

NEUROAESTHETICS, SUBLIME, AND WELL-BEING

Positive Affect of Awe and Aesthetic Emotions, and a Practical Framework

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Aesthetic experiences influence the way we perceive the world, often at a subliminal level. But relatively little is known about how these aesthetic experiences affect us cognitively and how they shape our identity and improve our well-being. The purpose of this paper is thus to: (1) examine and review the current literature in the emerging field of neuroaesthetics—how the brain responds to beauty and sublime experiences; (2) extrapolate from current literature the properties of beauty and what it means when people perceive something to be beautiful; (3) synthesize the current literature and my own research on the topic to bring more awareness on the health benefits and transcendent power of experiencing awe or sublimity; (4) use the PERMA (positive emotion, engagement, relationship, meaning, achievement) theory of well-being proposed by positive psychologist Martin Seligman to present an action framework I established, acronymed NUMA (nature walks, unconditional love, meditation, affirmative goals). Within this paper, I argue that these perceptually aesthetic experiences (which can happen in a variety of forms such as in nature, artworks, music, or poetry) elicit in us a sense of awe and wonder, which performs a “scale effect” or “overview effect” on us and if experienced regularly could guide us toward living a more meaningful life.

I. Introduction

A burgeoning corpus of research literature underscores the arts’ and aesthetics’ significant contributions to cognitive development, health, and well-being.^{1,2,3} The consensus among scholars is clear: the arts and art education are invaluable assets to society. Yet, the mechanisms through which we process art and discern beauty remain subjects of enduring debate within aesthetic psychology. A relatively uncharted area of inquiry is how aesthetic appreciation and emotions—such as awe, wonder, and the sublime—not only enrich our lives but also enhance our mental and physical health.

1 Cohen, G. (2006). “Research on creativity and aging: The positive impact of the arts on health and illness.” *Generations* 30 (1), 7–15.

2 Baker, D. (2013). “Art Integration and Cognitive Development.” *Journal for Learning through the Arts* 9 (1), n1.

3 Koch, S. C. (2017). “Arts and Health: Active Factors and a Theory Framework of Embodied Aesthetics.” *The Arts in Psychotherapy* 54, 85–91.

As an emergent discipline, neuroaesthetics has captivated scholars with its promise to bridge the arts and sciences, offering a fresh perspective on understanding aesthetic experiences through a scientific lens. This has sparked both enthusiasm for its interdisciplinary potential and skepticism about the feasibility of quantifying the subjective nature of beauty and art. While the existing body of research in neuroaesthetics predominantly explores the neural underpinnings of art appreciation, there's a noticeable scarcity of studies delving into sublime experiences and their connection to aesthetic emotions and overall well-being.

Remarkably, to the best of my knowledge, no research has yet ventured to outline pragmatic strategies for leveraging these insights towards human flourishing, as envisioned by Seligman in his seminal work, "Flourish."⁴ His PERMA model—a framework for well-being encompassing Positive emotions, Engagement, Relationships, Meaning, and Accomplishments—could offer a valuable lens through which to examine and enhance our understanding of the interplay between neuroaesthetics and well-being. This gap in the literature presents a compelling opportunity for future research, potentially paving the way for innovative approaches to fostering well-being through the arts, grounded in the principles of neuroaesthetics and positive psychology.

II. Neuroaesthetics, awe, and the sublime

Beauty is one of life's most fundamental pleasures and it has a powerful pull on what we do and strive for in life. Neuroaesthetics is a sub-discipline of empirical aesthetics that takes a scientific approach to the study of aesthetic perceptions of art, music, or any object that can induce aesthetic experiences.⁵ Semir Zeki, professor of neuroaesthetics and one of the pioneers in this field holds the view that art is an example of the variability of the brain. His empirical study along with Ishizu confirmed this view of a brain-based theory of beauty. Using functional magnetic resonance imaging (fMRI), Ishizu and Zeki found that one cortical area, located in the medial orbito-frontal cortex (mOFC), was always active during the experience of beauty, whether the stimulus was musical or visual.⁶ Despite these findings, the field of neuroaesthetics faces its share of skepticism. Critics challenge the reductionist approach that seeks to encapsulate aesthetic experiences within a framework of physical or neurological laws. They argue that the intricate and subjective nature of beauty might elude the grasp of scientific methodologies, which they perceive as overly narrow for such a multifaceted phenomenon.

Yet, the allure of neuroaesthetics cannot be understated. The discipline is rapidly emerging as a vibrant area of interdisciplinary inquiry within cognitive science, bridging the gap between the arts and sciences. Its potential to unravel the complexities of aesthetic perception and its impact on the human psyche continues to captivate scholars and enthusiasts alike. The ongoing dialogue between its proponents and detractors only adds to the richness and depth of the discourse, underscoring the multifaceted nature of beauty and the myriad ways in which we seek to understand it.

The emotions of awe and the sublime stand as towering pillars in aesthetic experiences, wielding immense power over our emotional responses. The academic discourse, straddling the realms of psychology and philosophy, has yet to reach a consensus regarding the interrelation of these two profound states.⁷ However, it's widely suggested that there exists a deep-seated kinship between them. While historical and contemporary literature often delineates awe and the sublime as distinct phenomena, recent arguments and empirical studies suggest a more intertwined relationship. Bethelmy and Corraliza advocate for viewing awe as an integral aspect of sublime experiences, a stance further corroborated by the empirical investigations of Clewis et al., which

4 Seligman, M. (2011). *Flourish: A Visionary New Understanding of Happiness and Well-Being*. Free Press.

5 Marin, M. M. (2015). "Crossing Boundaries: Toward a General Model of Neuroaesthetics." *Frontiers in Human Neuroscience*. 9: 443. doi:10.3389/fnhum.2015.00443.

