

Self-Transcendence and the Cosmic Task:
An Exploration of the Primal Paradox through the Consilience of
Neurophenomenology, Transpersonal Psychology, Buddhist Insights on
Mindfulness, and the Montessori Elementary Education

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Abstract

The purpose of this paper is to explore the primal paradox, that is the seemingly paradoxical relationship between the commitment to individual development and the development of the greater good of society and the greater whole, and its influence and role within Montessori elementary education. It begins by setting up the context of the universe in which we live. This is done by establishing the foundations of cosmogenesis, chaos theory, and systems thinking. The paper then examines human development through the lens of Montessori and the transpersonal psychologists Carl Jung and Abraham Maslow. Self-transcendence is proposed as both the final path of human development and the intersection of the primal paradox. The next question looked at is how self-transcendence is fostered in Cosmic Education and its relationship to Montessori's proposed paradigm shift towards a new human. What is the self? That question is explored through both the neurological and Buddhist lens. This exploration finishes by introducing neurophenomenology and its implications for the Montessori classroom.

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Prologue

“The fundamental images we hold of the universe are central to the whole process of exploring meaning” (Swimme & Tucker, 2011, p. 9). When I reflect on the heart of the mission of education, I believe that it should guide children towards an appreciation and love for the world as opposed to the exploitation of it (Gang & Morgan, 2003). As I was reading and researching, I was struck by creative manifestations created through the tension between seemingly polar forces. In regard to the potentiality of individuals to fully form, self-realize, and provide a positive contribution to society and the universe, my questions kept leading me back to the creative tension between the commitment to individuality and the individual’s responsibility to the greater whole. While it is clear to me that these things are not mutually exclusive, could a closer examination of this creative tension lead to greater insights into human potentiality and the role of education in maximizing it? The clearest explanation of the questions was put forth by John Briggs:

The primal paradox refers to the diametrically opposed experiences that pull constantly at our consciousness. In the first, each person experiences him or herself as a unique entity, an entirely separate being, confronting a world that lies outside...this separate self has its own thoughts, is locked inside its own brain, it dies its own death and leaves other selves behind...In the second experience, usually less present to the awareness, each person implicitly recognizes that her/his individual self (physically, psychologically, and in every other way) has emerged from, and is inseparably bound to, “All Else.” One’s own unique perspective—the me—is constantly defined and refined in the crucible of others. (Briggs, 2015)

It is the tension between these two forces that allows for the creativity and full expression of both an individual’s and humanity’s potentiality. Is the creativity born from paradoxical tension unique to the primal paradox, or are there examples throughout our world? This question will guide me as I explore the story of how our universe unfolded and some of the basic principles that connect all matter, with a specific look at life on Earth. This exploration will place my

further journey in a contextual relationship with the greater universe and its fundamental properties.

I will then look at human development, starting with Maria Montessori's four planes of development. By exploring the principles laid out by the core transpersonal psychologists, Carl Jung and Abraham Maslow, I aim to relate their concepts of self-actualization and self-transcendence to Montessori's vision of the long-term goals of education. I believe that this will help to set a foundation with which to better understand not only the individual's lifelong journey of individuation, but also understand what a self-transcendence means within the context of a community or society. This exploration will all be set within the context of systems thinking for, "Many of the difficulties people face these days are due to a lack of harmony in the relations between themselves and others" (Yun, 2003, p. 23).

The next part of my exploration will delve into Montessori's conceptual framework for the elementary education, Cosmic Education, and its relationship to the process of self-transcendence. Here I will discuss the tricky nature of spirituality and its implications for both Montessori education and lifelong human development. In order to fully understand self-transcendence and its ramifications for human development and the primal paradox, I will explore our conceptions and misconceptions on what the "self" actual is and what it is not. I will approach this question from both the neuroscientific (empirical) and the Buddhist (experiential) perspectives. The final part of my exploration will be an overview of how neurophenomenology can influence our observations. I will give an overview of the concept of neurophenomenology and apply its principles to a lesson I gave to my students and recorded. Included in this section of the paper will be the primary data collection and observations I made from both the third- and first-person perspectives.

I would like to make a few disclaimers regarding this paper and my exploration. This paper is not intended to be a list of answers to questions I was seeking. Nor is it supposed to be a range of conclusions from my research. In fact, I may raise more questions than I answer. To me this is the sign of a sincere exploratory process, and attempting to draw strict conclusions would be disingenuous to the exploratory process itself. I will attempt to make my connections between my tributaries of research and the Montessori elementary education, but even if such connections are not made overtly clear, they are intended.

Cosmogenesis

“We are a way for the cosmos to know itself” – Carl Sagan

Story of the Universe

13.7 billion years ago the entirety of the observable universe was confined to a single point, a singularity. With all the matter of our universe collected in a single point, the density of this singularity was infinite. Space-time curvature in this singularity would have had infinite curvature and thus as physicist and cosmologist, Stephen Hawking points out, “All our theories of cosmology are formulated on the assumption that space-time is smooth and nearly flat...Thus even if there were events before the big bang, we could not use them to determine what would happen afterward, because predictability would have broken down at the big bang” (Hawking, 2005, p. 68). So, humans can only know what happened after the big bang. Since the beginning of history (and presumably before) humans have felt an innate desire to tell each other stories about our origins. Creation stories are found throughout human cultures. Starting with Copernicus 500 years ago—including a giant leap forward in the early 20th century, specifically the work of Edwin Hubble and Albert Einstein—humans have told a new story and that story is

built upon the basic scientific principle of observation and fueled by human advances in technology, understanding, and collaboration. This is the story of our universe unfolding—the story of cosmogenesis—and it is far greater, with more complexity and beauty than any one person can imagine.

According to our current cosmological understanding, the temperature of the entire universe at the exact instant of the big bang was infinite, but even a second after exploding the temperature would have cooled to a mere ten billion degrees Celsius. The cooling of the universe decreased the energy of particles enough for them to begin to interact with each other. At this point in the unfolding of the universe, the existent particles would have been mainly photons, electrons and neutrinos. Particles also have antiparticles and because electrons have mass, when an electron interacts with its antiparticle, the positron, they eliminate each other. Within these first seconds of the big bang, the universe was cool enough to allow these particles and antiparticles to interact, but still hot enough to provide enough energy for them to destroy each other. The leftover particles after this period of annihilation make up the matter available in our universe today.

After the first minute of expansion the universe had cooled enough for a remarkable thing to happen. Particles began to organize themselves. Protons and neutrons are attracted to each other through the strong force, which binds the particles together to form nuclei. This first act of self-organization led to the creation of elemental atoms, starting with hydrogen; the building blocks of all matter. The importance of this self-organizing nature of the universe cannot be overstated. If the universe is inherently creative from the first moments of the big bang, are there examples of self-organization throughout cosmogenesis? Cosmologist Brian Swimme and

professor of religion and ecologist Mary Evelyn Tucker reflect on this in *Journey of the Universe*,

Even from the first moments, our universe moved toward creating relationships. Certainly, in a theoretical sense, we can imagine that things could have been different. We can theorize about a different kind of universe, a universe that would have taken the form of disconnected particles, a universe that would consist of trillions upon trillions of these tiny particles, each one completely independent of the others. (2011, p. 8)

Thankfully our universe is creative, attractive, and self-organizing.

The creative nature of our universe is born from tension between opposing forces. There are countless examples of this creative tension throughout our universe, and I will harken back to this concept, but I want to highlight two such examples here, the first being the very nature of the expansion of the universe immediately following the big bang. If the expansion of our universe were to be slower by as small a margin as one millionth of one percent, the universe would have collapsed upon itself almost immediately. If the universe would have expanded faster by the same narrow margin, all matter would have moved apart too quickly, and particles would have been unable to coalesce to form the building blocks of matter. Between these opposing forces we find the conditions for creativity leading to all life and existence as we know it. This “Goldilocks” realization led Swimme and Tucker to reflect upon the question, “...who is it that is marveling over this fact? It is none other than we humans—a much later development of these very atoms” (2011, p. 13). The other creative tension example I would like to mention at this juncture is the relationship between matter and antimatter. As previously mentioned, when matter and antimatter (or particle and antiparticle) collide with enough energy, it creates mutual annihilation. Based on scientific models of understanding, the big bang should have created an equal amount of matter and antimatter which, under the correct temperature conditions following the big bang, would mutually annihilate each other until there would be no matter left with which

to construct a complex universe. One of the most brilliant mysteries of our universe is that there was just slightly more matter than antimatter created during the big bang. According to Swimme, for every billion matter particles, there were not quite a billion antimatter particles, and it is this minute unbalance that allowed for all of the matter surviving to become the building blocks of our universe (Rogin, 2006).

The matter that survived annihilation continued to expand in cloud and became the material with which the universe would self-create into its next developmental phase: galaxies. In order for that original cloud of matter to split and organize into smaller clouds that could form the trillions of galaxies which occupy our universe, a substantial amount of force was required. The origin of this force was from the waves created by the explosion of the big bang itself. Truly, here is a creative process that is self-organized; the necessary force for the formation of greater and greater complexity was present from the very moment of creation. Original creation was not only creation in and of itself; it was also the catalyst for creative processes that had yet come to pass.

Galaxies allow for the creation of stars, but it is the star itself that is responsible for its own birth. “The gravitational attraction that causes the cloud to implode is generated by the mass of the cloud itself...the mass of the future star creates the gravity necessary to give birth to the star itself” (Swimme & Tucker, 2011, p. 29). Can we begin to see these self-creative forces nested within one another as reflections upon that which we know as the original creative event? Although the allure and grandeur of the expanding universe has only been visible to us for about a century, that of the stars has been evident to all of humanity. Humans are drawn to the stars out of an innate and deep cosmological understanding that they are our common ancestor. Stars are the ultimate creative force in our universe in that they take hydrogen and helium and melt it

into elemental particles so that all other elements can be made. Just as Swimme and Tucker imagine a universe in which all particles exist in isolation from each other, perhaps we can now imagine a universe without the creative processes of stars, in which hydrogen and helium gas collect in vast clouds without any further complexity. Just as with the expanding universe, the stars' creativity stems from a dynamic tension of forces. The continual tension between the collapsing of matter due to gravity and the expansion due to thermonuclear fusion allows for the creation of nuclei. This battle between expansion and collapse continues as the star continues to burn through and create heavier and heavier elements.

Most stars will die a quiet death, slowly burning through its available matter until it fades into a dwarf star. Some stars, however, are destined to be catalysts. These stars will continue to expand and fuse heavier and heavier elements until they fuse iron, at which point they immediately collapses upon themselves so tightly that all atoms are once again reduced to elemental particles. It is from this enormous pressure and destruction that the vast complexity and variety of matter is created. The heavier elements that make up the planets and all their components are dependent upon these supernovae explosions. Such magnificent creation from such unfathomable destruction led Swimme and Tucker to ask the questions, "What are we to make of this, as our very existence...depends upon it? Does it suggest that the universe, in order to create a single atom of carbon, requires the destruction of an entire star?" (2011, p. 34). To which I added my own: Are the human linguistic, mental, and moral binary constructions of creation/destruction, good/evil, life/death, etc. inadequate at describing the inherent processes at work within our universe?

Chaos Theory

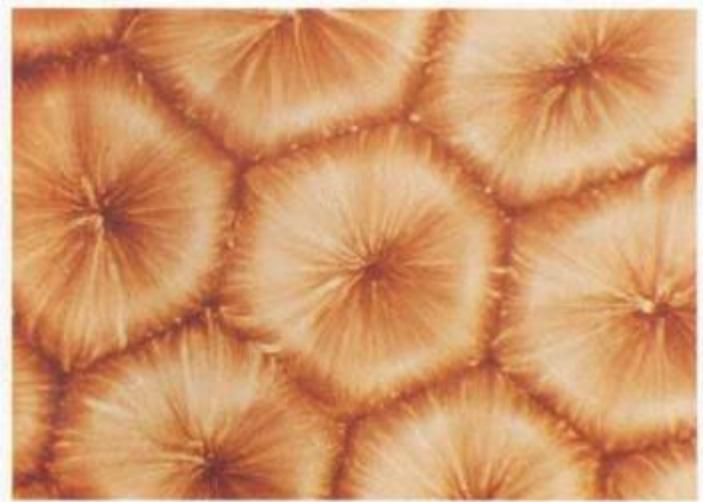
In order to approach chaos theory and its insights on the universe and the complex nested relationships within it, I would first like to explore with the term chaos. In *Seven Life Lessons of Chaos*, chaos theorist John Briggs and physicist F. David Peat introduce chaos theory as such, “The scientific term ‘chaos’ refers to an underlying interconnectedness that exists in apparently random events. Chaos science focuses on hidden patterns, nuance, the ‘sensitivity’ of things, and the ‘rules’ for how the unpredictable leads to the new” (1999, p. 2). Human insights and discoveries throughout the scientific revolution led to a greater reductionist view of the known world into mechanical components. The natural laws discovered by Sir Isaac Newton and the analytical approach to knowledge and understanding by René Descartes allowed humans to deconstruct the world into understandable and quantifiable chunks of knowledge. This Cartesian model of the universe holds that the whole is equal to the sum of its parts. While the great thinkers of the scientific revolution laid the groundwork for much of our current understanding of the universe, as humans probe further into the mysteries of the universe, we have found the nature of things to be much more complex and related than the parts-to-whole model suggests. It was Jules-Henri Poincaré who first laid the groundwork for this paradigm shift.

Poincaré was a French mathematician and physicist working on the motion of the planets and asteroids around the turn of the nineteenth century. What he discovered is that small gravitational influences upon objects can generate feedback loops that can magnify to create a critical point at which drastic events can take place. Briggs and Peat explain further:

Normally, all these tiny changes end up producing only a minor correction to the asteroid’s solar path. Yet under certain critical conditions, the various shifts and changes in orbit and gravitational attraction act to feed back on into the other, accumulating until a resonance occurs and the whole effect blows up into chaos. Resonance occurs when systems vibrate or swing in sympathy with each other so that the tiniest connection between them progressively magnifies their mutual interaction. (1999, p. 155)

Poincaré's discovery (known as the three-body problem) sowed the seeds that would germinate into chaos theory. Now it was possible to see the relationships of objects not as the interaction between two or more individual objects in a mechanical world, but rather as interconnected parts of a greater whole system. The chaos of the seemingly bizarre event is bred from the wholeness of the system, and vice versa. The paradigm shift lies in the notion that no longer is the whole equal to the sum of its parts, but rather the whole is greater than the sum of its parts. Creativity lies within the nested relationships of those parts to each other, and to the whole.

As I have been using the term “creative” and “creativity” to refer to many different phenomena and aspects of the universe, I would like to take the time now to explore the meaning of creativity as used in this context. Creativity in this cosmic sense refers to a much broader concept than the artistic leanings belonging to only certain individuals. Briggs and Peat give



*Figure 1. Hexagonal vortex cells in a liquid.
(Photo: Manuel Velarde, Universidad Complutense, Madrid.)*

the example of self-organizing hexagonal vortices to explain creativity in the context of chaos theory and its greater implications for our view of the universe. When water is heated the hotter water rises to the top while the colder water sinks to the bottom, creating a convection cell. The highest form of this chaotic interaction would be boiling water, which could also be referred to as having the highest *degree of freedom* or the “maximum range of behaviors available to the system” (Briggs & Peat, 1999, p. 14). Something amazing happens when the liquid is kept heated just below the highest degree of freedom. Instead of descending into disorder, the water

will actually self-organize into hexagonal vortexes. Chaos theorists refers to this as a *bifurcation point*. A certain critical point is reached within the environment of the system that changes the nature of the system itself; self-order out of chaos. Bifurcation points occur when the feedback loops of different elements within the system resonate with each other in unison to create a new reality. Self-organization occurs when the critical tension between degrees of freedom are met, just as previously seen through numerous examples in the story of the universe.

