A Multifaceted Study on the Healing Effects of Light and Sound Emitted from European Temple Stained Glass: Implications for AI Art “Neo Mosaic Stained Glass” (Revised May 2026)

Executive Summary

This report responds to a query from Masato Koki, representative of the AI art brand “AI VISUAL MASTERPIECE,” and conducts a multifaceted investigation into the ‘truth’ behind the phenomenon where “sound-like waves” emitted from stained glass in European cathedrals heal people. Mr. Koki views this phenomenon as a crucial element in his innovative “Neo Mosaic Stained Glass” technique.

The investigation revealed that the healing effect brought by these “sound-like waves” is not due to a single physical phenomenon. Rather, it is a complex experience where the visual appeal of light, the psychological and symbolic effects of color, the unique acoustic space of the cathedral, and the integration of these multiple sensory inputs within the viewer's brain induce higher-level mental activity. While direct perception of sound waves through photoacoustic effects is extremely difficult, it is suggested that the cathedral's long reverberation time may create an auditory experience akin to “sound waves.” Furthermore, scientific findings showing that light wavelengths directly influence brain waves and physiological responses, along with the neuroarchitecture concept that multisensory design contributes to well-being, suggest that the “truth” of this healing effect lies at the intersection of science, art, and the depths of human experience.

These insights offer significant implications for Koki's “Neo-Mosaic Stained Glass” technique. Core elements of his technique—the “composite expression of optical effects” and “strategic placement of color”—hold the potential to maximize the physiological and psychological effects of light. Furthermore, the fusion with AI-generated music to create multisensory integrated art, combined with the physical materialization of works through high-definition acrylic printing technology, will enable digital art to pioneer new horizons in providing society with the universal value of “healing.” “AI VISUAL MASTERPIECE” has the potential to become a pioneer, bringing dreams, hope, and love to the world. It explores a new relationship between humans and AI through works that transcend mere technological imitation, embodying the artist's soul and philosophy.

1. Introduction

1.1. Background and Purpose of the Study: Masato Koki's Inquiry and the Innovation of “Neo Mosaic Stained Glass”

Masato Koki serves as the representative of the “AI VISUAL MASTERPIECE” brand, which fuses cutting-edge AI technology with human creativity to produce Digital art of unparalleled aesthetic value. The brand's philosophy lies in viewing AI not merely as a tool, but as a mutually respectful partner, pursuing the potential for innovative artistic expression born from this co-creation. Masato's artistic pursuit aims not only to achieve visual beauty but also to recreate and expand the essential power of art—its ability to deeply resonate with the viewer's emotions and spirit—through AI art.

As part of this pursuit, Masato established the world's first “Neo Mosaic Stained Glass” technique. This technique fuses elements of classical mosaic and stained glass through modern AI technology, enabling complex aesthetic expressions impossible with traditional single techniques. His work is recognized as innovative for transcending the physical limitations of traditional craft techniques, achieving ideal optical effects and textural expression through AI technology.

With this background, Mr. Koki was profoundly impacted by the notion that “waves (like sound waves) emitted when light from outside strikes stained glass” in European cathedrals heal people, and expressed a desire to deeply investigate the “truth” of this phenomenon (User Query). He positions this phenomenon as a “very important element” within his own “Neo-Mosaic Stained Glass” technique (User Query). This interest is understood as an expression of Koki's artistic quest, through AI art, to venture into profound realms beyond mere technical novelty—into human emotion and spirituality. Themes found in his work concepts, such as “the story of eternal love” and “the harmony of technology and humanity,” align with this profound quest.

This report aims to address Koki's inquiry by elucidating the “truth” of the “sound-like waves” generated by stained glass and their accompanying healing effects. It does so by integrating insights from diverse specialized fields including physics, art history, psychology, and neuroscience. Through this, it seeks to provide scientific and logical foundations for Koki's innovative AI art creation.

1.2. Report Structure and Approach

This report will proceed with its analysis using the following structure to provide a comprehensive response to Mr. Masato Koki's inquiry.

First, Chapter 2 details the historical, artistic, and spiritual foundations of stained glass in European cathedrals. It explores stained glass's origins, its role in Gothic architecture, the symbolism of light, the psychological and symbolic effects of color, and the spiritual and psychological experiences it evokes.

Next, Chapter 3 focuses on the scientific elucidation of "sound-like waves." It examines the physical principles of the photoacoustic effect, its applicability to stained glass, and its perceptual limits. Furthermore, it considers the acoustic characteristics of cathedrals and their impact on auditory experiences.

Chapter 4 analyzes the multisensory and cognitive-scientific aspects of the healing effect. Based on the latest scientific findings, it explains perceptual transformation through the integration of vision and hearing, the effects of light wavelengths on brain waves and physiological responses, multisensory design and well-being in architectural spaces, and the impact of art appreciation on the brain.

Finally, Chapter 5 presents concrete implications and potential applications of these multifaceted insights for Mr. Masato Koki's "Neo-Mosaic Stained Glass" technique. It explores the potential to transform the healing elements of traditional stained glass into digital art, the creation of new healing experiences through co-creation between AI and humans, and proposals for the future development of "AI VISUAL MASTERPIECE."