6 Ishizu, T., and Zeki, S. (2011). "Toward A Brain-Based Theory of Beauty." *PLOS ONE* 6 (7): e21852. <https://doi.org/10.1371/journal.pone.0021852>.

7 Clewis, R. R. (2021). "Why the Sublime is Aesthetic Awe." *The Journal of Aesthetic and Art Criticism* 79: 301–14. doi: 10.1093/jaac/kpab023.

highlight a significant overlap between the two.^{8,9}

In light of these complexities and the ongoing academic debate, this paper will adopt a pragmatic approach. Awe and the sublime, despite their nuanced distinctions, will be treated as closely aligned, if not synonymous, emotional states for the purposes of our discussion. This alignment is characterized by a potent mix of heightened arousal, profound pleasure, and an accompanying sense of fear and humility. By considering awe and the sublime as interchangeable terms, this paper aims to navigate the intricate emotional landscape they encompass, acknowledging their capacity to profoundly move and transform us.

III. Musical aesthetics and sublime experiences

Aesthetic experiences can happen in a variety of settings, such as in nature, art galleries or museums, personal interactions, movies and theater, poetry, music etc. One of the most powerful elicitors of aesthetic emotions is music. Music is known to elicit a range of complex emotions including surprise, awe, “chills,” comfort, and laughter by either reinforcing or diverting our expectations and predictions of future events, which had been an important survival mechanism in human evolutionary history.^{10,11} Musicians can produce different emotional responses by manipulating one’s uncertainty of what will be heard and by combining delay, violation, and satisfaction of one’s auditory expectations, which cause arousal and tension, the resolution of which will elicit pleasure in listeners.^{12,13} By incorporating the five elements in the PERMA theory of well-being proposed by Seligman in his book *Flourish*, Croom suggests that music can enhance one’s sense of well-being and promote human flourishing by arousing positive emotions (P) in its listeners, strengthening social bonds and interpersonal relationships (R) through actively participating in group musical activities, promoting flow experiences through being fully engaged (E) and absorbed in the musical experiences characterized by the temporary losing of one’s self-consciousness, and giving us a sense of accomplishment (A) and meaning (M) through the constant practicing, improving, and mastering of one’s musical skills.¹⁴ Musical engagement has also been shown to have numerous physiological, neurological, and emotional benefits to a range of human life forms from unborn infants to the elderly and patients with chronic illness.¹⁵

Musical experiences offer us a great entry point to studying the effects of awe and sublime, as well as other aesthetic emotions. The inherent power of music to evoke a wide array of intricate emotions with apparent ease makes it a perfect exemplar of aesthetic emotion. Its universal language transcends cultural and linguistic barriers, reaching directly into the human soul. To unravel how music can kindle awe or sublime experiences, we should first dissect the anatomy of these profound emotional states. Awe and the sublime are often characterized by an overwhelming sense of grandeur or beauty that surpasses ordinary understanding, leading to a feeling of being connected to something larger than oneself. This can manifest as a mix of wonder, admiration, and even a hint of fear or reverence in the face of the vast and the unknown.

In a study of sublime experience in relation to nature, Bethelmy and Corraliza devised an instrument, SEN (Sublime Emotion toward Nature) scale, to measure what consists of sublime emotion toward nature. They tested the proposed scale’s reliability and validity in a sample of 280 participants from general population of Madrid. The study discovered that “sublime emotion was defined by two conceptual components: awe, and inspiring energy” and inspiring energy is defined by “feelings of vitality, joy, energy, oneness, freedom, eternity, and harmony

8 Bethelmy, L. C., and Corraliza, J. A. (2019). “Transcendence and Sublime Experience in Nature: Awe and Inspiring Energy.” *Frontiers in Psychology* 10: 509. doi: 10.3389/fpsyg.2019.00509.

9 Clewis, R. R., Yaden, D. B., and Chirico A. (2021). “Intersection Between Awe and the Sublime: A Preliminary Empirical Study.” *Empirical Studies of the Arts* 40 (2): 143–73. doi: 10.1177/027623742/994694.

10 Croom, A. M. (2012). “Music, Neuroscience, and the Psychology of Well-Being: A Précis.” *Frontiers in Psychology* 2: 393. doi: 10.3389/fpsyg.2011.00393.

11 Huron, D. (2006). *Sweet Anticipation: Music and the Psychology of Expectation*. MIT Press.

12 Croom, “Music, Neuroscience, and the Psychology of Well-Being.”

13 Huron, *Sweet Anticipation*.

14 Seligman, *Flourish*.

15 Croom, “Music, Neuroscience, and the Psychology of Well-Being.”

with the universe.”¹⁶ Burke compared the sublime emotion to a “delightful horror,” and defined it as feelings of amazement and fear, as well as to a lesser extent admiration, respect, and reverence; he believes that the sublime emotion is triggered by the experience of subjugation to something greater than oneself.¹⁷