Chaos theory gives us a lens with which to view our understanding of the universe and its inherent principles of self-creation and self-organization. I will come back to chaos theory many times throughout this exploration, and rest assured, there is plenty to delve into. However, I wanted to lay the groundwork here with which to guide further inquiry into interconnectedness and systems thinking because, in my observation and experience, it is with this lens that we are able to more fully realize and understand the nature of the universe, and in turn, ourselves.

Briggs and Peat illustrate this point beautifully when they mention the suggestion from biologist Lewis Thomas that biologists only focus in their studies on the complete understanding of one protozoan living in the gut of an Australian termite.

Because chaos tells us that everything is ultimately connected to everything else, gaining really deep knowledge about the protozoan would require understanding its connection to the entire history of evolution and the entire dynamics of its environment. What is true of a protozoan is true of ourselves. To fully know oneself would require, in effect, understanding the whole Universe. (1999, p. 91)

Before moving forward, I think it is important to consider first our views of simplicity and complexity. I have found the sheer vastness of nested relationships with the universe to be completely overwhelming at times. How do I even begin to understand such grandeur? Perhaps looking towards the universe itself will provide answers. As creativity is born from the tension of opposing forces, perhaps too then deeper understanding can be born in the tension between

simplicity and complexity. Are these qualities the natural order of particular phenomena, or are they human constructs in an attempt to categorize our understanding? I find solace in the suggestion by Briggs and Peat to abandon engrained dualities in our thinking that are often the source of confusion because, as they suggest, “[confusion] is a warning system that informs us we are failing to see the essential simple within the complex or we are overlooking the ripples of nuances within the simple” (1999, p. 95).

A Systems Approach to Life

“...there is no relation between the strength of the cause and the consequence of the effect.”
(Wheatley, 2006, p. 121)

Coming Forth with a World

Just as the scientific revolution physicists had a reductionist view of the universe where individual phenomena could be viewed as mechanistic parts of a whole, biologists in the nineteenth century viewed life as comprised of concretely understandable, individual, mechanistic parts. The whole of an organism, or of life, can be understood by the study of its individual parts. In the first half of the twentieth century a new approach to biology, organismic biology, offered a different view of life than the Cartesian model. Led by such pioneers as biologist Ross Harrison, biochemist Lawrence Henderson, and biologist Joseph Woodger, organismic biology emphasized that it was the study of the relationship between individual parts that led to a greater understanding of the whole, rather than the reduction into mechanical parts. Understanding a system requires the understanding of the interconnected relationships that themselves create the inherent nature of the system itself.

The seeds sown by organismic biology grew into the field of ecology. First coined in 1866 by Ernst Haeckel, ecological study focuses on the relationships between individual

components that make up ecosystems. Ecologist Charles Elton furthered this study with his pioneering work on food cycles, showing how the connecting force of ecosystems is the exchange of nutrients through that system. “Every animal is closely linked with other animals living round it, and these relations in an animal community are largely food relations” (Elton, 1927, p. 50). Ecology evolved and developed through the work of great minds such as Aldo Leopold and Edward O. Wilson. In his essay *Some Fundamentals of Conservation in the Southwest* (1923), Leopold lays out the path towards understanding ecosystems as highly complex systems of interdependent relationship, not only within themselves, but also amongst each other:

It is at least not impossible to regard the earth's parts—soil, mountains, rivers, atmosphere, etc.—as organs, or parts of organs, of a coordinated whole, each part with a definite function. And, if we could see this whole, as a whole, through a great period of time, we might perceive not only organs with coordinated functions, but possibly also that process of consumption and replacement which in biology we call the metabolism, or growth. In such a case we would have all the visible attributes of a living thing, which we do not now realize to be such because it is too big, and its life processes too slow. (1992, p. 95)

In laying out this worldview, Leopold laid the groundwork for what would eventually lead to the development of Gaia theory by chemist James Lovelock and microbiologist Lynn Margulis in the 1970s. Gaia theory sees all of the living and non-living components of earth as not only intimately intertwined, but self-organized into a single system which brings forth its own existence. Physicist and systems theorist Fritjof Capra and biochemist Pier Luigi Luisi state that,

Lovelock and Margulis challenged the conventional view...that the forces of geology set the conditions for life on Earth, and that the plants and animals were mere passengers who by chance found just the right conditions for their evolution. According to Gaia theory life creates the conditions for its own existence (2016, p. 164).

Beyond the life sciences, systems thinking also gives us a lens with which to view the dramatic paradigm shift away from the Cartesian model in relation to physics, specifically

particle physics and quantum theory. Quantum theory began asking questions about the nature of the subatomic world through the leadership of physicists Albert Einstein and Niels Bohr in the early twentieth century. Physicists quickly realized that this subatomic world behaved nothing like they thought, and it completely shook our understanding of the nature of matter. As Capra and Luisi describe it,

Every time [physicists] asked nature a question in an atomic experiment, nature answered with a paradox, and the more they tried to clarify the situation, the sharper the paradoxes became...It took these physicists a long time to accept that fact that the paradoxes they encountered are an essential aspect of atomic physics, and to realize that they arise whenever one tries to describe atomic phenomena in terms of classical concepts. (2016, p. 69)

Quantum physics and the endeavor to understand the subatomic world have radically changed the way that we view the nature of matter. Whereas classical physics looked at atoms and particles as concrete objects used to build larger conglomerations of matter, quantum theory has revealed that subatomic objects are by nature both simultaneously waves and particles. It is only through the process of observation that the object will be forced to reveal itself as either a wave or a particle. In recalling the lessons of chaos theory and the urging of Briggs and Peat to escape from dualities, perhaps it is possible to more easily come to terms with the idea that the very fundamental being of matter is inherently a paradox. Capra and Peat remind us that this paradox is inescapable because our language is rooted in the classical paradigm and it is—for the time being—the only way in which we have to describe these phenomena. Physicist Richard Feynman described this paradoxical duality by stating that we can think of a subatomic object as going from point A to point B in space-time not on a single path, but by taking every possible path, a metaphor that I find compatible with Briggs and Peat's nod to fractal geometry by "[imagining] a line that was so twisted in its complications that it would pass through every possible point on a plane...the line was a plane and...possessed both one dimension and two

dimensions” (1999, p. 111). All of these revelations have led physicists to describe the fundamental nature of the subatomic world as probabilistic as opposed to mechanical. Perhaps systems thinking can give us comfort in this seemingly paradoxical existence in the fact that transformation of concrete objects into probability waves allows us to see the patterns of interconnectedness. Nature has revealed that it is incapable of being broken into mechanical parts on a decreasing order, and that “...the subatomic particles have no meaning as isolated entities but can be understood only as interconnections...” (Capra & Luisi, 2016, p. 72).

While investigating and contemplating the paradoxical nature of the subatomic world can offer fundamental insights into the very being of matter, I found the realization of the human observer as participant could offer the most far-reaching implications. It is the act of observation which not only brings forth the subatomic object, but also determines its self-actualization. If you observe a subatomic object as a particle, it will appear as a particle, and if you observe the same object as a wave, it will appear as a wave. Not only is the human observer necessary to bring forth the subatomic world, the human observer participates in the form of its manifestation. “We can never speak about nature without, at the same time, speaking of ourselves” (Capra & Luisi, 2016, p. 74).

Cosmogenesis, ecology and Gaian theory, and quantum theory all reveal the nested nature of self-organizing matter within our universe. In my explorations and observations of the world (the natural world in particular), my deepest insights and feelings of connectedness have come from the overwhelming feeling of being immersed within a greater system. Systems occur at varying degrees of order and are simultaneously both self-preserving and interrelated. Early ecologists viewed these relationships within the classical concept of hierarchies. Hierarchies assume a certain order of power, however I can remember seeing classic food chain hierarchies

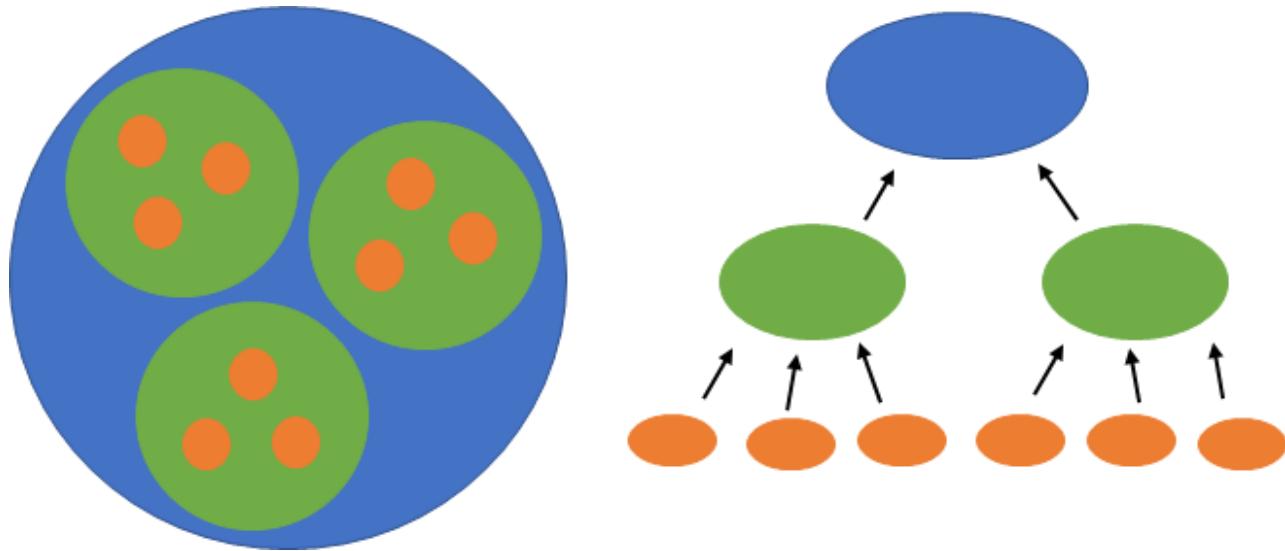


Figure 2. A holarchical view (left) of nested relationships as opposed to a hierarchical view (right).

as a student and thinking, “but don’t the decomposers eat everything?” In *An Ecogenesis for Education* (2000), Montessorian and systems thinker Marsha Snow Morgan offers an alternative approach to the traditional hierarchical structuring of nested systems: the holon. First coined by author Arthur Koestler in his 1967 book *The Ghost in the Machine*, a holon refers to something that is simultaneously a whole and part. A holon is autonomous and self-creative while still being nested within the contextual relationship to both the whole on its plane of order as well as other planes of order. A holarchy references the greater picture of all the planes of order containing nesting holons. Fractals and the fractal nature of the universe are corresponding to and give us another context with which to conceptualize holons and holarchies. In my observations and contemplations, I have found the organizational structure of the holarchy much more representative to the true nature of the universe as opposed to the hierarchy. For me, the holarchy better describes the nested relationships between particle → atom → molecule → cell → tissue → organ → organism → ecosystem → Gaia → solar system → galaxy → supercluster → universe, and all points in between. Systems thinking can also reveal to us that, within the

holarchy, certain properties of nature can express themselves at specific planes of order, but not at others. Capra and Luisi give an example of one of these emergent properties, “the concept of temperature...is meaningless at the level of individual atoms where the laws of quantum theory operate” (2016, p. 65).

The Story of Life: Autopoiesis, Cognition, and Consciousness

The term autopoiesis was coined by Chilean biologists Humberto Maturana and Francisco Varela in the 1970s. It comes from the root word “auto” meaning “self” and “poiesis” meaning “making”; self-making. Autopoiesis is Maturana and Varela’s response to the question of defining life. In his article *Cosmos, Gaia and Eros: Integrative Learning, Creativity and the Primal Paradox*, professor of education, Montessorian, and systems thinker Philip Gang defines autopoiesis thusly,

In autopoietic processes, entities are continually self-making, both self-contained and in relationship (coupled) to their environment. There is a network of processes in which the function of each component is to participate in the production or transformation of all components. In this way, the entire network continually “makes itself” while simultaneously bringing forth a world. (2015)

Although Maturana and Valera initially developed the concept of autopoiesis in a quest to define living organisms (such as a eukaryotic cell), it has since been used to describe and more deeply understand the nature of all manner of systems. The autopoietic system is truly self-creating because the sum of the relationship of its parts is the system’s own self-organization and reproduction. Because an autopoietic system does not exist in isolation, but rather within a greater holarchy, it can interact with and be influenced by its environment. It does so through the process of structural coupling.

Structural coupling refers to how an autopoietic system interacts with its environment and responds with changes to the structure of its own internal system. Capra and Luisi give us an

example of the differences with which living and non-living systems interact with their environments,

...if you kick a stone, it will react to the kick according to a linear chain of cause and effect, and its behavior can be calculated by applying the basic laws of Newtonian mechanics. If you kick a dog, the dog will respond with structural changes according to its own nature and nonlinear pattern of organization—the resulting behavior is generally unpredictable. (2016, p. 136)

The application of this understanding of how living autopoietic systems are structurally coupled to their environments sheds light on the process of adaptation over time in the course of evolution. An autopoietic system is therefore influenced by the structural changes that have resulted from every interaction it has had with its environment. At this point in my own discovery of autopoiesis, I had to pause for reflection. If it is true that I am only a product of the compilation of my interactions with my environment, then my existence is determined by outside forces. Where is my free will? A living organism's reaction is not determined by outside forces, though, not in the linear way the kicked rock reacts. A living organism is structurally coupled to the environment and can be disturbed by interactions with the environment but responds with its own autonomous internal structure. In response to their own question of whether autopoiesis is a prerequisite for life, Capra and Luisi state that, "in order to determine whether a given system is living or not, it will be sufficient to see whether it is autopoietic" (2016, p. 138). What does this say for systems that are typically considered non-living, but for which autopoiesis could be applied? Ecosystems? Gaia? Social organizations such as businesses, schools, even nations? All of these questions will require a life's work of deeper inquiry and reflection, but for now I want to explore the relationships between autopoiesis, cognition, and consciousness.

Cognition and autopoiesis are so closely related that it is almost impossible to talk about one without the other. I have already discussed autopoiesis as the structural coupling of an

organism (or system) to its environment. Cognition is the process by which that organism plays a part in the creation of that environment. The innate desire for self-preservation of the organism drives it to learn from its interactions with its environment and develop greater complexity within its own internal structure. There are examples of this throughout the process of evolution: nervous systems, the eye, sensory receptors, locomotion, respiration, photosynthesis, etc. Through cognition the organism not only evolves, but the environment co-evolves alongside it. The first cells to perform photosynthesis created an environment able to support the life which further evolved from that point forward. Autopoietic systems are simultaneously products of their environment and creators of that same environment. Capra and Luisi refer to this relationship between autopoietic unit, cognition, and environment as the “Trinity of Life” (2016, p. 142). I see this also as the allusion made by Gang to an autopoietic system, “bringing forth a world” (2015).

Cognition then could be defined as inherent in all living systems for they are self-organizing and because they “learn” from their interactions with their environment. These interactions can be thought of as mental activity and the systems themselves as “knowing”. While applying the terms “mental”, “mind”, and “knowing” to organisms without brains is far from widely accepted in the largely scientific community, I think the thought process alone is worth the time. When considering that the organism changes its internal structure based on its coupling to its environment, and those successive restructures lead to modified future interactions, a strong case could be made for this as a process of learning. Perhaps it is useful to compare this to a non-autopoietic system. The rock we previously kicked will not change its internal structure and alter its future interactions based on previous interactions. The rock is not learning. In this way I will apply the term cognition to living, autopoietic systems. I find a

helpful definition of cognition to be, “not a representation of an independently existing world but rather a continual bringing forth of a world through the process of living” (Capra & Luisi, 2016, p. 256). Whereas the Cartesian thinker states, *I think therefore I am*, the systems thinker states, *I self-organize and connect therefore I am*. Admittedly not as catching but perhaps closer to the truth.

Let us now take one step further and differentiate cognition from consciousness.

