

Subjective Time Dilation: A Visual Concept

With advising from Dr. Clark, Professor Dearing, and Professor Bankerd

By Emma Adler

What does it mean to be human? How can we dictate the amount of time and light by which our physical, emotional, and spiritual bodies are governed? From the base element—our physical body—every human on Earth is biologically composed of essentially the same psychological and physical anatomy as the other. The myriad ways, however, in which we receive, process, translate, and transmute outside stimuli from the world into our brains, has always been a subjective phenomenon.

In this thesis I will discuss how one human experience—subjective time dilation—is triggered by the phenomena identified as near death experiences (NDEs)—and what awaits our human psyche once we regain control of our mind’s perception and interpretation of our reality. As a sculpture focused student, I wanted to design a work of art that could help me delve into how anyone might confront subjectivity—and our visual receptors—all at once. The answer became as clear as a clean reflective message—mirrors.

Since the beginning of human history vanity has been an expression, experience, and a state of being created from something of an intimate origin: reflection, self identity—elements that are born from an awareness of ourselves in juxtaposition and retrospect to the existing outside world. When we see our reflections—we confront aspects of our true selves.

This is an even more fascinating experience when we confront the crossroads of where our bodies and souls choose to separate—or remain conjoined—in the psychological response state to an NDE. How much are we “aware” of time, space, and structure in that moment that feels like an expansive or endless frozen moment in time. Do we hold awareness or confront our “self” in that expanse that dances between time, space and form?

Answering these questions—or at least exploring the idea of self-awareness bridging self-confrontation is the basis of my senior sculpture piece. I constructed a large metal structure made out of iron rods to represent the structure and laws of our physical existence juxtaposed against hundreds of fragmented mirrors overtaking the structure of the piece and connecting it to the floor of the perception lab—connecting it to the psychological fragility that overcomes each of us inevitably—and most definitely in the experience of an NDE.

There is a state of psychological fragility that takes form in an existential crisis, or an NDE. This state creates in our brains a reality that we are confined to—and only able to achieve real release from using pre-structured universes our brains allow us to see through which are identified as psychological breaks. It’s only during the real time created during these “fractured reflective moments” that we get to experience the world outside of the commonplace human interpretation that affects time, space, and structure.

There is an identifiable power in a psychological break. These experiences, whether perceived as pleasurable or painful, help us to see outside our own subjective reality in myriad

profound ways. The NDA “break” phenomena create great interest within the scientific community but they also have the ability to create great opportunities for the artistic community. Who else better than a visual learner, to recreate what man has tried to put into mere language? Maybe these phenomena are too complex for words—maybe we must revert to primitive abstraction—using sticks and rocks and anything we can find to try and express our base and broken selves.

My senior thesis project seeks to go beyond words in the primal sense and instead a place of wounded experience that causes a split of our beings from the physical world to a form and function where time literally seems to reflect and slow down all aspects of life. To capture a moment between worlds—a moment of frozen time—is to seek what it means to really depict the power of someone's personal experience/s of art. I believe that art imitates life, and I believe that both psychologists and artists have a responsibility; an obligation really, to translate and communicate across our disciplines the fundamentals of life and healing of our minds, bodies, and souls.

Until the 14th century, when Descarte and the Roman Catholic Church “divied up” the disciplines and study of the physical body to science and the mind and soul to the dominion of the church—the disciplines were one. Art is a vessel to merge back with science the understanding of physical, physiological, psychic, emotional, and spiritual phenomena. All of these elements are captured in the experience of subjective time dilation when one experiences

an NDE. Elusive as it is expansive... art is the modality by which we can understand and translate what we are—see—and feel beyond our physical form.

Through a repetitive thought process I was able to plan out a formula to help create and ensure the connection between my sculpture and the intent of my sculpture through these self imposed instructions:

- Observe Natural Light
- Create An Extension Of Natural Light

- Observe Natural Light
- Create A Replica Of Natural Light
- Mimic Natural Light

I am using my written score to go farther into each line and build my piece off of my final thoughts and what they mean as a concept. For example: “Observe Natural Light.”

In what ways have we observed natural light? Is it by looking out our windows at our surrounding environment? Do we observe natural light when we water a plant, when there are no artificial lights around? Do we observe the natural light that makes it possible for us to see during the daytime? Can I make an artificial light that has the concept of natural light in it? How? Then... “Create An Extension Of Natural Light”...