While it might be difficult to induce the feelings of awe or inspiring energy the way we listen to music today, saturated by low-fi popular songs often played on our digital devices and often merely as background music, there are certain settings where eliciting the sublime is made easier while listening to music. Konečni thinks the pinnacles of composed and performed music are enough called “sublime,” but that in the present view music only formally becomes sublime and induce aesthetic awe when it is performed in vast architectural spaces with superb acoustics.¹⁸ But we know profound emotions can be elicited by listening to certain pieces of music even in an everyday mundane setting, as in a study by Konečni et al., which found that thrills could be reliably induced in U.S. college students by carefully chosen music (namely the ending of Rachmaninoff’s 2nd Piano Concerto and the U.S. national anthem). However, Konečni et al. also cautioned that “although thrills may often serve as the physiological platform for profound aesthetic experiences and frequent as they may be in the lives of many people, thrills are fleeting events that can hardly—in and of themselves—be considered genuine emotional responses.” These physiological responses to music (such as foot-tapping, dance, whistling, and thrills) are treated by Konečni et al. as pseudoemotional responses, though some of which can be developed into full-fledged emotional states (such as joy, sadness, being moved, and aesthetic awe) by cognitive mediation (such as personal associations to emotionally compelling events).¹⁹

IV. Neural correlates of awe and sublime experiences

In terms of awe, Dutch psychologist Michiel van Elk et al. published a fMRI study on the neural correlates of the awe experience. Using whole-brain analysis, they found that the brain regions that consisted of the default mode network (DMN), including the medial prefrontal cortex, the angular gyrus, and the posterior cingulate cortex/precuneus, were less activated during awe experiences; since DMN is involved in mind wandering and self-referential activities such as ruminating the past or envisioning the future, this suggests that the awe experience has an immersive effect that renders participants less cognitively occupied with self-centered thoughts.^{20,21} From an evolutionary standpoint, the default mode of our brain function likely has developed as a mechanism to help our ancestors to subconsciously scan the environment for predators or other safety threats.²² Neuroscience researchers studying dispositional awe (which refers to a person’s general tendency to experience awe across different situations) also found a structural neural differences in their participants; people who are high in dispositional awe have less regional gray matter volume in the anterior cingulate cortex (ACC), the middle cingulate cortex (MCC), the posterior cingulate cortex (PCC), and the middle temporal gyrus (MTG)—these are brain areas that play a role in attention, self-regulation, cognitive control, and social emotion. These associations could implicate that “higher trait awe has an increased propensity to embrace cognitive accommodation and new knowledge” (trait awe is a more permanent part of a person’s personality), but that “disposition awe is ultimately a reward-related emotional experiences, despites its involvement in the resolution of incongruity at the very beginning.”²³

16 Bethelmy and Corraliza, “Transcendence and Sublime Experience.”

17 Burke, E. (1757). *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful*. Printed for R. and J. Dodsley.

18 Konečni, V. J. (2005). “The Aesthetic Trinity: Awe, Being Moved, Thrills.” *Bulletin of Psychology and the Arts* 5: 27–44.

19 Konečni, V. J., Wanic, R. A., and Brown, A. (2007). “Emotional and Aesthetic Antecedents and Consequences of Music-Induced Thrills.” *American Journal of Psychology* 120: 619–43.

20 Elk, Michiel, M. Andrea Arciniegas Gomez, Wietske Zwaag, Hein T. Schie, and Disa Sauter. 2019. “The Neural Correlates of the Awe Experience: Reduced Default Mode Network Activity during Feelings of Awe.” *Human Brain Mapping* 40 (12). <https://doi.org/10.1002/hbm.24616>.

21 Andrews-Hanna, J. R. (2012). “The Brain’s Default Network and Its Adaptive Role in Internal Mentation.” *The Neuroscientist*, 18(3), 251–270.

22 Carr, A. (2022). *Positive Psychology: The Science of Wellbeing and Human Strengths*. 3rd edition. London and New York: Routledge. ISBN: 978-1-003-08286-6 (ebk) doi: 10.4324/9781003082866.

23 Guan, F., Xiang, Y., Chen, O., Wang, W., and Chen, J. (2018). “Neural Basis of Dispositional Awe.” *Frontiers in Behavioral Neuroscience*. 12:209. doi: 10.3389/fnbeh.2018.00209.

In addition to reduced activity in the default mode network, van Elk et al. also found that the important brain regions of the frontoparietal network (FPN), including the supramarginal gyrus, the medial frontal gyrus, and the insula, were activated the most strongly when participants experienced the awe emotion.²⁴ FPN is also known as the central executive network (CEN), which is implicated in activities that involve sustained attention, complex problem-solving, and working memory.²⁵ The findings of this study are consistent with the subjective reports of awe as an immersive experience that has a perspective shifting effect which makes one feel its own fragility and insignificance. The nature of awe stimuli is captivating, immersive, and attention-grabbing, which is responsible for reductions in self-reflective thought: the “key feature of the experience of awe is a reduced engagement in self-referential processing.”²⁶ This feature proves to be important to our sense of well-being.