Consciousness is the evolution of cognition to a higher plane of order with the prerequisite of a brain and nervous system. A cognitive system is aware of its environment, but a conscious system is also aware of itself. Capra and Luisi identify two types of consciousness: primary consciousness that involves its placement within the context of its immediate surroundings through sensorial perception and higher-order consciousness that requires a more developed sense of self and reflecting upon past memories, creation of an identity, and anticipation of the future. Higher-order consciousness has manifested itself in the great apes, specifically humans. It is higher-order consciousness that has allowed humans to create our vast array of mental constructs of language, ethics, philosophy, science, religion, etc. (I feel the need to interject a question here for consideration: can these human constructs be considered self-organized bifurcation points emergent from a critical condition in degrees of freedom?) So, is consciousness the result of systems, or are systems an emergent property of a fundamental consciousness?

Based off the work of the cognitive scientists, specifically Antonio Damasio, Capra and Luisi have summarized contemporary findings into the nature of consciousness as, “not located in a specific part of the brain, nor can it be identified in terms of special neural structures. It is an emergent property of a particular cognitive process...” (2016, p. 265). Damasio posits that

the most basic level of consciousness within the human being—the “protoself”—is the result of the brain continuously mapping the current condition of the internal autopoietic system. This protoself is the core foundation from which a greater realization of self can begin to take place. Damasio goes on to draw a distinction between emotions and feelings. Emotions are the chemical and neurological responses to environmental factors that regulate internal functions and aid in self-preservation. Emotions are the result of our deep evolutionary process and the countless interactions of our biological autopoietic ancestors with their environment. Feelings are the mental images that our brain makes in response to emotions. It is the layering of these mental images over the protoself that results in the continuous or “stream of” consciousness we experience.

Damasio’s core consciousness is created in pulses, each pulse triggered by an object that we interact with or recall. The continuous stream of consciousness arises from the steady generation of consciousness pulses that correspond to the endless processing of myriad objects, whose interactions, actually or recalled, modify the protoself. (Capra & Luisi, 2016, p. 270)

For Damasio, this stream of consciousness, or core self, relates to the primary consciousness described earlier as the consciousness of the senses in reaction to the immediate environment. Humans are also capable of higher-order consciousness and forming not only a core self, but also an autobiographical self. This self is a story we create for ourselves based off of the vast amounts of mental images we gather throughout our interaction with our environment and our own internal system. The autobiographical self evolves over time but remains relatively consistent throughout an individual’s life. I can tell you a story of my life and who I am, regardless of whether those memories are “true” or not. It is the mental images that are used to create that story which create this reflective self. Perhaps here is yet another example of the

creative forces between two dueling forces providing the dynamic tension required for actualization.

Humans have developed core consciousness to place themselves in context within their immediate environment and reflective consciousness to place themselves in context of their own self-identity. But humans have also developed language that is inexorably linked to the development of human consciousness. Language is the forming of abstract images in order to coordinate action. Our consciousness is so tied to these abstract images (ethics, strategy, morality, knowledge) that we cannot separate our consciousness from our language. This leads to the metaphors that we as individuals use to process and understand the world. The metaphors we use to understand the world allow us to extrapolate our fundamental experiences and interactions into theoretical abstractions. It is through these metaphors that we interact with others in the societal systems we have created.

Systems thinking is a unification of the myriad phenomena within our universe. It connects the quantum nature of matter, the Trinity of Life, and cosmogenesis and nests it within a universal holarchy. It is a complete paradigm shift in every facet of observing and thinking about the world. As I reflect upon the gravity of these statements I am reminded of what chaos theory teaches us about the nature of simplicity and complexity. As infinitely complex and beautiful as the universal holarchy is, it is unified by systems thinking because of its very nature. Everything is connected! And this is not new information. We know more about the nuances through our scientific inquiries now than ever before, but the understanding of interconnectedness is ancient wisdom held by humans since the beginning of our story. In fact, the Cartesian reductionist worldview seems to be the aberration in human thinking. Human societies and ancient wisdom have understood our world as a complex interconnected system for

thousands of years. Systems thinking is a return to that ancient wisdom which placed the human not atop a hierarchy, but within a holarchy. Can we use the foundation that has been laid in cosmogenesis and systems thinking to better understand the role of education in unlocking the potentiality of humans?

Human Motivation and Development

“Beware of unearned wisdom” – Carl Jung

Montessori: The Four Planes of Development

Maria Montessori was born in 1870 in Italy. In 1896, she was one of the first women to graduate from an Italian medical school. Over her career as an educator, she created a radical and revolutionary approach to education through strict adherence to scientific observation of children and their behavior. One of her great works—which in turn guided the development of

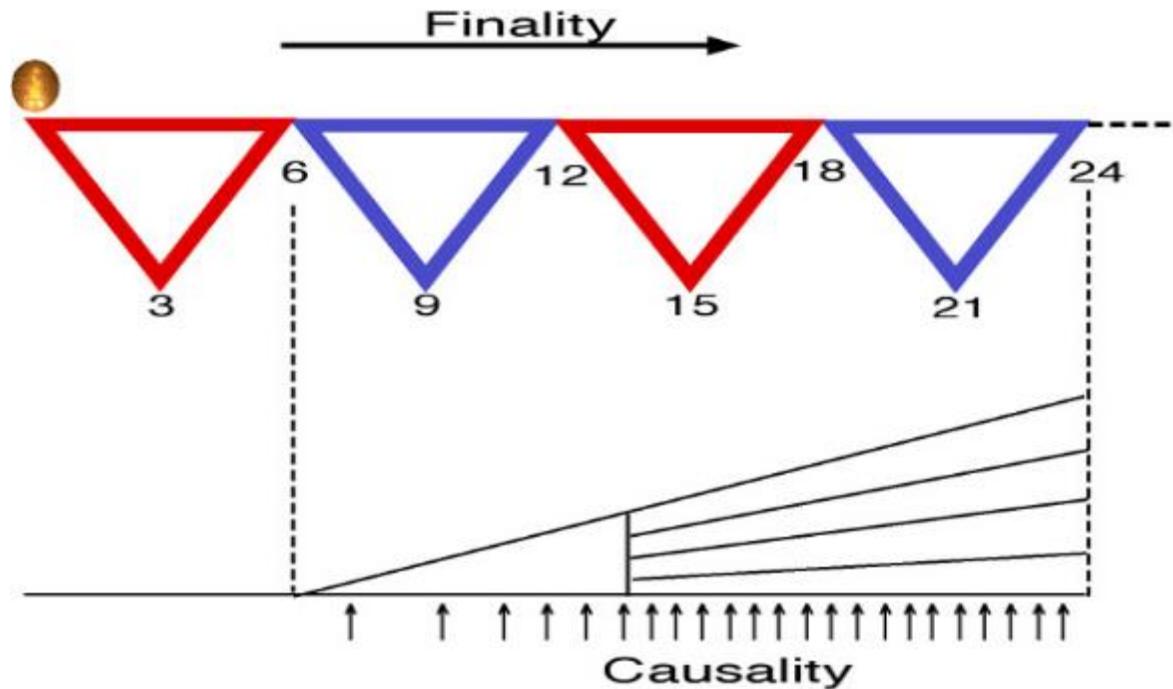


Figure 3. The four planes of development as given by Maria Montessori at a lecture in Perugia, Italy in 1950. (Photo: Philip Snow Gang; <https://campus.ties-edu.org/category/lc28-conferences/lc28-montessori-learning-insights/four-planes-of-development/>)

her pedagogy—was identifying the planes of development encompassing the growth of a child from birth through age 24, which she considered maturity. Montessori divided these 24 years into four distinct phases or sensitivity periods, considering the physical, intellectual, emotional, and social developments of the individual.

Figure 3 shows her planes of development represented by the four blue and red triangles with the traditional educational system view of development represented below. The first and most striking observation I made from this chart was the dichotomy between the linearity of the traditional development and the nonlinearity of Montessori's development. Each triangle represents a six-year plane of development during which the individual is sensitive to specific types of growth and the acquisition of specific types of knowledge. Each plane of development is further divided into three-year periods representing the opening (left side) and closing (right side) of these sensitivity periods. While each phase of development is necessary and prepares an individual for the next phase, “The characteristics of each are so different that the passages from one phase to the other have been described by certain psychologists as ‘rebirths’” (Montessori, 1971, p. 3). This notion of cycles of development between rebirths is contrasted against the linear, uniform development understood by traditional educational systems. Figure 3 shows the words “Finality” and “Causality” corresponding to Montessori’s view of development and the traditional view of development, respectively. Causality is the notion that children are born as empty vessels, and it is the responsibility of the adults to fill that empty vessel with knowledge. In this traditional view, adults are responsible for the creation (cause) of any knowledge gained by children (effect). Montessori chose finality to describe her planes of development. Finality has been described as, “The principle that everything is predisposed towards a specific end. A direct and genuine expression of creation, teleological in nature” (Gang, 1982, p. 6). In this

concept of finality, we are introduced to a fundamental principle of Montessori education: the autonomous nature of the child.

According to Montessori, newborn children possess within them all the necessary potentiality to become a fulfilled and productive individual and member of society. Montessori referred to this post-natal period as a second embryonic stage that is unique to humans. It is within this post-natal stage in which children learn directly from their environment. In *The Absorbent Mind*, Montessori describes post-natal children's relationship to their environment:

The developing child not only acquires the faculties of man: strength, intelligence, language; but, at the same time, he¹ adapts the being he is constructing to the conditions of the world about him...The child has a different relation to his environment from ours. Adults admire their environment; they can remember it and think about it; but the child absorbs it. The things he sees are not just remembered; they form part of his soul. He incarnates in himself all in the world about him that his eyes see and his ears hear. In us the same things produce no change, but the child is transformed by them. (1949/1984, p. 69)

The left side of the first triangle shows these first three years of life: active self-creation and construction. At around the age of three, children begin to shift in their development; they have a need and desire to make conscious the functions and abilities they have been creating. Children do this through the manipulation and mastery of their environment. Working with their hands, children are able to satisfy their own developmental needs within a prepared environment. It is the role of the Montessori teacher to prepare and protect this environment through which the children may have the freedom to develop independently. It is not a freedom in the sense of having no boundaries, for Montessori is quick to make the distinction that,

...liberty is not to be free to do anything one likes, it is to be able to act without help...in order to grow, [the child] must be active in tasks his intelligence tells him he can do and if people go to help the child, they act instead of him. (1971, p. 4)

¹ I have elected to retain the original gendered pronoun usage when quoting authors. Although it is not the accepted form today, I have chosen to keep the authors' original writings.

It is through this autonomous mastery of the environment that children are able to create their will and personality. This first plane of development is colored red to represent this as a creative phase. The creation of the senses and necessary basic human functions, as well as the creation of the will and personality.

The second phase describes the ages between six and twelve, and is colored blue because Montessori regarded this as a “calm” phase of growth between two creation phases. The development in this phase is categorized by an abstraction of knowledge and the acquisition of human culture. The second phase of development is considered to be in nature a period of more consistent growth rather than of active creation.

We are confronted with a considerable development of consciousness that has already taken place, but now that consciousness is thrown outwards with a special direction, intelligence being extroverted, and there is an unusual demand on the part of the child to know the reasons of things. (Montessori, 1948/2007, p. 3)

The education for these children must be expanded to include all the realms of human culture and the story of the universe. Montessorian Camillo Grazzini described the approach to education for this phase thusly, “The powers and possibilities during this period are so great that, as Montessori points out, it is easy to underestimate his capacities and thereby set up unnecessary limits and restrictions” (1996, p. 35). The answer to these children’s social and intellectual appetites is through Cosmic Education, which will be discussed in detail later.

In the third or adolescent phase of development, ages twelve to eighteen, Montessori returns to the color red to signify another period of creation that refers to the transformation from childhood towards adulthood; physically, intellectually, emotionally, and socially. In *Rethinking Education*, Philip Gang describes the developmental tension that arises during this period, and the potential for creativity from that tension.

Adolescents seek autonomy through cognitive, moral and ego development. If young people do not have a positive identity they will not act according to their moral principles. They will have difficulty using their new-found abstract thinking abilities for positive differentiation and individuation (1989, p. 109).

Just as in the earlier creative plane of development between birth and the age of six, we can see a striving for autonomy and independence, this time within the context of greater society as opposed to the immediate environment. In my observations of these different levels of development, I have noted that in many ways the children who are three-to-six and twelve-to-fifteen have more in common than those who are six-to-twelve. It is this search for autonomy that “occurs when individuals, in making decisions, look within themselves at their own thoughts and principles, rather than responding to external stimuli...” (Gang, 1989, p. 109). This shows true individual realization and autonomy rather than the replacement of personal growth with the external pressures of others or greater society. Although her development of the educational approach to the adolescent period is not as thorough as that of the earlier periods, Montessori had some clearly espoused views and there have been several Montessorians to continue her work. The core of her view towards adolescent education revolves around economically productive work, which leads to and teaches economic freedom and independence, contribution to the larger society, and self-confidence and worth.

Ages eighteen to twenty-four create the fourth phase of development which, similar to the second phase, is a time of abstraction and more uniform growth. Montessori connects this stage to the traditional university study where an individual can find and begin to realize their personal life’s mission. Only if the individual has been fully formed and realized can they fulfill their potentiality to the greater world.

...this is a time of life (if all has gone well before) when the individual can develop the spiritual strength and independence for a personal mission in life. This individual can become a human being whose aspirations have transcended the temptation of personal

advantages in the way of power and possessions, a human being who has attained a high level of moral conscience and responsibility and can work for the good of humanity. (Grazzini, 1996, p. 37)

Is the greatest potential path forward for humanity and (as a result of our actions) Gaia through the full development and respect for the personal liberty of autonomous individuals? If a commitment to individualism is made, can the self-realization of the individual work towards the greater good of the world? These questions will guide the rest of my journey.

Hierarchy of Needs

Psychologist Abraham Maslow is perhaps best known for his “Hierarchy of Human Needs”. His work on fundamental human needs and their relation to human motivation have been used ubiquitously throughout education, psychology, sociology, management, organizational leadership, etc. In *A Theory of Human Motivation*, Maslow identified five categories of human needs that motivate behavior and arranged them in a hierarchical manner in the sense that each need is prepotent to the subsequent need(s). That is to say that if one need is not sufficiently satisfied, then the motivating factors of the following need are not relevant.

Figure 4 gives a visual representation of this hierarchy.

The most basic and prepotent of human needs are physiological. These are the needs that are required to achieve homeostasis as a biological individual: breathing, food, water, excretion, warmth, etc. These



Figure 4. Maslow's Hierarchy of Needs as described in *A Theory of Motivation* (1943).
(Photo: <https://medium.com/coachilla-hq/the-new-hierarchy-of-needs-maslows-lost-apex-5e51031ce3fb>)

needs are the most prepotent because if they are not satisfied adequately, then the body as a biological entity will cease to function.

Undoubtedly these physiological needs are the most prepotent of all needs. What this means specifically is, that in the human being who is missing everything in life in an extreme fashion, it is most likely that the major motivation would be the physiological needs rather than any others. A person who is lacking food, safety, love, and esteem would most probably hunger for food more strongly than for anything else...For the man who is extremely and dangerously hungry, no other interest exists but food...The urge to write poetry, the desire to acquire an automobile, the interest in American history, the desire for a new pair of shoes are, in the extreme case, forgotten or become of secondary importance. (Maslow, 1943/2013, p. 3)

Clearly, the basic physiological needs of humans must be adequately met before any further development can take place. As vitally important as the physiological needs are, they will not be a direct focus of this paper.

