

Research on Art Therapy Healing in New Media Interactive Design Based on Color Psychology

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Abstract: This paper explores the healing mechanisms and application scenarios of new media interactive design based on color psychology in the process of art therapy. New media technology, with its characteristics of dynamic response and immersive interaction, expands the technical means of color therapy. The research utilizes specific case studies to analyze the application scenarios and future trends of color psychology in art therapy through new media interactive design. The article provides design ideas and future development directions for constructing a scientific art therapy system.

Keywords: Color Psychology, Art Therapy, New Media Interactive Design

1. Introduction

In the context of rapid development in contemporary society, mental health issues have become increasingly prominent. Art therapy, as a non-pharmaceutical intervention, has gradually become one of the effective methods to alleviate emotional disorders such as anxiety and depression. Color, as a key element of visual language, plays a crucial role in the art therapy process due to its psychological value. The strategic use of hue, brightness, and saturation can directly trigger emotional and physiological responses. The rise of new media interactive design has provided a broader practical space for color therapy. Dynamic color systems, VR immersive virtual environments, and multi-sensory collaborative interactions break through the static limitations of traditional therapy forms, deepening the therapeutic effect through real-time feedback and personalized adaptation. Research in this interdisciplinary field needs to be based on the theoretical framework of color psychology and combined with the interactive characteristics of new media technology to explore the balance between emotional design and scientific intervention. Starting from the emotional mapping mechanism of color, this paper analyzes its healing pathways in new media interactive scenarios, providing methodological support for constructing a more efficient and inclusive digital therapy system.

2. The Healing Mechanism of Color Psychology and the Characteristics of New Media Carriers

2.1 The Healing Mechanism of Color Psychology

Color psychology, as a discipline that studies the relationship between colors and human psychological activities, primarily focuses on the subjective psychological responses elicited by color stimuli during human social activities. These responses include complex mechanisms such as cognitive processing, memory storage, thought operations, and emotional changes. Researchers have demonstrated that colors play a significant role in influencing subjects' emotions, psychological diagnosis, and art therapy. Their impact mechanism in the process of art therapy, in particular, is profound, manifesting mainly at the physiological and cultural-social levels.

At the physiological level, light stimuli of specific wavelengths can directly affect the autonomic nervous system and the endocrine system. Bright and warm tones, for instance, have been found in neuroscientific studies to induce measurable changes in hormone levels (such as cortisol and serotonin), heart rate, and brainwave activity when humans are exposed to different color environments. For example, orange-red can promote the secretion of dopamine, evoking feelings of pleasure and vitality. In contrast, cool tones like blue and green have been shown to reduce levels of the stress hormone cortisol, gradually stabilizing heart rate and respiratory frequency, thereby inducing a state of

relaxation. This provides biological evidence for color-based emotional regulation[1].

At the cultural and social levels, the symbolic meanings assigned to color symbols profoundly influence individual perception and emotional experiences. For instance, the traditional ultramarine blue derived from Dunhuang murals has long been associated with tranquility, serenity, and spiritual transcendence in the Chinese cultural context. This cultural consensus makes it one of the preferred colors in localized art therapy programs for post-traumatic stress disorder (PTSD).

2.2 Empowering Advantages of New Media Interactive Design

New media technologies have introduced dynamic responsiveness and interactive features to the application of color psychology in art therapy. By monitoring users' physiological indicators or emotional data in real time, the system can automatically adjust color parameters in the therapeutic environment, enabling personalized intervention. The advancement of virtual reality technology has further expanded the dimensions of interactive design, extending it from two-dimensional planes to three-dimensional immersive spaces. In such customized virtual environments, colors not only directly influence user perception with stronger visual impact but also continuously optimize the therapeutic process through instant interactive feedback mechanisms, such as dynamically altering color combinations based on user movements. This significantly enhances the precision and sustainability of art therapy.

Another core advantage of this new media interactive design lies in its capacity for multisensory integration. Modern interactive devices can seamlessly integrate visual colors, ambient soundscapes, and tactile feedback to construct a unified multimodal therapeutic scene. When visual stimuli of warm hues are synchronized with corresponding harmonic audio and gentle vibrations, the therapeutic effects generated across different sensory channels create a synergistic enhancement[2]. This cross-sensory consistent design not only deepens the intensity of users' emotional experience of colors but also establishes a multidimensional perceptual field, thereby providing richer technical pathways and media possibilities for art therapy.