V. Sublime experiences and well-being

When it comes to aesthetic appreciation and well-being, studies have shown numerous benefits across different art settings, such as improvement of memory, lower stress levels, and amelioration of social inclusion. Additionally, viewing traditional and contemporary galleries promoted well-being, positive social impact, and cognitive enhancement in people with dementia.²⁷ Furthermore, a recent cross-national study by Jacobi et al. on aesthetic experiences and flourishing in scientists finds that “scientists in the disciplines of biology and physics who experience beauty, awe, and wonder in their work have higher flourishing in their lives.” The results show a large and statistically significant positive association between frequency of aesthetic experiences in scientific work and flourishing, even after controlling for demographic factors and negative workplace or life circumstances, including COVID-19 impacts. Specifically, they found that aesthetic experiences are the most strongly associated with the flourishing domain of meaning in life.²⁸ Meaning represents M in the PERMA theory of well-being mentioned in the abstract section of this paper. The findings by Jacobi et al. are of great significance to the present paper as it not only affirms findings of positive links between aesthetics and well-being by Mastandrea et al., but also conclusively points out the power of aesthetics as a “key source of flourishing for scientists in the disciplines of biology and physics,” and potentially for everyone else.²⁹

These aesthetic emotions are underlined by a similar emotion response—arguably a sense of wonder, awe, and sublime in its spectators. Aesthetic awe is regarded as the most profound and memorable human aesthetic response that is prototypical to a sublime stimulus.³⁰ The experience of awe plays an important role in meaning-making, which increases the possibility of finding new positive meanings in life, encourages people to transform mundane concerns and weakens people’s desire for materialistic acquisition, and provides people with the ability to shape their life frameworks and to develop a personal sense of meaning in life.^{31,32,33}

Dispositional awe, a personality trait characterized by the natural tendency to have awe responses, has been proven to promote psychosocial flourishing in Chinese emerging adults, in an empirical study by Zhao

24 Elk, Michiel et al. “The Neural Correlates of the Awe Experience: Reduced Default Mode Network Activity during Feelings of Awe.” *Human Brain Mapping* 40 (12). <https://doi.org/10.1002/hbm.24616>.

25 Menon, V. (2011). “Large-Scale Brain Networks and Psychopathology: A Unifying Triple Network Model.” *Trends in Cognitive Sciences* 15(10): 483–506.

26 Elk et al. “The Neural Correlates of the Awe Experience.”

27 Mastandrea, S., Fagioli, S., and Biasi, V. (2019). “Art and Psychological Well-Being: Linking the Brain to the Aesthetic Emotion.” *Frontiers in Psychology* 10: 739. doi: 10.3389/fpsyg.2019.00739.

28 Jacobi, C. J., Varga, P. J., & Vaidyanathan, B. (2022). “Aesthetic Experiences and Flourishing in Science: A Four-Country Study.” *Frontiers in Psychology* 13: 923–40. <https://doi.org/10.3389/fpsyg.2022.923940>.

29 Mastandrea et al. “Art and Psychological Well-Being.”

30 Konečni, V. J. (2015). “Being Moved as One of the Major Aesthetic Emotional States: A Commentary on ‘Being Moved: Linguistic Representation and Conceptual Structure.’” *Frontiers in Psychology* 6: 343. doi: 10.3389/fpsyg.2015.00343.

31 Bonner, E. T., and Friedman, H. L. (2011). “A Conceptual Clarification of the Experience of Awe: An Interpretative Phenomenological Analysis.” *The Humanistic Psychologist* 39 (3): 222–35.

32 Jiang, L., Yin, J., Mei, D., Zhu, H., and Zhou, X. (2018). “Awe Weakens the Desire for Money.” *Journal of Pacific Rim Psychology* 12.

33 Zhao H., Zhang H., Xu Y., He W. and Lu J. (2019). “Why Are People High in Dispositional Awe Happier? The Roles of Meaning in Life and Materialism.” *Frontiers in Psychology* 10: 1208. doi: 10.3389/fpsyg.2019.01208.

and Zhang. The study identified meaning in life and social connectedness as interpersonal, and intrapersonal mediators as underlying psychological mechanisms that facilitate the positive association between dispositional awe and psychosocial flourishing.³⁴ Psychosocial flourishing is a broader view of a good life that refers to an optimal, sustained sense of well-being and is described by Keyes et al. as the epitome of mental health.^{35,36} Peterson and Seligman proposed that awe, as a character strength, can help bring gratification, authentic and sustainable well-being to individuals.³⁷ People who experience awe create more personal growth goals that are connected to eudaimonic well-being.³⁸

For astronauts who had seen Earth from the space, awe and wonder experiences are the most common emotions as described in their in-flight journals and these experiences often have a dramatic impact on their lives as “they often report engaging in environmental and humanitarian causes after their experiences.”^{39,40} This is the result of what psychologists call a “perspectival shift,” which is “a dawning of a moral sense that is tied to a visual experience of seeing Earth from space; a sense that can lead to a renewed responsibility towards others or understanding of other cultures.” A similar phenomenon underlying the transformative experience of awe is called the “overview effect,” or “scale effects.” The awe-eliciting stimuli are usually so vast in physical size or in concept that people who experience it need to shift their mental constructs in order to accommodate the overwhelming size differences. “The combination of feeling overwhelmed and experiencing scale effects is sometimes equated to the experience of the sublime.”⁴¹ In his book, *How to Change Your Mind*, Michael Pollan invoked the overview effect in volunteers in psychedelic trials—the overview effect was powerful enough that it made the volunteers shift their worldviews and priorities and let go of their old habits with remarkable ease sometimes.⁴²