The next category of needs based on prepotency are the safety needs. These include personal, emotional, financial, health and well-being, protection from the adverse effects of the environment. In absence of having these needs met at a basic level, a human will seek safety and relief from whatever circumstances inhibit that particular need. Although Montessori developed the bulk of her work on the planes of development prior to Maslow's work on human needs, a clear connection can be seen between the two and their observations have a strong compatibility. Maslow acknowledged that the safety needs are best observed through the developmental needs of children, "Another indication of the child's need for safety is his preference for some kind of undisrupted routine or rhythm. He seems to want a predictable, orderly world. For instance, injustice, unfairness, or inconsistency in the parents seems to make a child feel anxious and unsafe" (1943/2013, p. 5). Maslow's statements on a child's need for undisrupted routine align with Montessori's description of the first plane of development and the importance of the prepared environment in a Children's House (3-6 year old) classroom. In regard to the question

of justice and fairness, anyone who has spent time around 6-12 year olds knows just how important this concept is in their lives. Montessori attributed this strong need for safety in children to their internal development of a system of ethics:

An example of this was given by a teacher who had a child who was always coming to her, telling what naughty things other children had done: “is that good or bad?” “Telling on others is not right” she answered finally. But he persisted in coming. Other times he was referred something positive, always asking the same question. It was only later that the teacher realized that this child was seeking to establish in his mind, as a guide to his own behavior, what was good and what was bad in the class. (1971, p. 7)

I will continue to explore this inherent development of a values system and the basic need for it later in this paper, especially in its correlation to Cosmic Education and the 9-12 classroom.

The next level of human needs according to prepotency is that of love and belonging. Even if an individual’s physiological and safety needs are fully and completely met, Maslow felt that individual would not survive (at least in any way we would consider human) in isolation.

The need for community...is itself a basic need. Loneliness, isolation, ostracism, rejection by the group—these are not only painful but pathogenic as well...Humanness and specieshood in the infant are only a potentiality and must be actualized by the society. (1964/2014, p. 12)

This is the point of development at which I first see the ripples of the primal paradox. Mario M. Montessori Jr., psychologist and Maria’s grandson, clearly states this paradox in *Education for Human Development*, “...human development is the result of an unconscious creative activity of the individual, and that this process is only possible in association with others. It is only in the community that man’s potentialities can be realized” (1977, p. 6). Here, M.M. Montessori Jr. states that not only is the greater community a basic need for individuals, it is necessary for the full development of that individual. Montessori herself saw the greater community as the place in which human individuals are able to apply the fruits of their continual development. She asked us to, “...consider two parts in humanity—that which is forming itself and that which

applies its formation” (1949/2002, p. 74). This interplay between the individual and the community will continue to be a focus of the paper moving forward. Throughout my journey in researching and writing this paper, it is this interplay and the distinction between an individual and the greater community through which that individual manifests his or her creative functions that I continue to come back to as the driving question. All of my other explorations throughout this journey are referent back to this interplay, the primal paradox.

Following love and belonging, the next prepotent human need, according the Maslow, is esteem. This includes a level of self-esteem and self-respect as well as a level of esteem and respect for others. “Satisfaction of the self-esteem need leads to feelings of self-confidence, worth, strength, capability and adequacy of being useful and necessary in the world. But thwarting of these needs produces feelings of inferiority, of weakness and of helplessness” (Maslow, 1943/2013, p. 7). Here again we see a strong similarity between the writings of Montessori and Maslow:

For success in life depends in every case on self-confidence and the knowledge of one's own capacity and many-sided powers of adaption. The consciousness of knowing how to make oneself useful, how to help mankind in many ways, fills the soul with noble confidence, with almost religious dignity. The feeling of independence must be bound to the power to be self-sufficient, not a vague form of liberty deducted from the help afforded by the gratuitous benevolence of others. (Montessori, 1948/2000, p. 64)

Montessori expands upon the source of esteem, identifying usefulness, independence, and self-sufficiency as sources of self-confidence.

D-Needs and Normalization

Maslow identified these first four categories of human needs as the deficiency needs or D-needs, meaning that any one individual that has not adequately satisfied any of these needs will be unhealthy. I see a strong correlation between Maslow's D-needs and Montessori's concept of normalization. For me, normalization is at the heart of what separates the Montessori

method from other pedagogies. What is ironic is that my first reaction to the term normalization was a rather negative one, as I was averse to the idea that there was some “normal” standard to which we hold children. Upon further exploration of the concept through Montessori’s readings and dialogue within the community of Montessorians, I came to find a deeper, more rich understanding of normalization. Normalization is not the judging of individuals against some greater “norm”, it is the state of being when a child (or adult) is intrinsically able to engage in their own development through the communion with their environment.

In consequence of this normalization the children do not become ‘obedient to a teacher who gives them lessons and corrects them,’ but they find their guide in the laws of nature, i.e. they start again to function normally. Then they can reveal to us by their outer behavior that kind of psychic physiology, which, like the physiology of the body, functions within... (Montessori, 1955/2007, p. 34)

Just as a human is not healthy unless their D-needs are fulfilled adequately, a child cannot adequately develop if they are not normalized. Normalization depends heavily upon these D-needs. If the physiological, safety, love/belonging, and esteem needs of a child are not satisfied, then he or she will never be able to fully normalize and develop.

In respect to this phenomenon of increased frustration tolerance [resiliency], it seems probable that the most important gratifications come in the first two years of life. That is to say, people who have been made secure and strong in the earliest years, tend to remain secure and strong thereafter in the face of whatever threatens. (Maslow, 1943/2013, p. 11)

Montessori’s concept of normalization goes one step further in that it requires the preparation of an environment (physical, psychical, and noetic) which at its aim promotes the autonomy, freedom, and individual liberty of the child to develop according to the intrinsic motivations held deep within each person. Montessori attributed “character flaws” to the deviation from a normalized development, i.e., to the environment and/or adult presence rather than as stemming intrinsically from the child himself or herself.

...when the environment offers motives for constructive activity, all the energies concentrate together and the deviations disappear. Only then, when the child has the possibility, the freedom, to develop normally, will we see the true personality of the child. It is this process of transition from deviated to normal development that Montessori called normalization... (Grazzini, 1996, p. 34)

In *A Theory of Human Motivation*, Maslow identifies that individual freedoms as not only the most important aspects of the basic needs, but as a precondition for the satisfaction of these needs to occur. He goes on to say that, “These conditions are not ends in themselves but they are almost so since they are so closely related to the basic needs, which are apparently the only ends in themselves” (1943/2013, p. 8).

Normalization is the core foundation with which Montessori built the rest of her pedagogy. It is important to stress that normalization is not the bestowing of a pre-determined value system or ethic on an individual child. On the contrary, for Montessori, it is the adult that too often interferes with the normal development of the child. In *The Formation of Man*, Montessori implores the adult educator to rethink the role of “teacher”:

Hence a prejudice has found its way into the adult—the notion that the life of the child can be changed or improved only through teaching. This prejudice impedes the understanding of the fact that the child constructs himself, that he has a teacher within himself and that this inner teacher also follows a program and a technique of education, and that we adults by acknowledging this unknown teacher may enjoy the privilege and good fortune of becoming its assistants and faithful servants by helping it with our co-operation. (1955/2007, p. 46)

In thinking about normalization in relation to the planes of development, I see a great urgency and importance on creating and promoting an environment that encourages normalization from a young age in order to maximize the development appropriate with each sensitivity period. “Inner development must precede independence. Therefore, it is this inner development that is the child’s major task. To accomplish it, the child is equipped with certain potentialities that do not exist; as such, in adults” (Montessori Jr., 1977, p. 19). I do not want to

overstate the point by saying that change is impossible if it has not been reached by a certain age, but that change and development will not be as whole and deep-seeded as if it were to take place during the appropriate sensitivity period for that particular development. An easy example from my classroom would be handwriting. Montessori discovered that the sensitivity period for handwriting was quite a bit younger than previously believed, and thus today in Montessori schools it is taught in the 3-6 classroom. I am constantly amazed at the beautiful cursive handwriting that my students display. When there is a student that comes into my classroom without Montessori experience, he or she often struggles quite a bit with handwriting, and almost never knows cursive. Although it is possible for them to learn cursive, it is a constant struggle and requires an inordinate amount of effort and time to learn a skill that was learned by the 3-6-year-old almost innately without such a struggle. The older student will also rarely if ever show the same mastery and command of the skill, precisely because they are passed the sensitivity period for that particular skill.

Through normalization, and thus through a commitment to individuality, the individual is capable of having the greatest effect on society. Because the greater community is where we must actualize ourselves, we are the holon developing within the greater holarchy and perhaps normalization can be thought of in another way: as the re-centering of a human's thoughts and actions to become aligned with the work of the greater holarchical system. Normalization is simultaneously the development of the individual and the community, a creative interplay within the primal paradox. Or as Montessori states in *Education and Peace*, "Education must foster both the development of individuality and that of society. Society cannot develop unless the individual develops, as we learn from observing the child, who immediately uses his newly won independence to act on a social environment" (1949/2002, p. 56).

Self-Actualization and Self-Transcendence

If all of the D-needs are met and an individual may be considered to be fully healthy, is this the ultimate state of existence for any one human? Can this individual be said to have fully reached their potential? I am going to guess that most people would respond no, that there is something more to life than simply satisfying our basic needs. Maslow agreed and laid out his line of questioning in *A Theory of Human Motivation*,

Even if all these needs are satisfied, we may still often (if not always) expect that a new discontent and restlessness will soon develop, unless the individual is doing what he is fitted for. A musician must make music, an artist must paint, a poet must write, if he is to be ultimately happy. What a man can be, he must be. This need we may call self-actualization. (1943/2013, p. 7)

If all of my D-needs have been met, and will continue to be met in perpetuity, but my life lacks a deeper meaning, a deeper understanding of purpose, of contribution, although I will be perfectly “healthy” I have not reached my ultimate potentiality as a human. I have not reached my optimum trajectory as an individual, and therefore I have also not pushed the human species towards its optimum trajectory. In introducing his concepts of logotherapy, psychiatrist Viktor Frankl supposes that not only is this greater meaning necessary for the full potential of a human to be expressed but that, “Man’s search for meaning is the primary motivation in his life...This meaning is unique and specific in that it must and can be fulfilled by him alone...” (1959/2006, p. 99). Maslow believed that very few people in our society are indeed self-actualized. Obviously this is impossible to objectively quantify, and Maslow himself was quick to point this out, but his view (through his observation, research, and clinical work) remained that the vast majority of people never reach this stage, at least not fully. It should also be pointed out that self-actualization is certainly a lifelong process and, just as elsewhere in the cosmos, a story of creative tension: “...between what one has already achieved and what one still ought to

accomplish...Such a tension is inherent in the human...We should not be hesitant about challenging man with a potential meaning for him to fulfill" (Frankl, 1959/2006, p. 105).

What does a self-actualized individual look like? First I believe it important to further clarify Maslow's thoughts on prepotent needs. It is not as though a need must be 100 percent satisfied in order for the need to become a motivating factor. Only in extreme circumstances (i.e. starvation) would even the most basic need of safety be an afterthought. However, as Maslow notes,

Another peculiar characteristic of the human organism when it is dominated by a certain need is that the whole philosophy of the future tends also to change. For our chronically and extremely hungry man, utopia can be defined very simply as a place where there is plenty of food. He tends to think that, if only he is guaranteed food for the rest of his life, he will be perfectly happy and will never want anything more... (1943/2013, p. 3)

An important personal realization from Maslow's understanding of prepotency is that it is possible for the higher needs to not appear until the more prepotent needs become satisfied to a sufficient level. As an educator, the question of prepotency is vital to me, especially if the goal of education is to move a child towards their own self-actualization. Is there a prepotent need that has not been sufficiently fulfilled that must be satisfied before they can begin to ask the higher questions? Maslow again,

In actual fact, most members of our society who are normal, are partially unsatisfied in all their basic needs at the same time. A more realistic description of the hierarchy would be in terms of decreasing percentages of satisfaction as we go up the hierarchy of prepotency. For instance, if I may assign arbitrary figures for the sake of illustration, it is as if the average citizen is satisfied perhaps 85 percent in his physiological needs, 70 percent in his safety needs, 50 percent in his love needs, 40 percent in his self-esteem needs, and 10 percent in his self-actualization needs. (1943/2013, p. 11)

So, for instance, a person who is only 30 percent satisfied in his or her physiological needs and only 10 percent in his or her safety needs will most likely not feel any motivation or drive from his or her self-esteem needs, let alone his or her self-actualization needs. This is what is meant

by prepotency. An easy example of this from my own classroom is that of proper sleep and nutrition. For students who are coming into the classroom under-slept and under-nourished, they are unable to ascend the first rungs of the motivational needs, and certainly cannot begin to delve into the greater questions which will guide them towards their cosmic task.

Along with Deficiency-needs, Maslow ascribed Deficiency-values. These are any values or motivations that result from the lack of having something. These values tend to be more self-centric and vain. I do not believe there should be any moral implication placed on this self-interest, much of which stems unconsciously from the intrinsic drive to live. However, when an individual *is* sufficiently satisfied in these D-needs, that is when a higher set of values is to be called upon to fulfill self-actualization. Montessori herself noted this in *Education and Peace*, “Every human being has his own interests in mind (though perhaps not in any conscious way); every individual acts in his own interest...Selfishness enters the picture only with regard to seeking possessions and power” (1949/2002, p. 108). Maslow referred to these higher values as Being-values to correspond with Being-needs. Below is a list of these B-values as compiled by Maslow in *Toward a Psychology of Being* (1962/2014, p. 75):

1. Wholeness: (unity; integration; tendency to oneness; interconnectedness; simplicity; organization; structure; *dichotomy-transcendence*²; order)
2. Perfection: (necessity; just-right-ness; just-so-ness; inevitability; suitability; justice; completeness; oughtness)
3. Completion: (ending; finality; justice, it's finished; fulfillment; finis and telos, destiny; fate)
4. Justice: (fairness; orderliness; lawfulness; oughtness)
5. Aliveness: (process; non-deadness; spontaneity; self-regulation; full-functioning)
6. Richness: (*differentiation*; complexity; intricacy)
7. Simplicity: (honesty; nakedness; essentiality; abstract; essential; skeletal structure)
8. Beauty: (rightness; form; aliveness; simplicity; richness; wholeness; perfection; completion; uniqueness; honesty)
9. Goodness: (rightness; desirability; oughtness; justice; benevolence; honesty)

² Italics added by author for emphasis on values particularly of interest in context of cosmogenesis, Cosmic Education, and Montessori.

10. Uniqueness: (idiosyncrasy; *individuality*; non-comparability; novelty)
11. Effortlessness: (ease; lack of strain; striving or difficulty; *grace*; perfect; beautiful functioning)
12. Playfulness: (fun; joy; amusement; gaiety; humor; exuberance; effortlessness)
13. Truth/Honesty/Reality: (nakedness; simplicity; richness; oughtness; beauty; pure, clean and unadulterated; completeness; essentiality)
14. Self-sufficiency: (*autonomy*; *independence*; not-needing-other-than-itself-in-order-to-be-itself; self-determining; environment-transcendence, separateness; living by its own laws)

The values on this list are not mutually exclusive to each other and I would not consider someone who does not display all of these qualities to necessarily be a lesser human. These values, according the Maslow, are simply the facets of “Being-ness” not mechanistic parts of a whole. Perhaps the most important thing to take from this list of values is that all of them result from an individual striving to be better, not from a deficiency in some basic need. Maslow referred to this striving as “metamotivation”. A self-actualized person (or someone working towards self-actualization) is motivated by factors beyond his or her basic needs. It is through this motivation, which while not deficiency correlated, is still intrinsic and leads the individual to his or her optimum trajectory in life.

Montessori has a strikingly similar concept to Maslow’s self-actualization, although she extended it beyond the human to the rest of Gaia, both living and non-living. She used the phrase “cosmic task” to refer to either an individual’s or a species’ function within the greater holarchy. Montessori illuminates for us the concept of a cosmic task in *To Educate the Human Potential*. She tells a story of the early oceans and how as more and more rain began to fall on Earth’s early land, erosion was magnified due to their being no life on earth yet. The vast amounts of minerals, and particularly calcium, was being to choke and pollute the ocean waters. It was the emergent properties of life itself that was able to find the solution. Thus, the trilobites, cephalopods, crinoids, and later the corals were able to take the excess calcium from erosion and use it in their very being. The individual crinoid who used minerals to grow tall and wide was

doing so by its instinctual drive to fulfill its crinoid potentiality (its self-actualization?), but in doing so it (along with the species as a whole) fulfilled its greater cosmic task: to remove excess minerals from the ocean to help promote greater abundance of life (Montessori, 1948/2007).