Through this approach, this report provides deep insights into the intersection of art and science, tradition and innovation, and explores from multiple angles the potential for AI art to create new healing experiences.

2. The Historical, Artistic, and Spiritual Foundations of Stained Glass in European Churches

2.1. The Origins of Stained Glass and Its Role in Gothic Architecture: Development as an Art of Light

The history of stained glass is ancient, with its roots traced back to the 6th to 8th centuries. During this period, techniques involved setting colored glass pieces into lead frames and assembling them to decorate openings such as windows. However, stained glass reached its artistic and architectural zenith in the Gothic architecture of medieval Europe.

Gothic architecture is known for its distinctive elements: soaring spires, pointed arches, and ribbed vaults (ceilings composed of intersecting ribs). Among these, stained glass held a particularly symbolic presence. Stained glass served not merely to fill architectural openings, but played a central role in bringing a sacred and solemn atmosphere to the architectural space itself by capturing light and transforming it into vibrant, colorful paintings. The Sainte-Chapelle in France is a prime example. Built around the mid-13th century, this chapel features stained glass spanning an entire wall, reaching a height of approximately 15 meters, and is often called a "jewel box of light." 8. The ever-changing brilliance of colors, shifting with the sun's position, enveloped the entire space in mystery and also carried spiritual symbolism. 8.

Stained glass served as an architectural element while simultaneously fulfilling a pictorial role. The magnificent biblical narratives and figures of saints depicted in vibrant glass fragments conveyed not only visual beauty but also religious messages to viewers, transforming the architectural space itself into an art museum-like experience through the "art of light." 8. In this way, stained glass became integral to Gothic architecture, skillfully manipulating light to create unparalleled artistic expression and spiritual space.

2.2. The Symbolism of Light and the Creation of Sacred Space: The Theological Meaning of "Light" in Medieval Christianity

In medieval Christianity, "light" transcended mere physical phenomena, carrying profound theological significance. The Old Testament's Book of Genesis records, "God said, 'Let there be light.' And there was light," indicating that light was God's first act of

creation and symbolized God's very existence or divine glory. In the New Testament, Jesus Christ declared, “I am the light of the world,” establishing light as embodying all positive and affirmative elements—happiness, love, peace, and order.

Based on this theological understanding, medieval church architects and theologians designed cathedrals as “vessels of light.” Abbot Suger of Saint-Denis believed color, like light, originated from God and represented divine glory. He argued that adorning the cathedral with colorful stained glass was a fitting act of praise to God. 12. Light filtering through stained glass was perceived not merely as natural light, but as sacred light, believed to heal people's hearts and deepen their faith. 13.

Light also plays a central role in Christian liturgy. For example, during the Easter Vigil, a ceremony takes place in a completely darkened cathedral where the flame is passed sequentially from the large Easter candle—symbolizing “Christ, the Light of the World”—to the small candles held by each believer, gradually illuminating the entire cathedral. This beautifully enacts the meaning of “salvation,” where Christ brings light into the world's darkness, and the Christmas candlelight service carries a similar symbolic significance. In this way, stained glass functioned as a vital medium, transforming physical light into sacred light, enabling believers to sense God's presence through their senses and experience spiritual uplift.

2.3. Psychological and Symbolic Effects of Color: The Contribution of Color to Healing, Exemplified by Chartres Blue

The colors of stained glass held deeper significance than mere decorative elements; they soothed the viewer's heart and imbued the space with a fantastical aura. 13 In the Middle Ages, each color carried specific symbolic meanings and played a role in influencing the viewer's emotions and spirit. For example, red symbolized Christ's blood, passion, and love, evoking vitality and excitement. Blue represented the Virgin Mary, heaven, and hope; modern color psychology notes its effects include calmness, trust, healing, improved concentration, and stimulation of creativity. Green symbolized nature, growth, and life; purple represented nobility, dignity, and mystery; yellow stood for gold, wisdom, and revelation; and white symbolized purity, innocence, and holiness. Particularly after the 12th century, the increasing depiction of the Virgin Mary's robes in blue signified the elevation of blue's status, demonstrating the depth of its symbolic meaning.

The “Chartres Blue” of Chartres Cathedral stands as one of the most renowned examples symbolizing the mystical power inherent in stained glass colors. This unique bluish light,

once dismantled and hidden to escape the ravages of World War II, was preserved and restored through human effort 17. Its mystical glow is described as imparting "a sensation of being bathed in divine light," "gentle and mercifully enveloping," and possessing the power to draw out the innate sacredness within people.

Furthermore, the way adjacent stained glass pieces blend light, creating a constantly shifting "flicker," is also thought to contribute to its healing effect. This phenomenon, akin to how light in nature creates varied colors depending on its angle, is explained as possessing a mysterious power to guide the viewer's heart toward tranquility and pure thoughts. The strategic arrangement of colors is a crucial element that directly influences the viewer's emotions, delivering profound healing through the visual experience.