VI. Practical implications

There is a great advantage to the present paper as it treats the concepts of awe and sublime as roughly equal experiences, precisely because the lack of consensus on those two terms have caused a chasm in psychological research in awe and the more philosophical approach in studying the sublime. Clewis implores researchers that study both domains to “consider the possibility that awe and the experience of the sublime are nearly the same thing, only referred to by another name, and that psychologists studying awe are investigating what philosophers of art have been calling the sublime.” It is striking how much literature has been written on the sublime, and how it has been such a persevering topic of discussion in philosophy and rhetorical theory for over two millennia, yet there is hardly any debate about awe or any venerable body of writings on awe in the history of philosophy.^{43,44,45} However, empirical psychologists have devoted much attention and research effort into awe, even if only recently, yet there is a gross interest and a growing body of psychological literature in awe research and “there remain very

34 Zhao, H., and Zhang, H. (2021). “Why Dispositional Awe Promotes Psychosocial Flourishing? An Investigation of Intrapersonal and Interpersonal Pathways Among Chinese Emerging Adults.” *Current Psychology* 42: 12682–96. <https://doi.org/10.1007/s12144-021-02593-8>.

35 Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D. W., Oishi, S., and Biswas-Diener, R. (2010). “New Well-Being Measures: Short Scales to Assess Flourishing and Positive and Negative Feelings.” *Social Indicators Research* 97 (2): 143–56.

36 Keyes, C. L., Dhingra, S. S., and Simoes, E. J. (2010). “Change in Level of Positive Mental Health as a Predictor of Future Risk of Mental Illness.” *American Journal of Public Health* 100 (12): 2366–2371.

37 Peterson, C., and Seligman, M. E. P. (2004). *Character Strengths and Virtues: A Handbook and Classification*. American Psychological Association. Oxford University Press.

38 Seaton, C. L., and Beaumont, S. L. (2015). “Pursuing the Good Life: A Short-Term Follow-up Study of the Role of Positive/Negative Emotions and Ego-Resilience in Personal Goal Striving and Eudaimonic Well-Being.” *Motivation and Emotion* 39 (5): 813–26.

39 Gallagher, S., Janz, B. et al. (2015). *A Neurophenomenology of Awe and Wonder: Towards a Non-Reductionist Cognitive Science*. Palgrave Macmillan. ISBN: 9781137496058.

40 Yaden, D. B., and Newberg, A. (2022). *The Varieties of Spiritual Experience: 21st Century Research and Perspectives*. Oxford University Press.

41 Gallagher, Janz et al., *A Neurophenomenology of Awe and Wonder*.

42 Pollan, M. (2019). *How to Change Your Mind: The New Science of Psychedelics*. Penguin Books.

43 Clewis., “Why the Sublime is Aesthetic Awe.”

44 Costelloe, T. M. (ed.). (2012). *The Sublime: From Antiquity to the Present*. Cambridge University Press.

45 Porter, J. I. (2016). *The Sublime in Antiquity*. Cambridge University Press.

few psychological investigations into the sublime.”⁴⁶ Since this paper considers and combines research from both sides, it is thus a more comprehensive review than some that only draw studies from either side exclusively, and a number of practical implications can be drawn from the literature reviewed in the present paper thus far.

A. Implication 1: Nature walk and positive emotion (P)

The connection between the experience of awe and an uptick in positive emotions—such as optimism, gratitude, and vitality—alongside a reduction in distressing emotions, is well-documented.^{47,48} This suggests that activities fostering a sense of awe can significantly bolster our positive emotional states. Nature, with its awe-inspiring vistas and intricate beauty, stands out as a potent source of such experiences. It’s reasonable to propose that regular nature walks, with a mindful appreciation of the surrounding beauty, can substantially enhance our well-being. Notably, the benefits of immersing oneself in nature surpass those of merely viewing natural scenes on a screen or engaging in indoor physical exercises, such as treadmill walking.⁴⁹ Thus, the first practical application of integrating awe research with well-being studies is to encourage daily nature walks in awe-inspiring settings. This practice aligns with the Positive Emotion facet of Seligman’s PERMA model for well-being, optimizing the chances to elevate positive emotions. Expanding on this notion, other activities can also serve as conduits for positive emotions and overall well-being. Engaging with music, particularly through live classical performances, offers a rich auditory experience capable of invoking deep emotional responses. Similarly, visiting art galleries and museums provides a visual feast that can stir the soul and evoke feelings of awe. Participating in singing, whether in a choir or solo, can uplift the spirit and foster a sense of community and belonging. Practices like loving-kindness meditation and mindfulness meditation offer pathways to inner peace, compassion, and heightened awareness, contributing to a more profound sense of well-being. Cultivating gratitude and compassion in daily life can transform our perspective, leading to a more appreciative and fulfilling existence. Surrounding oneself with positive influences and engaging in activities that promote savoring the present moment can amplify life’s joys.

B. Implication 2: Meditation and engagement (E)

Awe experiences by design engage our senses and have an immersive effect on us. They present a compelling pathway to deepening our engagement with life and enhancing our capacity for awe. By intentionally engaging our senses through awe-inspiring experiences, we can amplify our sense of presence and immersion in the moment. Mindfulness meditation, particularly when practiced in the embrace of nature, stands out as a potent tool for cultivating a heightened state of engagement, or what is often referred to as the flow state. Meditation and similar mental disciplines are well-documented for their efficacy in sharpening focus, augmenting cognitive performance, and fostering an environment conducive to flow experiences. These practices help sustain goal-directed attention, allowing individuals to become fully absorbed in the present, a state where self-awareness fades and time appears to expand or dilate.⁵⁰ This immersive experience, characterized by complete absorption in the activity at hand, mirrors the essence of awe, where the stimulus captivates our entire being. The potential for inducing flow states extends beyond meditation to encompass a variety of activities known for their capacity to engage and absorb. Engaging in arts and crafts, for instance, can provide a rich tapestry of sensory and cognitive stimuli, encouraging deep focus and creative expression. Similarly, the intimacy and connection experienced during sexual activity can lead to profound moments of presence and unity. Music, whether through playing an instrument or immersing oneself in practice, offers another avenue for flow. The intricate dance of melody, harmony, and rhythm demands focused attention and technical skill, providing a fertile ground for engagement. Likewise, the physical and