What Montessori is calling for is for education to promote each individual towards self-actualization, to find his or her cosmic task:

This harmony, based on the need of each and all, is of divine origin. That is why man has no conception of it and perceives only his own immediate needs. But if man could raise his consciousness to a higher level he would awaken and be aware of the disinterested goodness and self-sacrifice of his fellows. If we educate children to see this, they will ready themselves to feel gratitude toward all mankind. This is an effective aspect of our ‘cosmic education’. (1949/2002, p. 118)

Maslow also saw education as the driving force with which to maximize both individual and species-wide potentiality. At its core, he thought that education should,

...aid the person to grow to fullest humanness, to the greatest fulfillment and actualization of his highest potentials, to his greatest possible stature. In a word, it should help him to become the best he is capable of becoming, to become actually what he deeply is potentially. (1964/2014, p. 62)

Psychologist Carl Jung had a similarly expanded view of self-actualization. He referred to the entire lifelong process as “individuation”. Jung describes individuation as not a noetic property but rather as, “an expression of that biological process – simple or complicated as the ease may be – by which every living thing becomes what it was destined to become from the beginning” (Stevens, 1994, p. 81). Jung posited that individuated people (self-actualized?) are the keepers of wisdom for a society and contribute the greatest to the well-being of society.

To individuate is to realize one’s personal existence as a unique expression of humanity and, within the frail vessel of one’s little psychic world, to distill the essence of creation. In this microcosmic experiment the great cosmos becomes conscious of itself (Stevens, 1994, p. 84)

Moving forward, I will refer to self-actualization, cosmic task, and individuation as it is appropriate in their context to the originator of the concept (Maslow, Montessori, and Jung

respectively); however, I would like to point out that I believe all three concepts to be common in their fundamental principles.

Later in his career, especially in *The Farther Reaches of Human Nature*, Maslow critiqued his own work by adding a sixth category of needs after self-actualization: self-transcendence (1971/1976). The beginnings of his thinking can be found in the following paradox he presents in *Towards a Psychology of Being*:

As he [the self-actualized] gets to be more purely and singly himself he is more able to fuse with the world, with what was formerly not-self, e.g., the lovers come closer to forming a unit rather than two people, the I-Thou monism becomes more possible, the creator becomes one with his work being created, the mother feels one with her child, the appreciator becomes the music (and it becomes him) or the painting, or the dance, the astronomer is “out there” with the stars...That is, the greatest attainment of identity, autonomy, or selfhood is itself simultaneously a transcending of itself, a going beyond and above selfhood. The person can then become relatively egoless...

I wish to underscore one main paradox...The goal of identity [self-actualization] seems to be simultaneously an end-goal in itself, and also a transitional goal, a rite of passage, a step along the path to the transcendence of identity... If our goal is the Eastern one of ego-transcendence...then it looks as if the best path to this goal for most people is via



Figure 5: An updated version of Maslow's hierarchy of needs, including self-transcendence. (Photo: <https://medium.com/coachilla-hq/the-new-hierarchy-of-needs-maslows-lost-apex-5e51031ce3fb>)

achieving identity, a strong real self, and via basic-need-gratification rather than via asceticism. (1962/2014, pp. 93-100)

In reanalyzing his own set of human needs, Maslow ran head first into the primal paradox. Here Maslow started to make a clear distinction between the self-actualized person, still perfectly healthy and productive individuals, but still motivated by needs of the self. The self-transcendent individual is motivated by purely altruistic, or transpersonal (Maslow's phrasing), needs. Although self-transcendence is certainly possible in single acts, or moments of sustained altruism, the truly self-transcendent human is a fairly unique phenomenon. Two classic examples of the self-transcendent individual would be Mother Theresa and Mahatma Ghandi. Perhaps here we also see the intersection of Frankl's logotherapy and Maslow's motivational needs:

By declaring that man is responsible and must actualize the potential meaning of his life, I wish to stress that the true meaning of life is to be discovered in the world rather than within man of his own psyche, as though it were a closed system. I have termed this constitutive characteristic "the self-transcendence of human existence." It denotes the fact that being human always points, and is directed, to something, or someone, other than oneself—be it a meaning to fulfill or another human being to encounter. The more one forgets himself—by giving to a cause to serve or another person to love—the more human he is and the more he actualizes himself. What is called self-actualization is not an attainable aim at all, for the simple reason that the more one would strive for it, the more he would miss it. In other words, self-actualization is possible only as a side-effect of self-transcendence. (Frankl, 1959/2006, pp. 110-111)

Rearranging the Hierarchy

Along with its widespread usage, Maslow's hierarchy of needs has also received its fair share of criticism. While much of it is well-thought, the bulk of the criticism is at the hierarchy itself as opposed to the observations and ideas of Maslow. He himself was very hesitant to use the word "hierarchy" and was quick to point out that the vast majority of human behavior is a result of the interplay between motivational factors, as well as environmental influences.

“Within the sphere of motivational determinants any behavior tends to be determined by several or all of the basic needs simultaneously rather than by only one of them. The latter would be more an exception than the former” (Maslow, 1943/2013, p. 12). Even at the time of his earliest publications about the prepotent needs, Maslow saw them as more of an interplay of overlapping factors rather than rigid steps ending in the actualized individual. Here we have an issue that every individual has come across: the limiting factor of language to accurately describe new and novel ideas. So much of our experience of the world has an ineffable quality to it, particularly

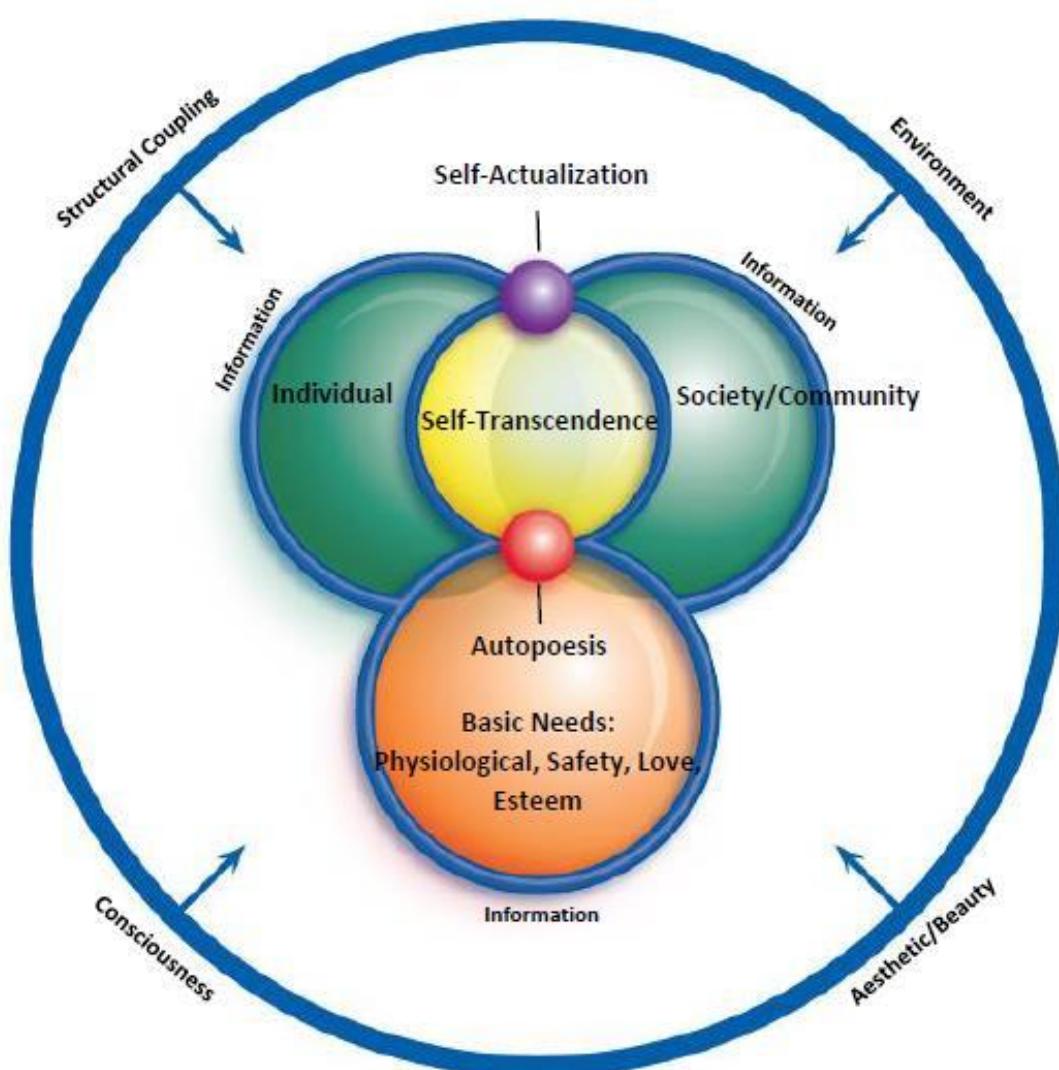


Figure 6: A systems map of human prepotent needs, based on Maslow's theories of motivational needs. (Photo: author's own; systems map template created by Marsha Snow Morgan)

when we are referring to the extremely subjective nature of concepts such as self-actualization and self-transcendence. Maslow talks at great length about science's struggle with the subjective in *Religions, Values, and Peak-Experiences*. "Science can be dangerous to human ends...as long as science is conceived to be akin to a chess game...whose only purpose is to explore the existent, and which then makes the fatal blunder of excluding subjective experience from the realm of the existent or explorable" (1964/2014, p. 29). In order to describe these still very real yet subjective phenomena, it seems to me that we are forced to use language and words that are typically either associated with religion or with reductionist science.

Perhaps thinking about Maslow's motivational needs as a holarchy, as opposed to a hierarchy, can bring a new metaphor to the mind and enable a deeper understanding of these topics. I propose a systems mapping of the human needs as represented in Figure 6. The two green circles are the primal paradox in its essence. The interplay between the individual and the society (or any community) is the backdrop to which all other human development takes place. The red dot represents the stability point of the system that I have labelled as autopoiesis. As autopoiesis is the basic understanding of what it means to be alive and cognitive, all else stems from this fundamental definition. The orange circle is the resource base for the system. I have placed the D-needs (physiological, safety, love/belonging, and esteem) here as without these basic and prepotent deficiency needs adequately satisfied, no other higher work can be accomplished. The purple dot represents the creative phase of the system and corresponds to self-actualization. It is during the process of finding our individual cosmic task that we as humans are at our most creative. Self-actualization, both as a means and an end, allows for our potentiality to be played out amongst the backdrop of the larger system. The yellow circle in the center in the unity point of the system. Self-transcendence is the unity of the whole system. It is

where all the work from the individual facets of the system express themselves as one. The individual must become a strong, actualized self before being able to fulfill his or her purely altruistic potential within the context of society. The self can only be truly actualized through the transcendence of the self. The blue borders surrounding the inner circles are the feedback loops that influence the system, both the individual facets and the system as a whole. The constant information being taken in from the outside world as well as the information coming from within our physiological and noetic selves feeds the greater system and guides its course. The larger exterior blue circle represents the external forces that impact the system. The structural coupling of the autopoietic individual with the environment is the intrinsic creative force that drives change and evolution. Consciousness is the ability of the universe to look back upon itself and the basis for the human endeavors we weave. The aesthetic and beauty of the universe influence and motivate the human in myriad ways, too numinous to ever truly understand but ever-present for the experiencer. “To be looking elsewhere for miracles is to me a sure sign of ignorance that everything is miraculous” (Maslow, 1964/2014, p. 10).

My personal journey through these topics has led to me to apply the insights from systems thinking and chaos theory to the human development theories of Maslow. It is here that I believe we see an integration between the realities of the universe as understood through cosmogenesis and the betterment of the human as understood through Montessori, Maslow, and Jung. By recognizing this consilience, it has given me a stronger and firmer foundation with which to understand and apply the aspirations Maria Montessori had for the role of education in fulfilling the potential of humans as individuals and as a species.

Cosmic Education

If we consider that human intelligence is a psychic faculty, then the universe from the beginning must be a psychic-producing process. To find a place for the human is the difficulty of those who maintain that the universe is simply a material mode of being without an intelligent dimension. (Berry, 1999, p. 192)

An Overview

Cosmic Education is the framework from which Maria Montessori conceptualized the entire elementary experience. She most discretely developed Cosmic Education in *To Educate the Human Potential* and *From Childhood to Adolescence*. The overarching goal of Cosmic Education in Montessori's own words is as follows:

If the idea of the universe be presented to the child in the right way, it will do more for him than just arouse his interest, for it will create in him admiration and wonder, a feeling loftier than any interest and more satisfying. The child's mind then will no longer wander, but becomes fixed and can work. The knowledge he then acquires is organized and systematic; his intelligence becomes whole and complete because of the vision of the whole that has been presented to him, and his interest spread to all, for all are linked and have their place in the universe on which his mind is centered. The stars, earth, stones, life of all kinds form a whole in relation with each other, and so close is this relation that we cannot understand a stone without some understanding of the great sun. No matter what we touch, an atom, or a cell, we cannot explain it without knowledge of the wide universe. (1948/2007, p. 6)

In committing myself to walk the path of my own potentiality by becoming a Montessori educator, I have spent significant time and energy in reading the primary sources, reading and connecting myriad other sources of knowledge and enlightenment, reflecting upon my own experiences and wisdom, and applying this cumulative effort towards my classroom, my students, and my larger community. One thing that I am consistently astounded by is how ahead of her time Montessori's understandings of systems, chaos-creativity, ecology, and cosmogenesis were. Thomas Berry recognized that the answer to many of the problems he identified with humans' relationship to the planet, each other, and themselves lay in Montessori education as laid out by Maria decades previous to his writing of *The Great Work*. Cosmic Education offers

an alternative to an education and science based on the Cartesian-Newtonian reductionist worldview. “The difficulty is that with the rise of the modern sciences we began to think of the universe as a collection of objects rather than as a communion of subjects” (Berry, 1999, p. 16).

In *Children of the Universe*, Montessorians Michael and D’Neil Duffy establish the goal of Cosmic Education much more succinctly, “The goal of Cosmic Education is to guide the child toward an initial examination of the question ‘Who am I?’” (2002, p. 4). While this question may seem too existential cliché to be of any practical use, it is each person’s magnum opus, and therefore the essence to any education.