3. Application Scenarios of Color Psychology in New Media Interactive Design for Art Therapy Healing

3.1 Mobile Interactive Art Therapy Scenarios

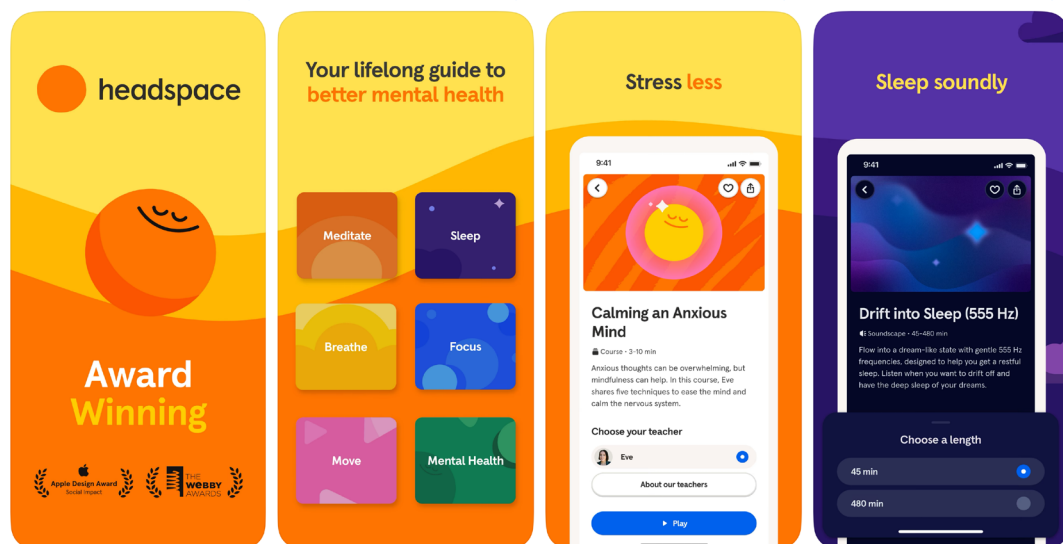


Fig.1 Headspace Application Interface (Image source: App Store)

The widespread adoption of mobile applications has made color therapy interventions more accessible and potentially integrated into daily life. For instance, the meditation app "Tide" extensively employs soothing gradient color backgrounds, transitioning from pale violet to sky blue, to create a tranquil visual atmosphere. Leveraging color psychology principles, it helps users quickly achieve a relaxed state. Interactive designs incorporating biofeedback technology can enhance the precision of

therapy. Cross-platform data synergy analysis suggests that integrating mobile color interventions with physiological data from wearable devices can establish a more comprehensive therapeutic effect evaluation system. For example, As shown in Figure 1, after integrating heart rate data from Apple Watch, the app "Headspace" can accurately identify users' emotional fluctuation thresholds under different color scenarios and optimize color schemes accordingly. For users with elevated cortisol levels, the system prioritizes "Ocean Meditation" series dominated by blue-green tones, thereby improving the efficiency of emotional improvement. This data-driven personalized service design signifies a shift in mobile color therapy from experience-oriented to scientifically validated approaches.

In the design of mobile art therapy applications, the construction of gamified incentive mechanisms must be systematically integrated with color-based intervention objectives. By transforming the physiological improvements achieved through users' sustained engagement in therapeutic activities into visual progress indicators, long-term adherence can be effectively reinforced. Specifically, the system can translate abstract data such as stress levels and heart rate variability into tangible representations using color and symbolic visual elements—for instance, employing variations in color saturation or brightness to signify degrees of stress alleviation. This type of evidence-based visual feedback applies principles of positive reinforcement, thereby transforming the therapeutic process into a structured experience with clear goal orientation.

On the other hand, introducing limited user color customization within a predefined therapeutic framework represents another critical design strategy. This approach allows users to select from a range of scientifically validated color themes, such as deep sea blue or forest green themes grounded in color psychology. While avoiding decision fatigue caused by excessive choices, this strategy grants users necessary autonomy and situational control. Such controlled personalization not only respects users' subjective color preferences and cultural backgrounds but also encourages a shift from passive recipients of interventions to active participants in the therapeutic process. Thereby, it enhances the psychological sense of involvement and deepens the ultimate effectiveness of color-based interventions.