46 Clewis., “Why the Sublime is Aesthetic Awe.”

47 Bethelmy and Corraliza, “Transcendence and Sublime Experience in Nature.”

48 Sturm, V. E., Datta, S., Roy, A. R., et al. (2022). “Big Smile, Small Self: Awe Walks Promote Prosocial Positive Emotions in Older Adults.” *Emotion* 22 (5): 1044.

49 Olafsdottir, G., Cloke, P., Schulz, A., et al. (2020). “Health Benefits of Walking in Nature: A Randomized Controlled Study under Conditions of Real-Life Stress.” *Environment and Behavior* 52 (3): 248–74.

50 Carr, *Positive Psychology*.

mental demands of sports, coupled with the pursuit of mastery and the joy of movement, can elicit powerful flow experiences.

C. Implication 3: Unconditional love and relationship (R)

It can be argued that awe experiences inspire one to love unconditionally. The awe-inspiring view of Earth from space, as reported by astronauts, exemplifies a transformative experience that expands one's sense of connectedness and empathy towards all humanity. This cosmic perspective illustrates the potential of awe to transcend personal boundaries and cultivate a more inclusive and compassionate worldview. In the realm of interpersonal relationships, awe can emerge from witnessing acts of great virtue, character, or excellence in others.⁵¹ This form of awe, though perhaps subtler than that evoked by grand natural phenomena, is no less significant in its ability to enrich our social bonds and inspire personal growth. Encountering individuals who embody remarkable qualities can motivate us to emulate these traits, thereby enhancing our own lives and the lives of those around us. To cultivate this sense of awe and unconditional love in daily life, practices such as compassion and loving-kindness meditation can be instrumental. These practices encourage a state of open-heartedness and empathy, not only towards others but also towards oneself, fostering a nurturing environment for relationships to flourish. Moreover, engaging in activities that reinforce social bonds and promote altruism can further enhance our capacity for unconditional love. Volunteering or mentoring, for instance, offers opportunities to contribute positively to others' lives, reinforcing the value of selfless service. Simple yet profound acts, such as performing random acts of kindness, practicing empathy, and active listening, can significantly strengthen interpersonal connections. The act of caring for a pet can also evoke feelings of unconditional love and responsibility, enriching our emotional lives. Other practices conducive to nurturing relationships include offering sincere compliments, celebrating positive developments in others' lives, and embracing forgiveness. These actions not only contribute to a positive social atmosphere but also encourage a cycle of kindness and understanding within our communities.

D. Implication 4: Goals, meaning (M) and achievement (A)

The propensity for dispositional awe to augment one's perception of life's significance suggests that deliberate engagement with awe-inducing stimuli could substantially enhance life's meaningfulness. It is, therefore, advisable for individuals to actively seek out experiences that evoke awe across various life domains. The pursuit of personally significant goals is intrinsically tied to the experience of a meaningful life. Goals serve as pivotal mechanisms that potentially enrich all facets of well-being as outlined in the PERMA model. The progression towards, or realization of, valued objectives can elevate positive emotions, foster engagement, nurture relationships, imbue life with meaning, and culminate in a sense of accomplishment.⁵² The literature on goal-setting underscores its myriad benefits, including providing direction, instilling motivation amidst adversities, concentrating efforts towards self-fulfillment, and ultimately rendering life more meaningful and satisfying. Moreover, goals oriented towards experiential engagement and positive outcomes, rather than material acquisitions or the avoidance of negative scenarios, are more conducive to enduring happiness and well-being. This distinction underscores the importance of goal quality and orientation in the pursuit of a fulfilling life. To facilitate the setting of coherent and attainable goals, several strategies can be employed. Envisioning an ideal version of oneself, coupled with journaling these aspirations, can clarify personal ambitions and desired life trajectories. Reflective practices that contemplate personal values and strengths, such as writing an imagined obituary, can provide insight into one's legacy and impact. Regular monitoring of progress towards these goals, coupled with incremental steps towards their realization, ensures sustained momentum and alignment with one's overarching life purpose. The intentional pursuit of awe and the strategic setting of meaningful goals emerge as critical components in the quest for a rich, purpose-driven life. These practices not only foster a sense of personal achievement but also contribute to the broader tapestry of well-being, aligning with the multifaceted nature of the PERMA model.

51 Graziosi, M., and Yaden, D. (2021). "Interpersonal Awe: Exploring the Social Domain of Awe Elicitors." *The Journal of Positive Psychology* 16 (2): 263–71, doi: 10.1080/17439760.2019.1689422.