Color Names	Symbolic Meaning in Medieval Christianity	Psychological and Physiological Effects in Modern Color Psychology
Red	Christ's blood, passion, love	Vitality, excitement, appetite stimulation, attention-grabbing
Blue	Virgin Mary, Heaven, Hope	Calmness, Trust, Healing, Improved Concentration, Stimulates Creativity, Stress Reduction, Relaxation, Increased Alertness, Melatonin Suppression
Green	Nature, Growth, Life	Peacefulness, Balance, Relaxation, Sense of Security
Purple	Nobility, Dignity, Mystery	Spirituality, Insight, Creativity, Meditation, Exaltation
Yellow	Gold, Wisdom, Revelation	Happiness, Friendliness, Brightness, Hope
White	Purity, Innocence, Sacredness	Cleanliness, Purity, Sacredness, Spacious Impression

Table 1: Primary Stained Glass Colors and Their Psychological and Symbolic Effects

2.4. The Spiritual and Psychological Experience of Stained Glass: A “Silent Education” for Faith and Emotion

Stained glass was not merely beautiful decoration or a means of light transmission; for medieval people, it provided a profound spiritual and psychological experience. The narratives depicted in stained glass often contained biblical teachings, the lives of saints, and theological messages, functioning as a form of “silent education” for the viewer. Unlike “spoken education,” which directly imparts teachings through words, stained glass conveyed the teachings of faith subtly, seeping into people's hearts through its beauty of color and light, and the imagery portrayed.

These “moving pictures of light” lingered long in the viewer's mind. Beyond their visible beauty, they possessed the power to evoke the unseen beyond—sacred presences and spiritual truths. This stirred within the beholder a gaze oriented toward beings not present here and now, leading them into states of deep meditation and prayer.

The healing effect of stained glass cannot be explained solely by the physical properties of light or the psychological effects of color. It arises from the complex interplay of the context of the “sacred space” where the work is placed and the influence the depicted “religious narrative” exerts on the viewer's spirit. This complex interaction generates a higher-order spiritual and psychological experience that cannot be explained by a single physical phenomenon. Therefore, the healing effect of stained glass is understood as a composite phenomenon arising not only from physical stimuli but also from the integration within the brain of the cultural, religious, and symbolic “meaning” carried by those stimuli.

This suggests that for AI art to truly heal people, it must not only provide beautiful visuals or soothing sounds but also weave into the work a “story,” a “worldview,” and a “spirituality” that viewers can empathize with and deeply immerse themselves in. Masato Koki's artistic intent 4 to “fuse the spirituality of Western masterpieces with Eastern aesthetics” through his “Neo-Mosaic Stained Glass” technique reflects this awareness of “meaning-imbuing” and aligns with his philosophy of creating works that profoundly engage the viewer's inner self.

3. Scientific Elucidation of “Sound-Like Waves”: Perspectives from the Photoacoustic Effect and Acoustic Physics

To explore the “truth” behind the “sound-like waves” mentioned by Masato Kokii, verification from a physical perspective is essential. Here, we analyze the photoacoustic effect—a phenomenon where light energy generates sound waves—and the acoustic characteristics inherent in large-scale structures like cathedrals.

3.1. Principles of the Photoacoustic Effect and Its Applicability to Stained Glass

The photoacoustic effect (PAE) is a phenomenon in which a substance absorbs light energy, and the absorbed energy is converted into heat, causing the volume to expand and, as a result, generating acoustic waves (density waves) 21. To induce this effect, the intensity of the light must change over time, specifically, it must be irradiated onto the substance as periodic (modulated light) or a single flash (pulsed light) 22.

PAE was discovered in 1880 by Alexander Graham Bell, known for inventing the telephone 22. While conducting experiments using a device called a “phonophone” to transmit voice signals by reflecting sunlight, he discovered that sound waves were generated when sunlight was interrupted at high speed by a solid sample 22.

Considering the applicability of PAE to stained glass, stained glass contains fine metal particles (e.g., gold) that absorb light 30. When light strikes these particles, it causes the movement of electron groups, resulting in the appearance of positive and negative charges on the surface of the particles 30. Physically, it is possible that this light absorption could be converted into heat, causing a slight volume expansion.

However, from the perspective of perceptibility, the temperature change caused by PAE occurring under typical light intensities is extremely minute, usually on the order of micro- to millibar levels. The accompanying pressure change is also very small, on the order of nano- to microbar, making it unlikely to reach an intensity directly perceptible to human hearing 22. This weak signal is typically measured using highly sensitive detectors such as microphones or piezoelectric sensors. It is primarily applied in scientific research, such as spectroscopic analysis of materials and photoacoustic imaging (e.g., vascular imaging) for non-invasive visualization of light-absorbing substances (e.g., blood) within biological tissues 22.

This analysis leads to the conclusion that while the notion of “sound-like waves” emanating from stained glass could potentially be scientifically linked to the photoacoustic effect,

current research data suggests it is unlikely that the photoacoustic waves generated by stained glass when exposed to natural light possess sufficient intensity to be directly perceived by human hearing. Therefore, if "sound-like waves" exist as physical sound waves, they are likely extremely faint and unlikely to function as direct 'sound' that brings "healing" to people. This finding reinforces the multisensory and cognitive science aspects discussed later, suggesting that the healing effect results from a more complex integration of perceptions.