3.2 VR Immersive Interactive Art Therapy Scenarios

Virtual Reality (VR) technology has now become widely recognized. Through VR, users can enter virtual worlds via multi-sensory stimuli such as vision, hearing, and touch. This technology enables the creation of highly controllable and immersive virtual environments for color therapy. Color psychology facilitates the translation from physiological signals to psychological states. By analyzing biological indicators such as pupil changes and skin conductance recorded by VR systems through color psychology models, color intervention schemes precisely tailored to the current psychological state can be derived. This data-driven therapeutic model overcomes the limitations of subjective judgment inherent in traditional art therapy. Furthermore, by creating dynamic color environments, it establishes safe and controllable psychological spaces, allowing patients to gradually achieve emotional regulation and cognitive reconstruction through immersive experiences. The mechanism involves color, as a primal non-verbal symbol, bypassing rational thought to directly trigger emotional responses in the limbic system. The incorporation of VR technology transforms this instinctive reaction into a recordable, analyzable, and optimizable therapeutic process, forming a closed-loop system of "biofeedback-color intervention-effect verification."

In the construction of virtual reality art therapy environments, the dynamic adjustment of environmental parameters constitutes a key design strategy[3]. The system continuously acquires real-time physiological data streams from users and adjusts the color saturation, brightness, and hue composition within the virtual space accordingly, achieving a synchronized response with the user's psychological state. When elevated anxiety levels are detected, the environmental colors can automatically transition to desaturated cool-toned schemes. Combined with soothing auditory stimuli, this guides the autonomic nervous system toward a balanced state. Such dynamic color environments transcend the limitations of traditional static interventions, establishing therapeutic scenarios with adaptive characteristics

Furthermore, the precise integration of multi-sensory channels represents another critical design dimension. Virtual reality systems construct a multi-modal perceptual field by integrating visual color matrices, spatial audio positioning, and tactile feedback devices. For instance, in blue-toned relaxation scenarios, synchronizing low-frequency ambient sound waves with gentle tactile vibrations can promote synergistic processing of different sensory inputs in the cerebral cortex. This consistent multi-channel design not only enhances the psychological effects of color but also improves the holistic nature of the therapeutic intervention by establishing a unified perceptual framework.

3.3 Spatial Interactive Art Therapy Scenarios

New media therapy spaces can utilize multimedia installations and intelligent environmental control systems to achieve dynamic adjustment and personalized adaptation of colors. For instance, in a psychotherapy room equipped with a color-temperature adjustable LED lighting system and emotion-recognition cameras that capture clients' micro-expressions and body language, the system can automatically shift the ambient color scheme from high-saturation orange-red to low-brightness gray-blue upon detecting signs of anxiety. Concurrently, hidden ceiling speakers emit alpha wave music synchronized with the color temperature, creating a visual-auditory cross-modal therapeutic field. This spatial design transcends the limitations of traditional static counseling environments by leveraging the dual mechanisms of visual and auditory stimulation to achieve the objectives of art therapy.

In the design of intelligent therapy spaces, the system establishes a dynamic environmental regulation mechanism by integrating multimodal perception data with color psychology models. When the system identifies a user's anxious state, the environmental control unit simultaneously activates visual and auditory intervention protocols: adjusting the lighting system's color temperature and illuminance to pre-set relaxation spectra while the spatial audio system emits specific frequency sound waves, forming a cross-sensory synergistic intervention. This data-driven environmental regulation mechanism enables precise management of the therapeutic process. By continuously recording changes in users' physiological indicators following color interventions, the system constructs personalized efficacy evaluation systems and continuously optimizes intervention parameters through machine learning algorithms, achieving enhanced alignment between color schemes and individual physiological response characteristics.

At the spatial interaction design level, the application of color psychology must adhere to specific visual perception principles. According to color arousal theory, short-wavelength colors can effectively suppress sympathetic nervous system activity; therefore, key functional areas in interactive interfaces should employ blue-green color schemes to reduce cognitive load during user operations. Simultaneously, following the emotional dimension model of color, areas requiring deep user relaxation should utilize low-saturation, low-brightness cool color combinations. By regulating environmental lighting's color temperature and illuminance, the user's autonomic nervous system can gradually achieve balance. Color-guided spatial design similarly builds on color psychology's visual guidance principles. Establishing clear color sequences and spatial flow lines guides natural transitions between different functional areas. For example, gradually shifting from neutral tones at the entrance to cool tones in the core therapy area reinforces functional zoning through this chromatic narrative while facilitating smooth psychological state transitions through color's emotional guidance.