52 Carr, *Positive Psychology*.

VII. Conclusion

Our discourse has highlighted the significance of neuroaesthetics, awe, and the sublime in contributing to a richer understanding of human psychology and aesthetics. By integrating insights from empirical research with philosophical inquiry, we have endeavored to illuminate the complex interplay between the brain, art, and the profound emotional responses they elicit, highlighting their integral role in human experience and well-being. Our dialogue extended into the nuanced realms of awe and the sublime, emotions often evoked by encounters with art, nature, and the vastness of the universe. We examined the philosophical and psychological perspectives that attempt to delineate these complex emotional states, acknowledging the challenges inherent in capturing their essence through empirical research. Despite these challenges, the potential of awe and the sublime to enrich human life and foster a deeper sense of connection with the world was a recurring theme in our discussion.

The implications of these aesthetic and emotional experiences for individual well-being were considered through the lens of the PERMA model, proposing practical applications such as nature walks, meditation, and the cultivation of unconditional love and meaningful goals. These practices were posited not only as means to enhance personal well-being but also as avenues to deepen our engagement with the world and elevate our capacity for awe and appreciation of beauty. In summarizing the discourse, it becomes evident that the integration of the PERMA model with actionable, daily interventions provides a comprehensive framework for the enhancement of individual well-being. The proposed NUMA acronym—comprising Nature walks, Unconditional love, Meditation, and Affirmative goals—articulates a strategic approach for individuals seeking to augment their life satisfaction and overall flourishing.

- Nature Walks: Engagement with natural environments through regular ambulatory activities facilitates an immersive experience of awe and appreciation, thereby contributing to enhanced positive affect and vitality.
- Unconditional Love: The cultivation of unconditional positive regard towards oneself and others significantly bolsters social connectivity and support networks, which are pivotal for emotional well-being and psychological resilience.
- Meditation: The disciplined practice of meditation, particularly mindfulness and metta (loving-kindness), enhances cognitive flexibility, attentional control, and emotional regulation, laying the groundwork for sustained personal development and self-reflection.
- Affirmative Goals: The establishment of positive, aspirational objectives promotes a proactive and purposeful life stance, engendering a sense of accomplishment and forward momentum, which are quintessential for subjective well-being.

The NUMA framework not only delineates pragmatic strategies for personal enhancement but also underscores the imperative of translating theoretical constructs from psychological research into accessible, real-world applications. By bridging the chasm between academic theory and practical implementation, this paradigm fosters a more nuanced comprehension of well-being, advocating for an integrative approach that encompasses cognitive, emotional, and behavioral dimensions. The path to flourishing is inherently multifaceted, necessitating a harmonious approach that nurtures the cognitive, affective, and volitional components of the human psyche. The NUMA framework offers a viable conduit towards achieving such equilibrium, encouraging individuals to engage meaningfully with their external environment, cultivate profound interpersonal relationships, foster internal tranquility, and pursue their aspirations with vigor and clarity. It is posited that this framework will not only enrich the dialogue between theoretical exploration and empirical praxis within the academic and research communities but also empower individuals and collectives to adopt these principles, thereby cultivating a milieu where optimal well-being and human flourishing are universally attainable.

VIII. Bibliography

- Andrews-Hanna, J. R. (2012). “The Brain’s Default Network and Its Adaptive Role in Internal Mentation.” *The Neuroscientist* 18 (3): 251–70.
- Baker, D. (2013). “Art Integration and Cognitive Development.” *Journal for Learning through the Arts* 9 (1): n1.
- Bethelmy, L.C., and Corraliza, J.A. (2019). “Transcendence and Sublime Experience in Nature: Awe and Inspiring Energy.” *Frontiers in Psychology* 10: 509. doi: 10.3389/fpsyg.2019.00509.
- Bonner, E. T., and Friedman, H. L. (2011). “A Conceptual Clarification of the Experience of Awe: An Interpretative Phenomenological Analysis.” *The Humanistic Psychologist* 39 (3): 222–35.
- Burke, E. (1757). *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful*. London: Printed for R. and J. Dodsley.
- Carr, A. (2022). *Positive Psychology: The Science of Wellbeing and Human Strengths*. 3rd edition. Routledge. ISBN: 978-1-003-08286-6 (ebk) doi: 10.4324/9781003082866.
- Clewis, R. R. (2021). “Why the Sublime is Aesthetic Awe.” *The Journal of Aesthetic and Art Criticism* 79: 301–14. doi: 10.1093/jaac/kpab023.
- Clewis, R. R., Yaden, D. B., and Chirico A. (2021). “Intersection Between Awe and the Sublime: A Preliminary Empirical Study.” *Empirical Studies of the Arts* 40 (2): 143–73. doi: 10.1177/027623742/994694.
- Cohen, G. (2006). “Research on Creativity and Aging: The Positive Impact of the Arts on Health and Illness.” *Generations* 30 (1): 7–15.
- Costelloe, T. M. (ed.). (2012). *The Sublime: From Antiquity to the Present*. Cambridge University Press.
- Croom, A. M. (2012). “Music, Neuroscience, and the Psychology of Well-Being: A Précis.” *Frontiers in Psychology* 2: 393. doi: 10.3389/fpsyg.2011.00393.
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D. W., Oishi, S., and Biswas-Diener, R. (2010). “New Well-Being Measures: Short Scales to Assess Flourishing and Positive and Negative Feelings.” *Social Indicators Research* 97 (2): 143–56.
- Elk, Michiel, M. Andrea Arciniegas Gomez, Wietske Zwaag, Hein T. Schie, and Disa Sauter. 2019. “The Neural Correlates of the Awe Experience: Reduced Default Mode Network Activity during Feelings of Awe.” *Human Brain Mapping* 40 (12). <https://doi.org/10.1002/hbm.24616>.
- Gallagher, S., Janz, B. et al. (2015). *A Neurophenomenology of Awe and Wonder: Towards a Non-Reductionist Cognitive Science*. Palgrave Macmillan. ISBN: 9781137496058.
- Graziosi, M., and Yaden, D. (2021) “Interpersonal Awe: Exploring the Social Domain of Awe Elicitors.” *The Journal of Positive Psychology* 16 (2): 263–271, doi: 10.1080/17439760.2019.1689422.
- Guan, F., Xiang, Y., Chen, O., Wang, W., and Chen, J. (2018). “Neural Basis of Dispositional Awe.” *Frontiers in Behavioral Neuroscience* 12: 209. doi: 10.3389/fnbeh.2018.00209.
- Huron, D. (2006). *Sweet Anticipation: Music and the Psychology of Expectation*. MIT Press.
- Ishizu, T., and Zeki, S (2011). “Toward A Brain-Based Theory of Beauty.” *PLOS ONE*, 6 (7): e21852. <https://doi.org/10.1371/journal.pone.002185>.
- Jacobi, C. J., Varga, P. J., and Vaidyanathan, B. (2022). “Aesthetic Experiences and Flourishing in Science: A Four-Country Study.” *Frontiers in Psychology* 13: 923940. <https://doi.org/10.3389/fpsyg.2022.923940>.