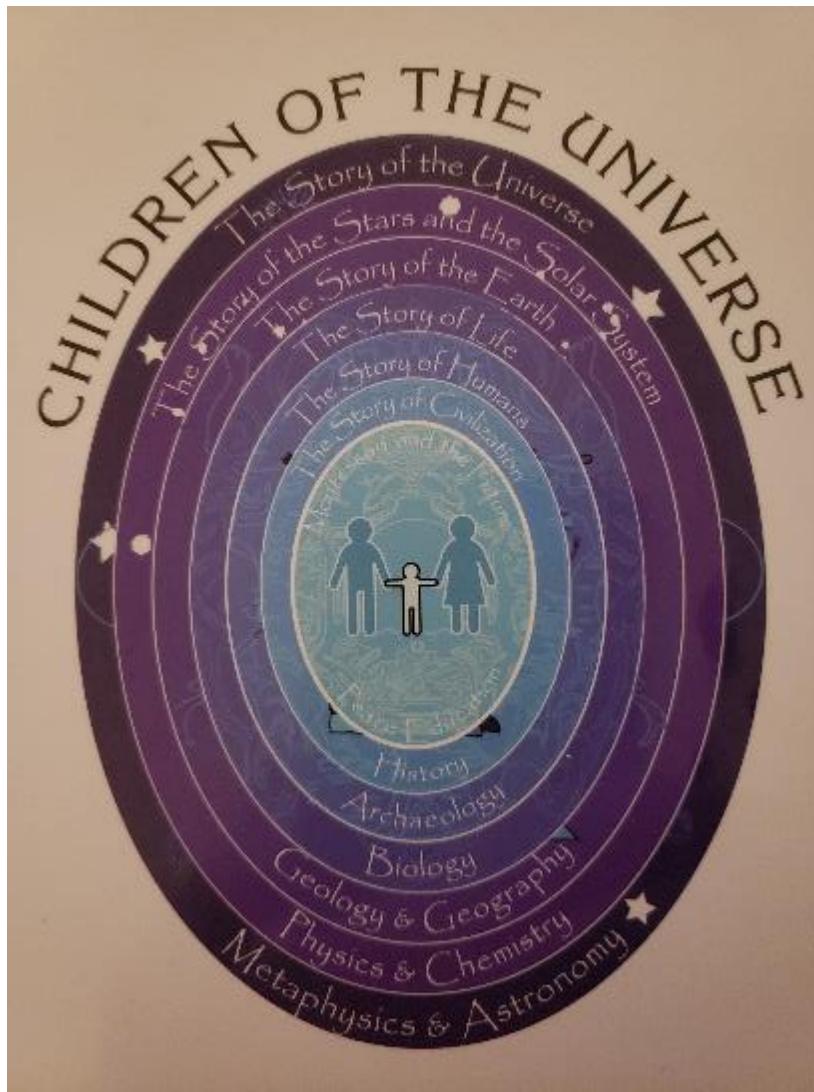
The role of education is to interest the child profoundly in an external activity to which he will give all his potential. We are concerned here with bringing him liberty and independence while interesting him in an activity through which he will subsequently discover reality. And for him this is the means by which he may free himself from the adult. (Montessori, 1948/2000, p. 11)

To me, the genius of Montessori in regard to Cosmic Education is she recognized that the potentiality of society and the human species is achieved through the actions of self-transcendent individuals, the ultimate human potential is self-actualization (cosmic task), self-actualization occurs through the individual’s interaction with his or her society (self-transcendence), self-transcendence occurs through a communion with the universe and the understanding of one’s own place within it (cosmogenesis), the child in the second plane of development is in his or her sensitivity period for the acquisition of cosmogenesis and the beginnings of asking these lifelong existential questions, the role of education should be to give children the universe and guide them towards their optimum trajectory (cosmic task).

Cosmic Education is not to be regarded as a facet within the larger elementary curriculum. It is the lens through which all subjects should be investigated. Certainly, it contains the cultural studies of science, biology, history, and geography. Even language and

mathematics, traditionally thought of as the absolutely most important aspect of an elementary education, are viewed through the lens of cosmogenesis and human culture for, “Language and math are the tools children use to explore their cultural heritage” (Duffy, 2002, p. 29). Children in the second plane are described by Montessori as being within a sensitivity period for the use of their imagination and moving from the concrete, sensorial world of their earlier years, towards a more questioning, abstract reality. Anyone who has spent time with children between the ages of six and twelve know that they have a tendency to ask “Why?” to everything. “Our aim therefore is not merely to make the child understand, and still less to force him to memorize, but so to touch his imagination as to enthuse him to his inmost core” (Montessori, 1948/2007, p. 11). The imagination of the elementary student is seemingly limitless, so why would we as educators build walls within their understanding? Give them the universe and let that be their limit. Knowledge in the form of facts is cheaper and getting cheaper everyday with the proliferation of the internet and technology. The whole of human knowledge is available at our fingertips. Not only is knowledge cheap, “[it] has become independent of its origins, its motivations, its functions. It has become familiar and therefore self-validating” (Maslow, 1964/2014, p. 62). We have more information and facts available to us now than at any point in human history, yet we so often fail to see the greater relationship those facts fit into. We can’t see the wood for the trees. But when children are given the universe as a context, they can place all their discoveries within the greater story as opposed to being lost in a sea of seemingly unrelated facts. “The children’s power of reason is stimulated to search for the connection between all things. Gradually from one detail the children become interested in another” (Lillard P. P., 1996, p. 56).

If the task of the educator is to grab and excite the imagination of children, then the story is the tool with which the educator works. This sense of awe and wonder is crucial to the process



*Figure 7: Representation of Cosmic Education using concentric circles scaling from the universe to the child. (Photo: used from *Children of the Universe* with permission from authors)*

begin to see a common thread connecting every human that has ever lived: the metaphysical questions we ask ourselves. Who am I? Where do I come from? and Why am I here? (Duffy, 2002). The unfolding of the universe illuminates the work of stars, galaxies, and the creation of our solar system. The fundamental forces of our universe, and the seeds of physics and chemistry are sown in the minds of Montessori students through the study of stars, their life cycle, and the elements they create. I will never forget when a child in my class fully understood

of Cosmic Education. As Montessorian John Fowler says, “If children do not have that love of learning, that desire for more, there is little reason to go on other than obedience and an adherence to the do-good stereotype” (2014, p. 341).

Through the telling of the big bang as a story of creation, the first introductions to astronomy are born. By investigating the creation stories of various cultures throughout space and time, students

that the atoms in his left hand could be from a completely different star than the atoms in his right hand. He was filled with such awe and wonder that he was quite literally speechless for minutes. After that experience a calm plateau of joy and contentment followed him for days. This is not some datum of information I could simply hand him. He had to come to this discovery for himself.

The study of life on Earth is a humbling story which can begin with a deeper understanding of geologic time. By teaching life on Earth within the context of deep cosmological time we “utilize the collective wisdom of the entire cosmological process and learn from the diverse processes which have been essential to the emergence of life on our planet” (Fowler, 2014, p. 344). The “Long Black Line” is an impactful lesson in which a 30 meter black strip of fabric is unrolled to reveal a centimeter of red at the end of it; the black representing the span of life on Earth and the red representing the time humans have been around. An investigation into the evolution of life shows humans as not above or superior to nature, but a part of it, a single branch on a massive tree. The story of humanity and human civilizations gifts us with an understanding of human culture and the many advances and geniuses of past humans. Montessori’s focus on the study of civilizations through the lens of the everyday person places an importance not on the rulers, or battles, or specific dates, but on the fundamental human needs that unite us all, past and present. Like the rest of the areas of study, students use and create timelines to demonstrate their understanding of the greater story and evolution of the story. The timelines are fractal, scaling to one another. The red strip at the end of the Long Black Line expands to become a timeline of humans. The small sliver at the end of the timeline of humans expands to become the timeline of civilization.

Throughout the entire process of Cosmic Education, the child is discovering, through their innate abilities, their place within the world. It gives students a consciousness that goes beyond themselves. “Montessori students are taught to see themselves as citizens of the world, a species within the family of living species on Earth, and, ultimately, as descendants of the universe” (Duffy, 2002, p. 128). Montessori believed that this expanded consciousness creates a new type of human, one capable of solving the problems modern society faces. Philosopher John MacMurray spoke to this necessary transformation, “Now is the point in history at which it becomes possible for man to adopt consciously as his own purpose the purpose which is already inherent in his own nature” (Maslow, 1964/2014, p. 51).

Education for a New Human

Montessori’s pedagogy was always about much more than curriculum and the acquisition of knowledge. She truly believed that right education was the pathway forward to a new world in which humans raise their consciousness to the point of ushering in a new paradigm of gratitude and peace. From *The Absorbent Mind*, “The child is endowed with unknown powers, which can guide us to a radiant future. If what we really want is a new world, then education must take as its aim the development of these hidden possibilities” (Wolf, 1996, p. 4). In trying to understand and give context to how Montessori felt about the greater role of education in society, it has been helpful for me to remember the time and place of Montessori’s development of Cosmic Education. In 1939 Maria and her son Mario traveled to India to give a training course lasting three months with the intention of a series of lectures around India (Kramer, 1988, p. 241). When Italy entered World War II on the side of the Germans in June of 1940, all Italian citizens in territories under the control of Great Britain were interned. Although they could not leave the country until after the war, the British government in India allowed the Montessori’s to

continue their work in education. Maria and Mario spent much of their time at a school in Kodaikanal, a location in southern India dripping with natural beauty. Here, they spent years working with and observing children and educators and the concept of Cosmic Education was formulated. Many of the botany and zoology lessons in particular came directly from watching the students interact and learn from the natural world around them. Montessori's appeal to the souls of children and to the spiritual side of education interplayed with both the Theosophical Society (who first invited Maria to India), and the spiritual traditions present in Indian culture.

Having lived through two World Wars, the motivation for Montessori to seek a new paradigm for the human as an individual and as a society is clear. She truly believed that it was through education that humans could raise their consciousness away from fear and move towards a path of peace. From *Education and Peace*,

In order to do so, the value of individuality must be released and put to use. Its power must be experienced. Man must be taught to see the world in all its grandeur, to extend the limits of his life, to make his individual personality reach out and touch those of others. (1949/2002, p. 46)

It has been useful for me to return to a definition of peace, one that I believe goes beyond the daily routine usage. In *Rethinking Education*, Philip Gang defines peace and places education squarely within its context.

To educate for peace is to believe that the great happening called our universe has meaning and purpose. If we are to help young people understand that peace is not just the absence of war, but a state of being that holds all of humanity responsible for our actions with each other and within the natural order, then education must provide a view of life which embodies the possibility for harmony in the world. (1989, p. 7)

If the goal of Montessori's Cosmic Education is the create a new human paradigm which places at its heart the goal of peace through the enlightening of human consciousness, then it was important for me to explore where our value systems derive from and their relationship to this higher consciousness, which I would relate to the concept of spirituality.

Value Systems and Spirituality

Something that has interested me in my exploration of Montessori's Cosmic Education and her push towards a new human consciousness is understanding value systems. The Enlightenment brought on a scientific and objective approach to acquiring and understanding knowledge of the world in which we live. In doing so, it critiqued and even tore down many of the pillars of organized religion. Maslow and many other thinkers (Nietzsche and Jung included) have criticized this tearing down of foundations as a path towards valuelessness and even nihilism. In *Religions, Values, and Peak Experiences*, Maslow lays out his view of this situation:

One could say that the nineteenth-century atheist had burnt down the house instead of remodeling it. He had thrown out the religious questions with the religious answers, because he had to reject the religious answers. That is, he turned his back on the whole religious enterprise because organized religion presented him with a set of answers which he could not intellectually accept—which rested on no evidence which a self-respecting scientist could allow. (1964/2014, p. 31)

Essentially, we have thrown the baby out with the bath water. Maslow also identified the important meta-questions in life, "What is the good life? What is the good man? The good woman? What is the good society and what is my relation to it?" (1964/2014, p. 64), as questions that were once answered by religion, but have been rejected in the scientific tradition. This has left many to see science and religion as mutually exclusive players in a zero-sum game. In *Waking Up*, neuroscientist Sam Harris describes the duality this line of thinking creates:

In the end, we are left to choose between pseudo-spirituality and pseudo-science. Few scientists and philosophers have developed strong skills of introspection—in fact, most doubt that such abilities even exist. Conversely, many of the greatest contemplatives know nothing about science. But there is a connection between scientific fact and spiritual wisdom, and it is more direct than most people suppose. (2014, p. 8)

Something that was immediately apparent to me was the close relationship between the meta-questions identified by Maslow and the meta-questions which form the basic foundation of Montessori's Cosmic Education. If the dogmatic commitment of the Western scientific tradition

to hyper-objectivity has undercut our value systems, but the answers of faith-based religion cannot sufficiently explain the world in light of our empirical observations, then perhaps there exists a “middle-way” where value systems and answers to the meta-questions can be sought through a cross-pollination of empirical evidence and objective observation.

Maslow himself identified education as the key path forward towards this new paradigm and he warned against the dangers of stripping the value-seeking aspect education out of schools.

The final and unavoidable conclusion is that education—like all our social institutions—must be concerned with its final values, and this in turn is just about the same as speaking of what have been called ‘spiritual values’ or ‘higher values.’ These are the principles of choice which help us to answer the age-old ‘spiritual’ (philosophical? religious? humanistic? ethical?) questions: What is the good life? What is the good man? The good woman? What is the good society and what is my relation to it?...It used to be that all these questions were answered by organized religions in their various ways. Slowly these answers have come more and more to be based on natural, empirical fact and less and less on custom, tradition, ‘revelations’, sacred texts, interpretations by a priestly class. What I have been pointing out in this lecture is that this process of a steadily increasing reliance of natural facts as guides in making life decisions is now advancing into the realm of ‘spiritual values.’ Partly this is so because of new discoveries, but partly it is so because more and more of us realize that nineteenth-century science has to be redefined, reconstructed, enlarged, in order to be adequate to this new task.

(1964/2014, p. 64)

It was here in my exploration where I came face to face with the idea of “spirituality”, an admittedly tricky concept with a slippery definition. Montessori spoke often on this topic, though not necessarily naming it directly as spirituality, she often spoke about the “soul” of the child and each child’s “possibilities” and “potentialities”. From *The Absorbent Mind*, “The child is endowed with unknown powers, which can guide us to a radiant future. If what we really want is a new world, then education must take as its aim the development of these hidden possibilities” (Wolf, 1996, p. 4).

Former Czechoslovakian President and humanitarian Vaclav Havel spoke of self-transcendence as the deepest foundational commonality linking humans worldwide,

It follows that, in today's multicultural world, the truly reliable path the peaceful co-existence and creative cooperation must start from what is at the root of all cultures and what lies infinitely deeper in human hearts and minds than political opinion, convictions, antipathies or sympathies: it must be rooted in self-transcendence. (Wolf, 1996, p. 109)

To me the exploration of self-transcendence is closely linked to the concept of spirituality. If the long-reaching goal of the Montessori education curriculum through Cosmic Education is to awaken within children the acknowledgement and subsequent quest for their cosmic task, then understanding the inherent spiritual need in humans is a crucial aspect along that path. In *Education and Peace*, Montessori goes so far as to say that the ultimate and highest priority of the adult is to reveal this inherent spiritual nature of humans and, "If he does so, the steps he subsequently takes and the aid he offers the child will be of great importance; if he does not do so, all his work will go for nothing" (1949/2002, p. 77).

Harris offers us a definition of spirituality that includes the process of self-transcendence, Although such experiences as 'self-transcendence' are generally thought about in religious terms, there is nothing, in principle, irrational about them. From both a scientific and a philosophical point of view, they represent a clearer understanding of the way things are. Deepening that understanding, and repeatedly cutting through the illusion of self, is what is meant by spirituality in the context of this book. (2014, p. 9)

I have found this definition of spirituality to be useful in my exploration for a number of reasons. First, it separates spirituality from the religious context. Spirituality and religion are separate concepts that I believe must be teased out and shown to be independent practices and motivations of human fundamental needs, and the greater nature of reality. This does not exclude the compatibility of the two, nor does it make them mutually exclusive, but it does identify spirituality as a field of experience distinct from the dogmas and traditions of religion. Secondly, this definition ties spirituality directly to the process of self-transcendence. In doing so, I believe it rightly entangles the two concepts as inseparable from each other. While there are surely distinctions to be made between spirituality and self-transcendence (although many may

be rather technical) I have found that an encompassing view of one must contain the other. Moving forward, while I will attempt to be as clear as possible in my discussion of both spirituality and self-transcendence, one term will naturally infer the recognition and validity of the other. Thirdly, I prefer this definition of spirituality because it considers both the first-person perspective of experience and the external objective nature of reality. As I will explore later in this paper, I believe both perspectives to be invaluable in the truth-seeking process.