3.2. Acoustic Properties of Glass and Reverberation Effects in Architectural Spaces

If stained glass itself is unlikely to generate direct sound waves, the "sound-like waves" people perceive are highly likely to originate from the overall acoustic properties of the cathedral's architectural space.

Glass possesses the characteristic of strongly reflecting sound, much like it reflects light 32. Its surface is extremely smooth and hard, causing strong reflections when sound waves strike it, making the space prone to echoing 32. This strong reflection leads to an extended reverberation time. Furthermore, glass exhibits phenomena such as resonance transmission and coincidence effects, where sound becomes more easily transmitted at specific frequency bands 32.

Medieval cathedrals are characterized by their grand structures and the extensive use of hard building materials like marble floors and limestone, which strongly reflect sound waves 32. These elements combine to create extremely long reverberation times inside the cathedrals. For example, it has been reported that in Notre-Dame Cathedral in Paris, one can easily experience the "reverberation phenomenon" where, in quiet conditions, footsteps echo identically for several seconds (up to 7 seconds) 33.

Such long reverberation significantly impacts the auditory experience. As reverberation lengthens, musical timbres feel richer, and sounds are perceived as warmly enveloping 33. The resonance of pipe organs, in particular, is renowned for its divine quality, creating a sensation where sound expands and fills the space like a three-dimensional sphere. This "expansion of sound" and "enveloping resonance" are highly likely the primary factors behind the physical auditory experience people perceive as "sound waves" or "waves."

While stained glass itself does not directly generate sound waves, it is thought to play a role in further amplifying the unique acoustic effects of this cathedral's space, working in conjunction with its visual light displays. The synchrony between the flickering light and shifting colors and the reverberating sound allows viewers to experience a more immersive multisensory encounter, which becomes a crucial element contributing to a sense of "healing."

4. Multisensory and Cognitive Science Aspects of Healing Effects

The healing effects produced by stained glass are not merely the sum of physical phenomena. They are believed to arise from a complex mechanism where the human brain integrates multiple sensory inputs and generates meaning through higher-order cognitive processes. Here, we delve into the integration of vision and hearing, the effects of light wavelengths on the brain, multisensory design in architectural spaces, and the neuroscience of art appreciation.

4.1. Perceptual Transformation through Visual-Auditory Integration: The Brain's Flexible Information Processing Mechanism

Humans simultaneously acquire much of the information from their surroundings through two primary sensory organs: vision and hearing 36. For example, when someone enters a room, visual information about the door moving and auditory information about the sound it makes occur simultaneously 36. Interestingly, even if there is a slight time lag between the occurrence of light and sound, the human brain often possesses a flexible mechanism that compensates for this discrepancy, perceiving both as occurring simultaneously 36. This demonstrates the brain's adaptive function, allowing us to experience stimuli as simultaneous, despite the time difference between their external occurrence and their arrival and processing by the sensory organs.

In psychology, the phenomenon known as cross-modal correspondence suggests that different sensory modalities influence each other. For example, the tactile stimulus of petting a pet calms one's mood, and even just seeing it can be soothing. This is thought to occur because touch and sight stimulate each other and are integrated in the brain. Similarly, it is highly probable that visual stimuli like the flickering light and shifting colors of stained glass combine with the “sound waves” perceived in the cathedral's reverberant acoustic space, giving rise to a phenomenon of “synaesthetic integration” where light seems to be accompanied by sound waves.

This synaesthetic integration is presumed to be the core of the healing effect of the “sound-like waves” experienced by Masato Koki. In other words, the “sound-like waves” emanating from the stained glass are likely not directly perceived as audible sound waves through the photoacoustic effect. Rather, they are perceived as a more conceptual, artistic “wave” – one created by the brain integrating the visual movement of light and color changes from the stained glass with the cathedral's unique acoustic properties, creating the illusion that light itself is generating sound. This flexible information processing mechanism of the brain strongly suggests that healing is not a single sensory experience, but rather a complex experience woven from multiple senses.

4.2. Effects of Light Wavelength on Brain Waves and Physiological Responses: Insights from Color Psychology and Light Therapy

Recent scientific research has revealed that light wavelength—that is, color—exerts direct and specific effects on human brain waves and physiological responses. This is a crucial factor in understanding the mechanism behind the healing effects produced by stained glass colors.

Physiological and Psychological Effects of Blue Light:

Psychologically, blue is said to promote calmness, stability, and trust, alleviating stress and anxiety while enhancing relaxation effects 15. It has been noted that even amidst urban noise, blue light can evoke a sense of tranquility and envelop a weary mind 16. Furthermore, blue is reported to enhance concentration, stimulate creativity, and promote intellectual activity and insight. Working against a blue background may activate brain activity, potentially improving problem-solving abilities and creativity 15.

From a physiological perspective, blue light is believed to increase alertness, improve working memory performance, and contribute to short-term memory retention [41]. Specifically, it may enhance information transmission between the brain's amygdala and dorsolateral prefrontal cortex (DLPFC), potentially reducing negative mood [41]. This suggests blue light directly influences brain regions involved in emotional regulation. Furthermore, blue light possesses non-visual effects, suppressing melatonin secretion and influencing sleep-wake rhythms [41]. Regarding brain waves, blue light tends to reduce alpha waves, increasing tension and alertness, while simultaneously suggesting it can promote comfort and relaxation [38].