- Jiang, L., Yin, J., Mei, D., Zhu, H., and Zhou, X. (2018). "Awe Weakens the Desire for Money." *Journal of Pacific Rim Psychology* 12.
- Keyes, C. L., Dhingra, S. S., and Simoes, E. J. (2010). "Change in Level of Positive Mental Health as a Predictor of Future Risk of Mental Illness." *American Journal of Public Health* 100 (12): 2366–71.
- Koch, S. C. (2017). "Arts and Health: Active Factors and a Theory Framework of Embodied Aesthetics." *The Arts in Psychotherapy* 54: 85–91.
- Konečni, V. J. (2015). "Being Moved as One of the Major Aesthetic Emotional States: A Commentary on 'Being Moved: Linguistic Representation and Conceptual Structure.'" *Frontiers in Psychology* 6: 343. doi: 10.3389/fpsyg.2015.00343.
- Konečni, V. J. (2005). "The Aesthetic Trinity: Awe, Being Moved, Thrills." *Bulletin of Psychology and the Arts* 5: 27–44.
- Konečni, V. J., Wanic, R. A., and Brown, A. (2007). "Emotional and Aesthetic Antecedents and Consequences of Music-Induced Thrills." *American Journal of Psychology* 120: 619–43.
- Marin, M. M. (2015). "Crossing Boundaries: Toward a General Model of Neuroaesthetics." *Frontiers in Human Neuroscience* 9: 443. doi:10.3389/fnhum.2015.00443.
- Mastandrea, S., Fagioli, S., and Biasi, V. (2019). "Art and Psychological Well-Being: Linking the Brain to the Aesthetic Emotion." *Frontiers in Psychology* 10:739. doi: 10.3389/fpsyg.2019.00739.
- Menon, V. (2011). "Large-Scale Brain Networks and Psychopathology: A Unifying Triple Network Model." *Trends in Cognitive Sciences* 15 (10): 483–506.
- Olafsdottir, G., Cloke, P., Schulz, A., Van Dyck, Z., Eysteinnsson, T., Thorleifsdottir, B., and Vögele, C. (2020). "Health Benefits of Walking in Nature: A Randomized Controlled Study under Conditions of Real-Life Stress." *Environment and Behavior* 52 (3), 248–74.
- Peterson, C., and Seligman, M. E. P. (2004). *Character Strengths and Virtues: A Handbook and Classification*. American Psychological Association. Oxford University Press.
- Pollan, M. (2019). *How to Change Your Mind: The New Science of Psychedelics*. Penguin Books.
- Porter, J. I. (2016). *The Sublime in Antiquity*. Cambridge University Press.
- Seaton, C. L., and Beaumont, S. L. (2015). "Pursuing the Good Life: A Short-Term Follow-up Study of the Role of Positive/Negative Emotions and Ego-Resilience in Personal Goal Striving and Eudaimonic Well-Being." *Motivation and Emotion* 39 (5): 813–26.
- Seligman, M. (2011). *Flourish: A Visionary New Understanding of Happiness and Well-Being*. Free Press.
- Sturm, V. E., Datta, S., Roy, A. R., et al. (2022). "Big Smile, Small Self: Awe Walks Promote Prosocial Positive Emotions in Older Adults." *Emotion* 22 (5): 1044.
- Yaden, D. B., and Newberg, A. (2022). *The Varieties of Spiritual Experience: 21st Century Research and Perspectives*. Oxford University Press.
- Zhao, H., and Zhang, H. (2021). "Why Dispositional Awe Promotes Psychosocial Flourishing? An Investigation of Intrapersonal and Interpersonal Pathways Among Chinese Emerging Adults." *Current Psychology* 42: 12682–96. <https://doi.org/10.1007/s12144-021-02593-8>.
- Zhao H., Zhang H., Xu Y., He W. and Lu J. (2019). "Why Are People High in Dispositional Awe Happier? The Roles of Meaning in Life and Materialism." *Frontiers in Psychology* 10:1208. doi: 10.3389/fpsyg.2019.01208.