I have come to view Cosmic Education as the recognizing and understanding of cosmogenesis through the lens of spirituality and self-transcendence, which brings me to the next major question in my exploration: Is there an inherent value system within the understanding of cosmogenesis through self-transcendence? Harris directly ties human spiritual traditions to ethics and morality, “Most traditions of spirituality also suggest a connection between self-transcendence and living ethically” (2014, p. 14). I have found in both my personal reflections and meditations as well as my research and readings, that it is through the entanglement of cosmogenesis and spirituality that ethical and value structures begin to arise. Understanding that the atoms in our body were created in the death of a star may not empirically imply any sort of ethical statement, but when viewed through the lens of consciousness driven by the process of self-transcendence, moral lessons and ethical implications seem to manifest themselves as inherently apparent. The mechanism by which this occurs in the brain is believed to be “awe”.

“Awe is an emotional response to perceptually vast stimuli that defy one’s accustomed frame of reference in some domain” (Piff, Dietze, Feinberg, Stancato, & Keltner, 2015). Piff et. al., showed that awe-inducing experiences led individuals to adopt a more ethical and prosocial relationship with others and the world around them. This higher ethical and moral standard also made individuals more collaborative and focused on the collective whole as opposed to

individual gain. Studies on the impact of awe also consistently show that it has a self-reducing (self-transcendent?) effect on the experiencer. “It would seem, as hypothesized, that awe leads to more prosocial tendencies by broadening the individual’s perspective to include entities vaster and more powerful than oneself and diminishing the salience of the individual self” (Piff, Dietze, Feinberg, Stancato, & Keltner, 2015). I would like to point out in particular the connection between the small-self and prosocial behavior. I think this strikes right to the heart of the primal paradox and gives insight on how the mechanisms of self-transcendence not only create inherent value-systems but also lead towards more prosocial and collaborative behavior. “Folding into social collectives requires that the individual strike a balance between the pursuit of self-interest and acting in ways that enhance the interest of others” (Bai, et al., 2017). It is exactly the embracing of this delicate balance and interplay of the primal paradox that Montessori advocates for in *Education and Peace*,

...the value of individuality must be released and put to use. Its power must be experienced. Man must be taught to see the world in all its grandeur, to extend the limits of his life, to make his individual personality reach out and touch those of others. (1949/2002, p. 46)

This, to me, is the power within Montessori’s insights on Cosmic Education; that in the intrinsic nature of development, a human child will find meaning and value with which to construct their world view if they are afforded an environment in which to find awe and wonder in the story of our universe. Berry points out the inherent and self-evident place of the human condition within the holarchy of cosmogenesis in saying that, “[...] if the universe brings us into being with all our knowledge and our artistic and cultural achievements, then the universe must be an intellect-producing, aesthetic-producing, and intimacy-producing process” (1999, p. 81).

The Self, Mindfulness, and Buddhism

“Being able to stand perfectly free of the feeling of self is the start of one’s spiritual journey, not its end.” (Harris, 2014, p. 133)

If self-transcendence is to be the defining process by which the human individual reaches their individual potentiality and also the mechanism by which values and meaning can be derived from cosmogenesis, then I believe it is necessary to explore just what the self is. Upon starting down the path of investigating this question, it was immediately apparent to me that this is a much more complicated and nuanced question than I had anticipated. However, in the most fundamental aspect of the question, it is quite simple. The self is an illusion. Wherever we look for it—whether through scientific, religious, spiritual, psychological, psychedelic, or philosophical means—an identifiable, independent self simply does not exist (Varela, Thompson, & Rosch, 1991/2016, p. 59). How is it that this fundamental truth is so at odds with our daily subjective experience of our “selves”? Examining that question and its implications will be the subject of this section.

The Self and Neuroscience

Neuroscientists have identified the default mode network (DMN) as the system within our brains that is responsible for self-referential activity and self-identity. The DMN is located within the connection between three parts of the brain: the posterior cingulate cortex (PCC), medial prefrontal cortex (MPFC), and the inferior parietal lobule (IPL) (Davey, Pujol, & Harrison, 2016). The network centers on the PCC, which has the highest metabolic rates in the brain. The PCC is thought to be responsible for coordinating mental representations. It is one of the most connected nodes of the brain and acts as a kind of communication hub for the rest of the brain. The IPL, specifically the left-sided IPL, acts in gathering semantic information with which the systems integrates into its formation of our perceived reality. The MPFC is involved

in thought processing and has been shown to be particularly active when an individual is making a decision where the correct (or more beneficial) choice is not apparent. Together these nodes create the DMN and are seemingly responsible for our notion that we as individuals have a self.

We suggest that this tripartite core-self system is responsible for engendering conscious self-awareness—providing a sense of oneself as a subjective agent in space and time. The system can be hypothesized to function as a network in which complex phenomena, such as self-representations, are dynamically accessible via PCC and IPL activity, and which are gated into conscious awareness by activity in the MPFC, as influenced by changing internal and external demands. (Davey, Pujol, & Harrison, 2016)

What led neuroscientists to the discovery of the DMN was paying attention to the vast amount of energy (60-80%) the brain uses on internal activity and the fact that a very small portion of the external information gathered by the senses actually enters the brain's processing networks (Raichle, 2010). Neuroscientists had previously thought of this energy as noise associated with brain function, but a closer look revealed the complex DMN is most active when individuals are engaged in self-referential activity or are thinking to themselves undisturbed (Buckner, Andrews-Hanna, & Schacter, 2008). The DMN is also more active when we are making judgments about ourselves as opposed to others (Harris, 2014, p. 120). The DMN appears to act as our executive functioning mechanism, making sure that all of the systems of the brain are not interfering with the priority goal of preserving the individual. But why do we experience the manifestation of this network as subjective? The answer may actually lie within the objective.

In the domain of self-related processes, these regions might support broader aspects of self-awareness that are suppressed during the self-referential task. This likely includes broad low-level monitoring of the environment ('surveillance' or 'watchfulness'), which has been hypothesized to represent an important function of the DMN. (Davey, Pujol, & Harrison, 2016)

Could our identification of a subjective self emerge from the awareness that we are the object of another subject? Is it possible that the illusory self only exists as a response to the realization of

being the object of someone else's subjectivity? "Again and again, we are thrust out of the safety and seclusion of pure subjectivity by the knowledge that we have become objects in the world for others" (Harris, 2014, p. 111).

Perhaps the most interesting thing about the DMN is when it is not active. Activity in the DMN decreases during activities of "flow" or immersion in the moment, activities that also correlate to an experience of losing one's self or identity.

The PCC, which has a unique anatomical position as a brain-wide connectivity hub likely acts as the central conduit thought which temporal and parietal cortical representations of self are made accessible to prefrontal cortical reflective systems; with a unitary notion of self defined by the large-scale integration of the network's activity. Intriguingly, the ingestion of psychedelic drugs has been reported to reduce connectivity within the DMN and to reduce PCC-mediated network synchronization, the extent of which was reported to be correlated with a sense of dissolution of the self. (Davey, Pujol, & Harrison, 2016)

The experience and effects of psychedelics on individuals has been the focus of recent studies into understanding the self and its role in mental wellness, psychology, addiction, anti-social behavior, depression, and end-of-life anxiety. The core of these experiences all center around this loss of self. These self-transcendent experiences are what Maslow referred to as peak-experiences and identified as key experiences in an individual's life that move him or her along the path towards self-transcendence. Examples of these peak-experiences do not have to be as dramatic as the psychedelic trip but could include any experience in which an individual experiences a loss of self, no matter how fleeting the experience may be. Meditation, exercise, nature immersion, intent focus on a task, dance, music, fasting, sensory deprivation, religious ceremonies, etc. All of these are examples of activities that are capable of leading to the diminishing of the self. Maslow went so far as to call the particularly powerful peak-experiences "little deaths" which lead to a rebirth of ourselves from the death of our ego (1964/2014, p. 14).

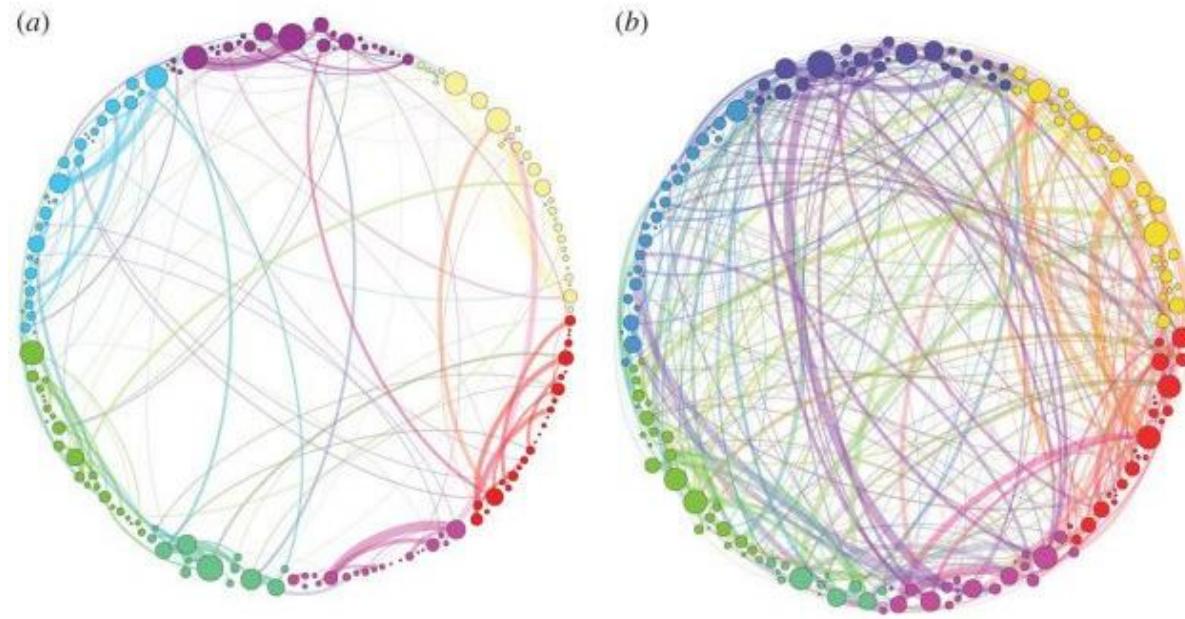


Figure 8: Brain mappings of connectivity of neural pathways in a person given a placebo (a) and psilocybin (b). Note that this does not show an increase in overall brain activity, but rather connectivity proposed to be due to the diminished role of the DMN. Photo: (Pollan, 2018)

The DMN clearly has evolutionary and biological advantages, or else the body would not commit so much of its energy toward sustaining it, but what are the costs of misidentifying the actions of the DMN as an identifiable self, separate from the greater system? One of the major ways in which our brain changes as we age is that it establishes well-worn pathways across repeated neural connections. Neurons that fire together wire together. This is beneficial to us in that it enables us to learn skills and perform tasks without having to relearn them every time. But these well-worn paths can also cause us to limit our conscious experience and worse, engrain negative habits of thinking and action. As Figure 8 shows, peak-experiences that result in the loss of self can help to open (or re-open) new pathways. A metaphor Michael Pollan uses in *How to Change Your Mind* is that of a snowy hillside. As we sled down the hill it creates paths in the snow. Eventually those paths become so worn that they become the only direction the sled

can take. Peak-experiences are like a fresh layer of snow which opens up the opportunity for brand new paths to be created (Pollan, 2018).

Children have naturally less worn neural pathways and experience consciousness in a dramatically different way than adults. One reason is that they have simply had less time to develop the well-worn paths adults have and thus their brains have a much greater diversity of connections than adults. Another reason that children experience consciousness so differently than adults is autobiographical memory. Autobiographical memory is the mechanism through which we develop a story of ourselves and it, “depends on the causal relationship between our past selves and our current and future selves. As adults we think of our lives as a single unfolding causal story that links our past, present, and future experience” (Gopnik, 2009, p. 145). Children develop their autobiographical memory over time and do not have the same attachment to the notion of self as adults do. Our selves take firmer and firmer control the older we get. Varela compared this phenomenon to being born with the abilities of a virtuoso violin player who slowly over time loses his or her skill due to the acquisition of bad habits (Varela, Thompson, & Rosch, 1991/2016). Psychologist Alison Gopnik compares the different in child and adult consciousness,

If for adults external consciousness is like a spotlight, internal consciousness is like a path. It is my own particular path, the track that I make as I move through the world. I can look back at it and see where I've been and look forward to peer, however dimly, toward my destination. The path pulls us forward and gives our lives their peculiar momentum. This path can, of course, easily become a rut, a narrow track that we endlessly and obsessively traverse. Just as attention in children is more like a lantern, their inner consciousness may be more like wandering than a voyage—a journey of exploration rather than a conquest. They paddle in the pond of consciousness instead of coursing down that rushing stream. Safe in the protected compass of immaturity, they can go anywhere they want. (2009, p. 154)

What ramifications do these neurological discoveries about the construction of a self have for Montessori education? One is the importance of ensuring the integrity of the work cycle.

Montessori stressed the vital importance of allowing uninterrupted work time. Allowing students the independence and autonomy of spontaneous learning through interaction with the environment allows for this flow state. Encouraging and creating an environment that fosters such flow states could allow for students to become engrossed in tasks that diminish the presence of the DMN and preserves a diversity of neural pathways. In *Education for Human Development*, Montessori Jr. speaks to the importance the materials in the classroom play in this role:

The material is intended to facilitate a transfer of nonspecific knowledge, that of a general idea or principle that can later be used as a basis for recognizing special cases or applications of it. Montessori material should be developmental. It should be limited to essentials, and should be constructed so that a particular general idea or principle is isolated. The children then become conscious of this idea or principle by handling the material in the way they are instructed. The built-in controls of error show them when they are wrong. The insight they gain into the underlying general principle or idea is felt as a personal discovery. They are fascinated by it and will repeat an exercise time and again with great concentration until they have fully absorbed the principle or concept it illustrates. (1977, p. 69)

Through this exploration I have come to believe that a commitment to Montessori's principles as applied in the elementary classroom through Cosmic Education can create an environment in which children are able to continue on the developmental path towards self-transcendence not through the direct pressures of external forces, but through the natural intrinsic motivations and developmental processes inherent in humans. The creation of such an environment, infused with a recognition of the spiritual aspect of reality, speaks to the ultimate goal Montessori had for education and the creation of new paradigm that dramatically alters humans' relationships to each other, the living world, Gaia, and the cosmos. Otherwise we are imparting upon children our own understanding of ourselves and perpetuating, "a social structure in which there is no love, but only the pursuit of self-centered advantages" (Krishnamurti, 1953, p. 84).

Buddhist Insight on the Self, Mindfulness and Consciousness

Modern neuroscience gives an empirical objective-based glimpse into the nature of the self and consciousness, but for a more complete understanding, I turned to Buddhist traditions. I am certainly not the only person turning towards Buddhism for insights into the nature of consciousness, and there are plenty of sectarian thinkers and scientists looking into Buddhism for insights and connecting them with the scientific discoveries. There are a number of aspects that make Buddhism a well qualified vehicle for such a study. One is that there is simply thousands of years of recorded personal experiences and empirical insights on the nature of consciousness (Harris, 2014, p. 23). This lineage of teachings and observations far predates the modern fields of psychology and neuroscience. Another benefit of using Buddhism as a vehicle to study consciousness is that it, "...does not demand blind faith from its adherents; here, mere belief is dethroned and replaced by confidence, saddha, as it is known in Pali, based on knowledge of truth" (Thittila, 1992, p. 17). Although there have been plenty of other religious and contemplative traditions that have something to say about the nature of consciousness, Buddhism does not require any act of faith or suspension of disbelief. There is no conversion required to practice the Buddhist traditions and the adherence to culturally specific dogmatic traditions is not necessary. Gautama Buddha himself said of such faith and belief:

Do not believe in anything on mere hearsay; do not believe in anything that is traditional just because it is old and handed down through generations; do not believe in rumours or anything because people talk about it; do not believe simply because the written testimony of some ancient sage is shown to thee; never believe in anything because the custom of many years leads thee to regard it as true; do not believe in anything on the mere authority of thy teachers or priests. According to thy own experience, and after thorough investigation, whatever agrees with thy reason and is conducive to thine own well-being and to that of all other living beings, accept as truth and live accordingly. (Thittila, 1992, p. 17)

Buddhism also has the inherent quality of being non-Western. Developed outside of the Cartesian paradigm affords Buddhism a different perspective on the nature of consciousness and the self that is unavailable for religious, philosophical, and religious traditions that arose from within that paradigm. Lastly, I believe that Buddhism also has things to say in regard to the ethical and value systems derived from an understanding of the nature of reality. Historian Jared Ward points out that, “In cosmological ideas such as karma and samsara there is woven into actions a grand sense of significance and a moral accountability in social interactions” (2012, p. 8).