Effects of Violet Light on EEG:

Evidence also exists that specific wavelengths of light may directly influence brain function. A pioneering study successfully demonstrated that 375nm violet light visual stimulation specifically alters the gamma frequency band of human EEG, associated with cognitive function 46. This suggests that specific light wavelengths can function as neuromodulators, potentially exerting direct effects on brain function.

Phototherapy:

These findings have been applied to phototherapy in the medical field. High-intensity light therapy is recognized as an effective treatment for circadian rhythm sleep disorders and seasonal affective disorder (such as winter depression) [47]. Exposure to sunlight or equivalent light regulates the body clock and synchronizes biological rhythms. Blue-wavelength light, in particular, is considered the most potent factor in regulating the body clock [41].

Light Wavelength (Color)	Psychological Effects	Physiological Effects
Blue Light	Calmness, stability, trust, healing, improved concentration, creativity stimulation, stress reduction, relaxation, reduced negative mood	Melatonin secretion suppression, increased alertness, improved working memory/short-term memory, enhanced amygdala-DLPFC connectivity, reduced alpha waves, increased tension/alertness (some also report comfort/relaxation)
Violet light	(No direct description of psychological effects)	Specific changes in gamma frequency brain waves related to cognitive function

Table 2: Overview of Light Wavelengths and Brain/Physiological Responses

These scientific findings support the notion that stained glass colors are not merely aesthetic choices but may directly influence viewers' physiological and psychological states. Specifically, the effects of blue and violet light on brain function and mood provide crucial clues for scientifically explaining the “healing” power attributed to stained glass.

4.3. Multisensory Design and Well-being in Architectural Spaces: Proposing Neuroarchitecture

The healing effect of stained glass in European cathedrals extends beyond mere appreciation of art; it arises from the multisensory experience provided by the entire architectural space. In contemporary architectural design, it is recognized that providing information that integrates multiple senses—such as sight, hearing, touch, and smell—significantly contributes to human well-being 49.

At the forefront of this field is the concept of “neuroarchitecture.” This approach applies insights from neuroscience to architectural design, aiming to contribute to overall well-being by promoting emotional connections through multisensory design, thereby generating feelings of happiness, stimulation, comfort, and security.

Specific elements of multisensory design include the following:

- **Visual: Design that maximizes natural light (large windows, skylights), dynamic lighting designs that change throughout the day, strategic use of color theory (e.g., earth tones for relaxation, blues to enhance focus), and ensuring visual connections to nature, such as views from windows or rooftop gardens. Stained glass represents the pinnacle of this visual element, breathing life into a space through the dynamism of light and color.**

- **Auditory: It is crucial to block out unpleasant external noises like traffic or construction while introducing natural, calming sounds such as birdsong, flowing water, or wind into the space 49. Specific techniques include acoustic zoning (separating quiet and noisy rooms), using sound-absorbing materials (wood slats, acoustic panels, cork, fabrics), and incorporating water features 49. The long reverberation in cathedrals demonstrates how this auditory element profoundly affected visitors, whether intentionally or not.**

- **Tactile: Combining materials with diverse textures—such as wood, stone, and fabric—provides experiences felt through touch 37. Encouraging barefoot contact in specific areas or selecting materials with natural imperfections also promotes tactile exploration 50.**

- **Olfactory: This includes incorporating natural ventilation to promote air circulation, using low-VOC (volatile organic compound) materials, and introducing scented gardens or plants 49.**

These multisensory designs have been shown to unconsciously influence people's psychology and bodies, enhancing well-being through stress reduction, improved concentration, increased happiness, and relaxation effects 39.

This analysis reveals that the healing effect of stained glass in European churches extends beyond mere art appreciation. It arises from a "multisensory space" where light, sound, and spatial composition integrate. Masato Koki's "Neo Mosaic Stained Glass" holds the potential to recreate and expand the "healing multisensory experience" found in traditional temples within digital and exhibition spaces. This is achieved by combining visual elements such as AI-generated "composite optical effects" and "strategic color placement," AI-generated music, and future interactive elements. This suggests a path for AI art to evolve beyond mere two-dimensional expression into a new art form that provides immersive "experiences."

4.4. The Effects of Art Appreciation on the Brain: Neuroaesthetics Unravels the Mechanisms of Emotion, Cognition, and Empathy

Research in neuroaesthetics—a fusion of neuroscience and aesthetics—reveals that art appreciation affects the human brain beyond mere aesthetic pleasure, activating higher mental activities such as emotion, cognition, and empathy. The healing effects of stained glass are also thought to arise through these active brain processes.

When appreciating art, various regions of the brain become activated.