In multimedia installation design, the integration of color and interactive feedback must comply with multisensory integration principles. When users interact with touch interfaces, the system should provide corresponding color feedback based on operation type: confirming operations with gentle green cues and warning operations with moderate orange alerts. This feedback mechanism aligned with color conventions effectively communicates information while avoiding stress responses caused by excessive visual stimulation. Furthermore, dynamic color variations in spaces should follow visual comfort guidelines. Color transitions should employ gradual change patterns to avoid disruptive sudden shifts that might strain the user's visual system. By precisely controlling the transition rates of color parameters, users can maintain comfortable psychophysiological states during immersive experiences, ultimately realizing the intended outcomes of art therapy.

4. Future Trends of Using Color Psychology in New Media Interactive Design for Art Therapy Healing

4.1 Technological Integration and Data-Driven Approaches

The future development of applying color psychology in new media interactive design for art therapy healing hinges on technological integration and data-driven approaches. Utilizing more precise biosignal sensing methods, such as high-precision heart rate sensors and electroencephalography (EEG), combined with computer analysis, can capture users' subtle emotional changes in real-time. These data can be visually represented through reasonable and real-time dynamic visualization, providing a solid data foundation for dynamic color feedback and thereby establishing scientific and rational therapeutic plans. Secondly, artificial intelligence (AI) and generative art will play increasingly significant roles. AI can not only suggest optimal color schemes but also generate endlessly varied, personalized

dynamic color artworks in real-time, adapting to users' evolving emotions and providing continuous new solutions and therapeutic possibilities[4]. Additionally, more research and development are needed for cross-modal perception synchronization technology to ensure precise synchronization of different sensory stimuli such as color, sound, and vibration, maximizing the therapeutic potential of multi-sensory integration.

4.2 Deepened Application in Vertical Fields

The application of color interactive therapy will continue to deepen into more vertical fields. In the corporate sector, intelligent color plugins integrated into workflow software could be developed to dynamically analyze employee fatigue levels and adjust screen color temperature and tone accordingly, such as introducing soothing green tones to reduce digital eye strain and enhance concentration. In clinical psychology, integrating with cognitive behavioral therapy could involve designing highly customized color scripts for exposure therapy tailored to patients with specific phobias or post-traumatic stress disorder[5]. In education, for children with special educational needs, such as those on the autism spectrum, interactive learning environments with clear color coding and predictability could be designed to reduce anxiety and promote learning. Each vertical application requires deep collaboration with domain experts and rigorous clinical validation of effectiveness.

4.3 Personalization of the Therapeutic Process

A key challenge facing art therapy healing in new media interactive design from the perspective of color psychology is the need to account for cultural differences associated with color for each user. For example, red in China symbolizes the national flag and is predominant in traditional Chinese wedding attire, representing auspiciousness and happiness. However, in some Western countries, red is often associated with bloodshed. Similarly, white is used in mourning contexts in Eastern cultures but symbolizes purity and weddings in the West. The symbolic meanings of other colors also vary across different countries and regions. Therefore, cultural attributes should be considered when employing color as a medium for art therapy. Future research, combined with big data, could build culturally intelligent color systems that customize personalized therapy plans based on users' geographical location, language, or religious information. Furthermore, the application of color psychology is also influenced by factors such as religion and personal experiences. For such populations, it is necessary to collect more user information and conduct assessment tests during the therapeutic process to tailor personalized therapy plans[6].

5. Conclusion

Integrating color psychology into new media interactive design expands the technical means available in the field of art therapy healing. This integration transforms color from a static visual element into a dynamic visual interaction. Moreover, such interactive design, combined with biological methods, becomes a quantifiable, real-time adaptable scientific intervention for art therapy healing. However, the further development of this interdisciplinary field still faces numerous challenges. Future research should strengthen quantitative scientific studies on the relationship between human emotions and color, incorporating knowledge from disciplines such as neuroscience and design psychology to promote the continued advancement of art therapy healing towards greater scientific rigor, controllability, and humanization.

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