In the exploratory stage of the creative process, the DMN is working together with the executive network to evaluate and clarify pre-structural ideas that are emerging from the unconscious. This is a process of conscious integration and making meaning of unconscious content. More importantly, when one is in the integrative stage of the creative process, the significant activation of the DMN and deactivation of certain parts of the executive network reflects that the artist is in a state

of flow, which is a strong blockage of external stressors and internal distractions that serve as a powerful psychological buffer to the task. This also reflects, from a neurological perspective, a highly integrated dynamic balance among three large-scale brain networks (the DMN, responsible for internal self-reference and integration, the salience network, responsible for capturing information that is relevant to the self, and the executive network working efficiently under certain goals). At the peak of the aesthetic flow pleasure, a similar pattern is also seen—with the DMN's dominant activation. Its core lies in the deep integration of inner experiences—the integration of emotions and meanings aroused by the aesthetic object into one's own life story, system of values, and conception of existence. So, participation in the arts (particularly in the state of flow) induces a DMN-dominant state that achieves profoundly psychologically healing and growing experiences that go beyond the pleasure, by reaching the core of the self in three ways: promoting the deep integration of inner experiences, providing a pressure buffer by inducing self-forgetfulness, and enhancing self-identity and a conception of life's meaning.

Conclusion

Neuroaesthetics provides a new perspective for exploring the mental healing process of engagement in the arts, including artistic creation and aesthetic appreciation. From the Neuroscience evidences, art participation is in essence a "neuroplastic intervention". Its long-term therapeutic value lies in that it can gradually reshape brain networks by repeatedly inducing certain patterns of neural activities, and help with building resilience to psychological trauma, improving stress coping abilities, and hence promoting mental health and development in the long run. Future studies are urgently needed to explore how these neural mechanisms translate into clinical efficacy for different clinical populations such as post-traumatic stress disorder, depression and anxiety disorder, and how different art forms differ in or are common to their specific neural activations and inducible plasticity.

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