- **Emotional Activation: The colors, shapes, and expressions in a work affect the viewer's heart, evoking feelings of emotion or joy. This occurs because the brain's "limbic system," which governs emotions, becomes active [56]. The vivid colors and shimmering light of stained glass can directly stimulate this emotional center, potentially eliciting positive feelings.**

- **Deepening Visual Information Processing: Works seen by the eye are analyzed in detail within the brain's visual cortex for color, shape, depth, and more, enabling understanding of the piece's atmosphere and meaning 56. The complex patterns and depiction of depth in stained glass stimulate activity in the visual cortex, fostering richer perception.**

- **Stimulation of Cognitive Functions: Viewing abstract art and pondering "What is this expressing?" activates the brain's "cognitive functions," enhancing its flexibility 56. The process of interpreting biblical narratives or symbolic meanings depicted in stained glass encourages this cognitive exploration.**

- **Generation of Joy and Pleasure: The feeling of "I like this" when viewing beautiful art arises from activation of the brain's "reward system" 56. This reward system also activates when eating delicious food or engaging in enjoyable activities, making art appreciation a pleasurable experience 56. The solemn beauty of stained glass strongly stimulates this reward system, bringing deep satisfaction.**

- **Enhanced Empathy: Neurons called "mirror neurons" help us understand others' actions and emotions. They also become active during art appreciation, enabling us to more deeply perceive the emotions and messages embedded in a work 56. Through stained glass figures and narratives, viewers empathize with the characters' emotions and beliefs, gaining an opportunity to confront their own inner selves.**

- **Enhanced Concentration: Art appreciation also heightens the viewer's concentration. Focusing on the intricate details and shifting light within stained glass allows one to detach from daily distractions and attain a state of mental tranquility.**

Interestingly, even when encountering art that does not appeal to one's personal taste, the brain has been shown to respond by processing new information and viewing it as an opportunity for learning 56. Exposure to expressions that differ from existing values can broaden perspectives and potentially lead to new discoveries and growth in sensitivity 56.

These findings in neuroaesthetics indicate that the healing effect of stained glass is not merely passive sensory stimulation, but arises through the viewer's brain actively processing information and engaging in higher mental activities like emotion, cognition, and empathy. Therefore, for AI art to pursue "healing," it is suggested that creating thought-provoking works that prompt this active brain engagement and resonate deeply with the viewer is crucial. Masato Koki's works, embodying concepts like "profound vision" and "eternal love stories," align precisely with this neuroaesthetic approach. They aim to create pieces possessing 'depth' and "meaning" that deeply engage the viewer's brain, evoke emotional resonance, and invite intellectual exploration.

5. Implications and Applications for the "Neo Mosaic Stained Glass" Technique

The multifaceted aspects of stained glass's healing effects revealed through our research provide significant insights for the future development of Masato Koki's "Neo Mosaic Stained Glass" technique and the "AI VISUAL MASTERPIECE" brand. We explore the potential to digitally recreate and further expand the power inherent in traditional art.

5.1. The Potential for Converting Traditional Stained Glass Healing Elements into Digital Art

Masato Koki's "Neo Mosaic Stained Glass" technique is the "Neo Mosaic Stained Glass" technique is the world's first innovative digital expression technique, established by AI artist Masato Koki through a single work that involved over 200 prompts, more than 5,000 prototypes, and a total of over 200,000 iterations. [4]. This technique fuses classical mosaic and stained glass with modern AI technology, enabling complex aesthetic expressions impossible with traditional single techniques [4]. The eight core elements inherent in this technique deeply resonate with the mechanisms of stained glass's healing effects elucidated in this report, holding the potential to contribute to creating new healing experiences through digital art.

1. Explicit Mosaic Structure & Emphasis on Grout Lines: This element clearly expresses that the entire image is composed of countless small glass fragments (tesserae), with black grout lines distinctly separating each piece. This pursues the texture and structural beauty of a physical glass craft rather than a mere flat painting, achieving a transformation into a three-dimensional craftwork. Viewers can enhance their immersion in the work by

simultaneously perceiving this visual depth and physical presence.

2. Composite Optical Effects: Leveraging AI's unique capabilities, it creates complex optical effects involving multiple light sources and reflective surfaces—effects impossible in reality. By simultaneously depicting water reflections, light from buildings, and celestial light, it digitally recreates and holds the potential to expand upon the "flickering light" and "ever-changing brilliance of color" inherent in traditional stained glass. This serves as a crucial element that keeps the viewer's eyes engaged and draws them into the work.

3. Van Gogh-esque Sky Expression: We recreate the swirling, dynamic expression seen in Van Gogh's "Starry Night" using mosaic techniques. 4. By imparting emotional impact and visual dynamism to static mosaics, we stir the viewer's emotions, activating the brain's reward system and areas governing feelings. 56. This approach, fusing the spirituality of Western masterpieces with Eastern aesthetics, amplifies the narrative depth and richness inherent in the work.

4. Building Depth Perception: Building upon and evolving Hiroshi Sato's "Depth Expression" technique, we impart a three-dimensional spatial sense to the flat mosaic representation through clear layering of foreground, middle ground, and background 4. This draws viewers into the work, heightening immersion.

5. Diversifying Texture: We express the physical characteristics of each glass fragment—bubbles, irregular edges, and variations in height 4. This creates warmth and authenticity reminiscent of handmade craftsmanship rather than mechanical perfection. This visually evokes tactile elements, promoting multisensory perception integration 37.