Each line is its own subject of research and the end result consisted of a metal structure, alluring its audience to succumb to this portal of fragmented time and distortion—an open door depicting the phenomena of time itself. Distorted through open interpretation by the viewer.

I fused myself together with the science behind sensation and perception so that my confidence in my final work would show through effortlessly. I studied the basic anatomy of visual perception—how our eyes translate surrounding stimuli into images—into this technicolor movie we experience and co-create everyday.

I taught myself about fundamentals such as binocular disparity—a disorder in which the outside stimuli falls on different retinal views, causing distortion to a person’s sight. This concept inspired me as an element of something I could use to depict my translation of Subjective Time Dilation. I could artificially replicate stereoscopic vision by blurring images and overlapping them, though I felt it wasn’t deep enough to my topic. Going further, I felt a shift in gears towards something more dimensional and dominating.

I needed my Sr. thesis sculptural work to represent time in a structural manner, and something that to me represents time is disintegration—something able to age—objects that weather away with time—eroding into earth—into its true core substances just as humans fade away. Time is responsible for representing and exercising mortality of biological life and the materials that support it. That is why my sculpture’s “bones” are rusted iron rods, welded together into a geometric pattern consisting of sharp angles and long rusted bars of metal,

growing out of them like flowers on a plant's branches—mirror shards sticking up and out into every direction. My piece was a compass directing to all directions at once, reflecting its facing surroundings into multiple distorted and blurry realities for the viewer to observe, and digest.



I wanted to connect this piece back to its roots of vanity and ancient interventions of self identity. I didn't want this to be just a futuristic interpretation—but rather an acknowledgment to all the linear time that has passed us. I wanted to portray these ideas into something that mimicked a relic—invoking the steady hum and solidity of the human body experienced as shimmering chaotic shards we call life.

To visually translate something rather formal and psychological is in itself an abstract interpretation of one's own abilities and I am excited to see where my abilities grow from here.

I remember my earliest memory of my brain slowing down time, it was something that occurred to me throughout my younger life. I never knew what it was, or that it even had a name. I never spoke about it because I didn't like medication and I didn't want to take the risk of being prescribed it, or worrying about my mother worrying about me. I would be doing mundane tasks, even sometimes just being alone would be enough stimulus to trigger me into subjective time dilation. The feeling of time warping and slowing down, my heart beat, loud and slow. The sound of the air around me, heavy and wavy. I never knew why it would happen to me, these intense and short lived attacks. I never knew what would trigger it, but I was always alone when it happened.

It wasn't until nearly a decade later while I was studying psychology over the summer here at Suny Purchase that my professor, Dr. Clark briefly mentioned a phenomenon where time would slow down around us in order to preserve our constructed reality and its very strict relationship with time. Although brief, time can appear to slow down real life events, forcing us to experience an alternate reality than the one that humanity has sculpted and structured throughout history. Every technological advance, every century that passes, we govern ourselves and we transcend through time, always moving forward, permanently changing the course of time to compliment where we are in the world, and how we communicate with the world in time and space.

There are more studied versions of this natural phenomenon, critical life threatening events such as a car accident, a complicated surgery, a critical moment that either threatened our life or acknowledges the crucial moment we are in, such as a child being born, our loved ones last breath, anything that brings us back into ourselves, forces us to acknowledge who we are at source. We try so hard to convince ourselves of our own authority through science and math but its subjects such as subjective time dilation that remind us of our fragility and our ignorance.

Anything from spatial distribution, to object based stimuli, to NDE triggers—there is no global or universal experience, there is no multi-person experience, it is completely and totally based on individual triggers and can not be replicated in the same forms between experiences. Although there are enough similarities in how an NDE feels, there are never cases that have ever involved more than one person experiencing this phenomena at the same time. It is an isolated brain activity—coping skill even—that can only be observed by said individual. There is a huge and unstudied connection between subjectivity in brain stimuli and processing and art based subjectivity that also functions out of brain stimuli and processing. I felt that this field was untapped which is precisely why I wanted my project to explore these circumstantial similarities.

There have not been any studies that I could find to correlate artistic expression with scientific data on NDEs, despite the fact that new and emerging fields of study seek to connect neuroscience in an interdisciplinary focus with art.

“Applying imagination to knowledge gained from empirical studies creates opportunities to develop new methods and tools for discovering the connections between nervous systems, mental processes and patterns of behavior.”

“One paramount goal of the neuroscience of art is to understand the nature of creativity... What constitutes a creative process? How is it manifested in the brain? And how it is manifested in art that connects science, technology, engineering, mathematics, and all other forms of disciplinary knowledge?”