6. Strategic Color Placement: Strategically arranging vivid, jewel-like colors maximizes the unique beauty of glass through gradient effects and luminous qualities. This achieves a fusion of emotional impact based on color psychology and Japanese color aesthetics. This approach intentionally leverages the physiological and psychological effects of light wavelengths, such as the healing effects of blue light detailed in this report 15 and the influence of violet light on brain waves 46.

7. Integration of Mixed Techniques: By organically integrating multiple techniques—such as mosaic, stained glass, collage, Art Nouveau, and Neo-Japanese—it achieves a richness and depth of expression impossible with a single technique. This provides diverse visual information to the viewer's brain, encouraging cognitive exploration and generating deeper engagement and satisfaction.

These elements embody Koki's unique artistic philosophy that "while techniques can be imitated, the journey and soul behind them cannot be replicated by anyone." They demonstrate their true value in the application to "Neo-Japanese," a fusion of Japanese

aesthetic sensibility and Western classical techniques, enabling the creation of works possessing universal value

Core Elements of the “Neo-Mosaic Stained Glass” Technique	Relevance to Healing Effects (Aspects Clarified in This Report)
Explicit Mosaic Structure & Emphasis on Grout	Pursuing physical presence and structural beauty enhances viewers' visual immersion and promotes multisensory integration.
Composite Expression of Optical Effects	Digitally reproduces and amplifies light fluctuations and color shifts to maximize visual healing effects. Forms the foundation for inducing the perception of “sound-like waves” through visual-auditory integration.
Van Gogh-esque Sky Expression	Imparts emotional impact and visual dynamism, activating the brain's emotional centers and reward system. Delivers spiritual uplift and healing.
Building Depth Perception	Imparts a three-dimensional spatial sense to flat works, promoting an immersive experience that draws viewers into the artwork.
Diversifying Texture	Creates a handmade warmth and sense of authenticity, evoking tactile elements through sight. Promotes multisensory perceptual integration.
Strategic Color Placement	Intentionally utilizes the psychological and physiological effects of specific colors (especially blue) – such as calmness, healing, enhanced concentration, and altered brain waves – to directly influence the viewer's mind and body.
Integration of Mixed Media	Achieves richness and depth of expression, providing diverse information to the viewer's brain to encourage cognitive exploration and deep engagement.

Table 3: Elements of the “Neo-Mosaic Stained Glass” Technique and Their Relevance to

5.2. Creating New Healing Experiences Through AI and Human Co-Creation

Given scientific findings that the “sound-like wave” experienced by Masato Koki is unlikely to be perceived as a direct sound wave by human hearing through the photoacoustic effect, it is proposed that the “sound-like wave” generated by AI should be expressed not as a direct sound wave, but as a more conceptual and artistic “wave.” This implies pursuing expressions that, synchronized with visual light movements and color modulations, are perceived as “sound” within the viewer's brain. This approach intentionally leverages the brain's flexible information processing mechanism of visual-auditory integration, as detailed in this report.

Mr. Koki has already created original compositions using the AI music generation tool “Suno,” and his work “Eternal Embrace” explores a new form of art woven from painting and music. His work concept incorporates the “Neo Doll” philosophy 58, where AI's ‘voice’ heals people's hearts and brings peaceful resolutions, embodied through the development of the “most healing frequency.” By combining this music production experience with the visual expression of “Neo Mosaic Stained Glass,” Koki holds the potential to become a global pioneer in creating truly multisensory healing art.

Specifically, by highly designing the synchronization of sight and sound, and changing the timbre, rhythm, and frequency of AI-generated music in sync with the shifting light and color changes of the stained glass, an experience can be created where light and sound are perceived as a unified “wave” within the viewer's mind. Furthermore, interactive elements could be incorporated. For instance, building a system where the work's light and sound change in response to the viewer's movements or shifts in ambient light could encourage active viewer participation, offering deeper immersion and healing. Such multisensory integrated art holds significant potential as a new art form that transcends traditional art appreciation, stimulating the viewer's senses and directly influencing their physical and mental well-being.

5.3. Recommendations for Future Development of “AI VISUAL MASTERPIECE”

The physical output quality of Masato Koki's “Neo Mosaic Stained Glass” technique is critically important in pursuing its ‘healing’ elements. Physically materializing digitally created artworks at the highest quality, imparting a “sense of authenticity” and “presence” that appeals to the viewer's five senses, is an essential step for AI art to create profound healing experiences.

Reproduction of Texture and Luster via High-Definition Acrylic Printing Technology:

Acrylic material is an ideal choice for reproducing stained glass's light effects in digital art. Acrylic possesses extremely high transparency, with its light transmittance of 93% slightly exceeding that of standard glass at 92%. Furthermore, its excellent weather resistance, durability, ease of processing, light weight, and impact resistance—16 times that of glass—make it optimal for displaying artworks. 59. The characteristic of creating depth and three-dimensionality when light passes through acrylic is highly compatible with the multi-layered expression of stained glass. 64.