- Todd Siler, 2015, *Neuroart: picturing the neuroscience of intentional actions in art and science*

The fascination I feel for the intersectionality of neuroscience and art as an emerging artist has given me pause to consider pursuing a Masters Degree in art therapy as well as a potential PhD in “neuroart.” Understanding cognitive and behavioral responses to art is usually the typical direction of this field... however I would seek to reverse engineer that process to connect more deeply to that which has so far, artistically speaking, been untapped and unexplained. How does the creative process of ART explain what happens to us on a molecular and cellular level in experiences of NDEs or other relatable psychological, physiological, and spiritual experiences.

This is the question my thesis sought to consider, if not fully articulate.

I also want to add a personal reflection as to why I was drawn to this subject matter. My late Grandfather, Dr. Norman Adler (whom I called *Zeidi* which is Yiddish for Grandpa), was an early neuroscientist who, when my mother was a young girl, created a major at the University of Pennsylvania called the BBB Major: biological basis of behavior. Growing up I tried to read some of Zeidi’s textbooks to make sense of the “how” and “why” minds work the way they do. Years later, when I was a very young child, my mother had two NDEs giving birth to my

younger brother. She had told me the story many times. I am to this day profoundly moved as to what she experienced and to hold witness to the beautiful tendrils of its lasting impact on her psyche and soul.

Perhaps a natural product of the osmosis of my lineage's experiences in life and academia—I have sought to blend my innate interest and affinity towards psychology and NDEs with a penchant for physical forms of creativity. I have always held a near insatiable curiosity about the expression of the deep “why” we experience things psychologically, emotionally, and for me the exploration—if not direct answers—must be expressed artistically.

Even as I conclude my undergraduate tenure, however, I feel I am only just emerging as an intellectually curious artist. I have a passion to create, translate, and transcend our worlds into colors, forms, and structures that represent something larger than our physical beings—something that reunites our mind, bodies, and souls.

In the end of it all, our visual receptors are responsible for addressing the world around us. Our eyes are the only parts of us that we desperately rely on in order to communicate, in order to understand, and in order to live life watching ourselves and those around us shift and transcend forward, aging with time, time aging with us. It feels as if life itself is subjective, the very foundation of it able to crumble away with the slightest questioning. It's an intimate and reflective experience that has been a lightly studied phenomenon for centuries. The idea that we cannot be separated from our time line, that if we are, even for a moment, we get stuck in a

place, in a specific environment that our bodies deem stimulating, a very similar effect of our brains slowing down time in order for us to breathe in the art around us.

Sources:

Neuroart: picturing the neuroscience of intentional actions in art and science by Todd Siler, Siler, Todd. "Neuroart: Picturing the Neuroscience of Intentional Actions in Art and Science." *Frontiers*, *Frontiers*, 1 Jan. 1AD, <https://www.frontiersin.org/articles/10.3389/fnhum.2015.00410/full>.

Zeki, S. (2001). Artistic creativity and the brain. *Science* 293, 51–52. doi: 10.1126/science.1062331

Zeki, S. (1999). *Inner Vision: An Exploration of Art and the Brain*. New York and Oxford: Oxford University Press.

Yang, F. G., Edens, J., Simpson, C., and Krawczyk, D. C. (2009). Differences in task demands influence the hemispheric lateralization and neural correlates of metaphor. *Brain Lang.* 111, 114–124. doi: 10.1016/j.bandl.2009.08.006

Vuilleumier, P., and Driver, J. (2007). Modulation of visual processing by attention and emotion: windows on causal interactions between human brain regions. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 362, 837–855. doi: 10.1098/rstb.2007.2092

Vartanian, O., Bristol, A. S., and Kaufman, J. C. (2013). *Neuroscience of Creativity*. Cambridge, MA: The MIT Press.

Vartanian, O. (2012). Dissociable neural systems for analogy and metaphor: implications for the neuroscience of creativity. *Br. J. Psychol.* 103, 302–316. doi: 10.1111/j.2044-8295.2011.02073.x

Ticini, L. F., Urgesi, C., and Calvo-Merino, B. (2015). Embodied aesthetics: insight from cognitive neuroscience of the performing arts. *Aesthet. Embodied Mind Beyond Art Theory Cartesian Mind-Body Dichotomy Contributions Phenomenology* 73, 103–115. doi: 10.1007/978-94-017-9379-7_7