The main types of high-definition printing on acrylic include:

- **Acrylic Mounting (Photo Acrylic/Clear Mount): This method involves laminating an image printed on photo paper to the back of an acrylic sheet 64. It provides an exceptionally clear, high-end finish, imparting depth and dimensionality to the artwork 65. Furthermore, the acrylic material's inherent UV-blocking properties prevent fading and ensure long-term durability 65.**

- **UV Direct Printing: This method involves printing directly onto the acrylic sheet using a UV inkjet printer. This printing method dries quickly, making it suitable for short lead times and small-lot production. Particularly when combined with “thick-layer printing” or “multi-layer printing,” it enables textured expressions that appeal not only to visual realism but also to tactile sensation, creating a sense of luxury and a unique presence. When printing on transparent acrylic material, applying white ink beneath the image ensures it stands out clearly and vividly, unaffected by the background 60.**

- **PrimoArt (DNP High-Resolution Output Technology): Developed by Dai Nippon Printing (DNP), “PrimoArt” is a reproduction technology that captures original artwork using the ultra-high-resolution “PHASE ONE” camera (over 100 million pixels). It employs 10-color ink and a proprietary color table to faithfully reproduce the original's color tones, brushstrokes, and texture to an extraordinary degree. This technology enables the output of digitally created illustrations at a quality level worthy of being called an**

“original artwork” 85, making it essential for guaranteeing the highest quality and reproducibility in the physical manifestation of AI art.

Maximizing Psychological Effects Through Color Management and Gamut Optimization:

To ensure print data quality, proper resolution settings are essential. Generally, a resolution of 300dpi (dots per inch) is recommended for print data. Using high-resolution images enables smooth gradient expression. While CMYK is the standard color mode, using 10-color inks like those in Primo Art expands the reproducible color gamut beyond conventional CMYK printing, allowing for color tones that closely match the original artwork 85.

Color proofing services are crucial for guaranteeing the final work's quality. Utilizing services like press proofs or simple proofs to verify color tones on actual printing paper and presses ensures the desired finish is achieved. Particularly for fine art pieces, rigorous color verification is recommended. Additionally, the color temperature of the light in the viewing environment (e.g., standard 5000K daylight white) significantly affects how the print appears, making it important to specify an appropriate viewing environment.

Introduction of interactive elements stimulating the viewer's senses:

As a future development for “AI VISUAL MASTERPIECE,” it is proposed to create a more immersive multisensory experience by combining AI artworks with dynamic lighting (changes in light intensity and color temperature), synchronized AI-generated music, and even tactile feedback (textured surfaces, vibrations, etc.). Introducing interactive elements that alter the artwork's appearance in response to viewer movement or changes in ambient light encourages active viewer engagement, offering deeper healing and emotional resonance. This allows AI art to transcend mere visual beauty, maximizing its value as an “experience” that appeals to all five senses.

The utilization of these high-definition acrylic printing technologies allows the light, color, and texture elements of digitally created “Neo-Mosaic Stained Glass” to be fully realized as physical works. This enables the pursuit of “perceptual fidelity” in the viewer's brain, comparable to that experienced with traditional stained glass. This opens a path for digital art to embody “healing” through physical form, paving the way for AI art to pioneer new horizons in providing society with the universal value of “healing.”

6. Conclusion

This report, starting from Masato Koki's inquiry, deeply explored the “truth” of the healing effects of the “sound-like waves” emitted from stained glass windows in European churches from multiple perspectives.

The investigation revealed that this healing effect is not caused by a single physical phenomenon. It is concluded that direct perception of sound waves via the photoacoustic effect is extremely difficult for human hearing due to their faintness. Instead, the healing effect is understood as a complex experience. It arises from the integration within the viewer's brain of multiple sensory inputs: the visual appeal and symbolic meaning of the stained glass colors, the unique acoustic properties of the vast cathedral space (particularly its long reverberation), and the resulting stimulation of higher mental activities such as emotion, cognition, and empathy. Scientific findings indicating that light wavelengths directly influence brain waves and physiological responses, along with the neuroarchitecture concept that multisensory design contributes to human well-being, strongly suggest that the “truth” of this healing effect lies at the intersection of science, art, and the depths of human experience.

Masato Koki's “Neo Mosaic Stained Glass” technique digitally reconstructs and further expands the healing elements inherent in traditional stained glass, holding infinite potential. The core elements of his technique—“composite expression of optical effects,” “strategic placement of color,” and “diversification of texture”—resonate deeply with the healing mechanisms elucidated in this report. Specifically, findings on the impact of blue and violet light on brain function and the contribution of multisensory integration to well-being substantiate that his work possesses the power to directly influence viewers' minds and bodies, transcending mere visual beauty.

Mr. Koki's philosophy of co-creation between AI and humans extends beyond mere visual art. By integrating AI-generated music to create multisensory art and introducing interactive elements, it can offer viewers unprecedented immersive healing experiences. The utilization of high-definition acrylic printing technology physically materializes digitally created art at the highest quality. By imparting a sense of authenticity and presence that appeals to the viewer's five senses, it enables AI art to pioneer new horizons in providing society with the universal value of “healing.”

“AI VISUAL MASTERPIECE” will become a pioneer in realizing a grand vision: exploring new relationships between humans and AI through works imbued with the artist's soul and philosophy, transcending mere technological imitation, and bringing dreams, hope, and love to the world. Koki's artistic pursuit represents an extremely important endeavor, suggesting that digital technology can become not merely a tool, but a medium capable of enriching human sensibility and spirituality.

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