One of the basic tenets of the Buddhist tradition is the understanding that although the self is illusory, our mind continues to grasp for a foundational self. This constant grasping creates an,

...undercurrent of restlessness, grasping, anxiety, and unsatisfactoriness that pervades experience is called Dukkha, usually translated as suffering. Suffering arises quite naturally and then grows as the mind seeks to avoid its natural grounding in the impermanence and lack of self. (Varela, Thompson, & Rosch, 1991/2016, p. 61)

It is quite natural to first react to many of these Buddhist concepts with a negative emotion. That was certainly the case for me. Such concepts as suffering and emptiness certainly did not engender an immediately positive worldview for me. There are a couple things that have been helpful for me in achieving a greater understanding. One is that I am cognizant of the fact that many of the Buddhist teachings have been translated and there simply are not English words for these concepts that have been developing for thousands of years. These concepts have an ineffable quality to them in their native languages, let alone in translation. Buddhist scholar T.P. Kasulis warns of this very trap, “...language can never leave its own constructs and internal rules, it cannot serve as a vehicle for philosophical truth...language might serve us well in an everyday, pragmatic way, but for questions of ultimate philosophical and religious concern, it

is...inadequate" (1981, p. 22). Another discovery that aided in my understanding and reaction to the Buddhist teachings is the distinction between relative truth (*samvrti*) and ultimate truth (*paramartha*).

Relative truth (*samvrti*, which literally mean covered or concealed) is the phenomenal world just as it appears—with chairs, people, species, and the coherence of those through time. Ultimate truth (*paramartha*) is the emptiness of that very same phenomenal world. The Tibetan term for relative truth, *kundzop*, captures the relation between the two imagistically; *kundzop* means all dressed up, outfitted, or costumed—that is, relative truth is *sunyata* (absolute truth) costumed in the brilliant colors of the phenomenal world. (Varela, Thompson, & Rosch, 1991/2016, p. 226)

The Buddhist teachings are not denying that our phenomenological experience in the world does exist, rather that it is when we take the characterizations that we have created to live within this world for absolutes that we get ourselves in trouble.

Buddhists use the concept of emptiness (*sunyata*) to describe the true reality of things. The reality of things we experience as objects are said to be empty because everything exists arises dependently. Nothing has ever existed in isolation. You cannot grasp the concept of one individual “thing” without putting it into relation with something else. The denial of *sunyata* leads the mind towards what Varela called the Cartesian anxiety (1991/2016, p. 141). In the Cartesian ideal, the mind is a mirror of nature. Knowledge exists in a pre-given, independent world, and is attained through a precise representation of that world. The Cartesian anxiety folds inward on the self-construct and upon seeing there is no grounded self, suffering and a loss of meaning take hold,

...this habitual tendency [to grasp] is considered to be the root of the two extremes of ‘absolutism’ and ‘nihilism.’ At first, the grasping mind leads one to search for an absolute ground—for anything, whether inner or outer, that might by virtue of its ‘own-being’ be the support and foundation for everything else. Then faced with its inability to find any such ultimate ground, the grasping mind recoils and clings to the absence of a ground by treating everything else as illusion. (Varela, Thompson, & Rosch, 1991/2016, p. 143)

This search for ultimate ground extends beyond the subjective self to include a belief in a pre-given, independent external world. But sunyata does not imply a cold, meaningless, compassionless existence. Rather, it is sunyata and groundlessness that enact the creative, colorful, complex, and interdependent universe in which we live out our experiences. This is the bringing forth that Capra and Luisi are describing when they speak of the nature of cognition, “Cognition, then, is not a representation of an independently existing world, but rather a continual bringing forth of a world through the process of living” (2016, p. 256). It is this realization of the open and creative nature of sunyata that allows for a loosening of the grip on the self and a chance to experience consciousness in its present form. “This is the mind that can actually know first hand the groundlessness of the enacted edifice in which humans live, thereby clearing the way for transformative wisdom to emerge” (Varela, Thompson, & Rosch, 1991/2016, p. xi).

Mindfulness (sati) is the Buddhist practice of recognizing and cultivating a state of mind that experiences the present moment and awakens to “clear awareness” (Harris, 2014, p. 34). An important distinction for me to remind myself when engaging with mindfulness is that it is active, not theoretical. Mindfulness is a change in experience, not in thought. Thoughts themselves are only an experience of consciousness, not consciousness itself. Many of the Buddhist practices regarding mindfulness fall under the umbrella of meditation. There are numerous meditative and mindfulness traditions, and I will speak in rather broad terms regarding the overall themes and discoveries. I think it is also appropriate to note that I have been practicing meditation for over twelve years at the time of this writing, through various techniques and teachings. More recently I have been more committed to routine meditations, many of them guided. An anecdotal note concerning my experience in meditation is that I have found that

although the teachings can be seemingly complex and the practice itself can be challenging and at times feel like a dead-end, I do not have to walk far on the path of meditation and mindfulness to see it reap rewards in my experience.

Buddhist practitioners obviously do not realize any of these things (even mindfulness) all at once. They report that they catch glimpses that encourage them to make further efforts. One of the most important steps consists in developing compassion toward one's own grasping fixation on ego-self. The idea behind this attitude is that confronting one's own grasping tendencies is a friendly act toward oneself. As this friendliness develops, one's awareness and concern for those around one enlarges as well. It is at this point that one can begin to envision a more open-ended and nonegocentric compassion. (Varela, Thompson, & Rosch, 1991/2016, p. 248)

One of the reasons I find mindfulness practice to be so essential in my personal life is that it has improved my ability to see thoughts for what they are, experiences of consciousness. Seeing thoughts as they arise has given me the knowledge and firsthand experience that I can choose whether or not to let those thoughts control my emotions and actions. As simple as this sounds, it is almost like a superpower in the face of my everyday situations. Truly, mindfulness is not the acquisition of something new, it is rather the awakening to what was already there.

“Once one recognizes the selflessness of consciousness, the practice of mediation becomes just a means of getting more familiar with it. The goal, thereafter, is to cease to overlook what is already the case” (Harris, 2014, p. 199). The more I practice meditation the easier and more consistently I can experience this awakened awareness in my daily life. To me it is moving towards what Maslow called plateau experience.

[Plateau experience] is serene and calm rather than a poignantly emotional, climatic, autonomic response to the miraculous, the awesome, the sacralized, the unitive, the B-values. So far as I can now tell the high plateau-experience always has a noetic and cognitive element, which is not always true for peak experiences, which can be purely and exclusively emotional. It is far more voluntary than peak experiences are. One can learn to see in this unitive way almost at will. It then becomes a witnessing, an appreciating, what one might call a serene, cognitive blissfulness...

...Very important today in a topical sense is the realization that plateau experiencing can be achieved, learned, earned by long hard work. It can be meaningfully aspired to. But I

don't know of any way of bypassing the necessary maturing, experiencing, living, learning. All of this takes time. A transient glimpse is certainly possible in the peak-experiences which may, after all, come sometimes to anyone. But, so to speak, to take up residence on the high plateau of unitive consciousness—that is another matter altogether. That tends to be a lifelong effort. It should not be confused with the Thursday evening turn-on that many youngsters think of as the path to transcendence. (1964/2014, p. 14)

What Maslow describes here is a crucial part of the path of self-transcendence. The plateau experience can be learned, and I propose that it should be the goal of education and specifically Montessori elementary education to guide children towards the practices that make plateau experience possible. I believe mindfulness and meditation should be a critical part of Cosmic Education and the classroom experience. In order for this to happen, the educator must also walk that path. I have been leading short meditations of 3-10 minutes multiple times a week in my classroom and have both observed tangible positive outcomes and been told directly from students of their own positive developments. It is a powerful gift to reveal to someone that the thoughts they have do not have to control their emotions and/or actions. I also introduce my students to cognitive fallacies that we as humans ritually fall prey to on a daily basis. By being able to identify and name these fallacies, we as a community have not stopped them from happening, but we now have the tools to identify and address them when they are the root of a problem. Although my integration of mindfulness and meditation is happening within the 9-12 classroom, I think it is important to note that there is no reason these concepts could not be taught from the youngest ages and continue throughout the extent of our lives for, "...any subject can be taught effectively in some intellectually honest form to any child at any stage of development" (Montessori Jr., 1977, p. 63).

Accepting sunyata and learning to live without foundations is not the end goal of the Buddhist journey. Rather, it is the beginning of a lifelong awakening and path towards self-transcendence. An easy trap to fall into when attempting to live without firm foundations is that

we replace foundations with mental structures that themselves become foundations. “The philosophical challenge that Nietzsche faced, which has come to characterize the task of postmodern thought, is to lay down a path of thinking and practice that gives up foundations without transforming itself into a search for new foundations” (Varela, Thompson, & Rosch, 1991/2016, p. 241). If it is the Cartesian anxiety of oscillating between grasping for internal and external foundations, then replacing illusory foundations with the quest of ridding oneself of foundation as a foundation is only masking the underlying issue. I am making this distinction not because I believe I have figured this out or because I believe I live this awakened consciousness on a regular basis. On the contrary I have only fleeting moments of true consciousness and I still feel as though I am early on the path, but because my research into those who have come before me on this path and my own experiences have lead me to believe that anyone who wishes to take meditation and mindfulness seriously must first make serious attempts at understanding sunyata and the nature of the illusory self.

Perhaps less obvious but even more strongly enjoined by the mindfulness/awareness tradition is that meditations and practices undertaken simply as self-improvement schemes will foster only egohood. Because of the strength of egocentric habitual conditioning, there is a constant tendency, as practitioners in all contemplative traditions are aware, to try to grasp, posses, and become proud of the slightest insight, glimpse of openness, or understanding. Unless such tendencies become part of the path of letting go that leads to compassion, then insights can actually do more harm than good. Buddhist teachers have often written that it is far better to remain as an ordinary person and believe in ultimate foundations than to cling to some remembered experience of groundlessness without manifesting compassion. (Varela, Thompson, & Rosch, 1991/2016, p. 250)

What of the inherent ethical and value structures in the Buddhist approach to mindfulness and consciousness? An attempt to philosophize using language would be antithetical to the questions itself so I will only say that my personal experiences in mindfulness, reading Buddhist scholars and teachers, and knowing glimpses of pure consciousness have left me without a question as to the ethical and moral values inherent in this understanding. Compassion and

gratitude are the words I keep coming back to, because a true realization of the interconnectedness and entanglement of all manifestations of the universe supersedes any harmful moral and ethical considerations that arise out of a false sense of self. This, to me, is the true gift of self-transcendence. “Instead of being embodied (more accurately, reembodied moment after moment) out of struggle, habit, and sense of self, the goal is to become embodied out of compassion for the world” (Varela, Thompson, & Rosch, 1991/2016, p. 250).

Neuroscience and Meditation

Many neuroscientists have recently applied their methods to studying mindfulness, meditation, and their effects on the brain. There is consensus that a mind that is left to its own devices is generally unhappy and leads to negative emotional states. “A human mind is a wandering mind, and a wandering mind is an unhappy mind. The ability to think about what is not happening is a cognitive achievement that comes at an emotional cost” (Killingsworth & Gilbert, 2010). When the human mind is not engaged in activity or a specific task is when the DMN is most active. There seems to be a correlation between increased activity of the DMN and unhappiness as well as the diminishing of the DMN and general pleasantness and mental wellbeing. It seems that the change in emotion is directly tied to activity or inactivity, not to the actual nature of the activity. In fact, researchers found that, “people were less happy when their minds were wandering than when they were not, and this was true during all activities, including the least enjoyable” (Killingsworth & Gilbert, 2010). Killingsworth and Gilbert also found that it was the mind wandering that presupposed the negative moods and not vice-versa.

If it is the active DMN during mind wandering that is at the root of so much needless human suffering, then it makes logical sense that the Buddhist mindfulness practices which specifically address reaching beyond the illusion of self would be an antidote. Researchers have

found that meditation not only correlates strongly to positive emotions but that, “this shift does not require hundreds or even dozens of hours of practice” and, “that the benefits of meditation may be more accessible than was previously believed” (Moyer, et al., 2011). Long term meditation practice has been shown to lead to anatomical changes in the brain as well. “Meditators tend to have larger corpora collosa and hippocampi (in both hemispheres). The practice is also linked to increased gray matter thickness and cortical folding” (Harris, 2014, p. 121). The first structural change helps to increase connectivity between hemispheres as well as between nodes of the neural network, similar to the increased connectivity seen with a diminishing of the DMN during peak-experiences. The second structural change mentioned could indicate meditation as a preventative measure against age-related cognitive diseases. Overall, both the empirical research and experiential testimonies are in alignment that meditation and mindfulness have untold benefits for our mental and physical health, as well as the way in which we enter into relationships with everything around us as both individuals and as communities.

Spirituality begins with a reverence for the ordinary that can lead us to insights and experiences that are anything but ordinary. And the conventional opposition between humility and hubris has no place here. Yes, the cosmos is vast and appears indifferent to our mortal schemes, but every present moment of consciousness is profound. In subjective terms, each of us is identical to the very principle that bring value to the universe. Experiencing this directly—not merely thinking about it—is the true beginning of spiritual life. (Harris, 2014, p. 206)

Implementing Research Through Neurophenomenology

“You can observe a lot just by watching” – Yogi Berra

Introduction to the Research

Montessori spoke of the teacher as possessing the qualities of a technician, a scientist, and a saint. A technician in the sense that a Montessori teacher must be deliberate and exacting

in their presentation of lessons, movements, and speech. The presentation of a lesson is the gift we give, and it must be distilled to its most precious and valuable form. The Montessori teacher must understand this gift completely, give the gift in the most developmentally appropriate manner, and then have the humility to get out of the way. They must also be exacting in the way in which they carry themselves. They must model the behavior desired from the students at all times.

Montessori also called upon teachers to be scientists in the sense that it is through the act of objective observation, followed by reflection and reasoning, that they are able to make decisions and apply their craft. Only through observation will a child reveal his or her true self. Relying on objective observation, as opposed to assumption and pre-conceptions, preserves the autonomy of children and shields them from the prejudices of the adult.

The third quality Montessori aspired her teachers towards was that of the saint. This is to say that the Montessori teacher should recognize and foster the spiritual nature of children. Every living thing comes into this world as potentiality, an autopoietic entity which begins to fulfill that potential through a structural coupling with its environment. This act of self-creation is the sacred nature and fundamental reality of creativity within the universe. We are all emergent from, and referent to, the universe. The path towards the fulfillment of that potential is the finding of our cosmic task, and it is the role of the Montessori teacher to guide children towards finding that task for themselves. The technical and scientific qualities are all for naught if there is to be no larger meaning within the context of the universe.

This research will focus on the act of observation which to Montessori was, “the fundamental quality” of a teacher (1917, p. 76). Observation in the classroom is the method by which the teacher is able to appropriately see each individual student as they are: autonomous

individual learners. “The fundamental principle of scientific pedagogy must be, indeed, the liberty of the pupil; such liberty as shall permit a development of individual, spontaneous manifestations of the child’s nature” (Montessori, 1912/1965, p. 28). Montessori approached observation as a strict scientist and this commitment to objectivity formed her pedagogy and her understanding of the Planes of Development. She clearly lays out her call to objectivity in *The Montessori Method*:

He who experiments must, while doing so, divest himself of every preconception. It is clear then that if we wish to make use of a method of experimental psychology, the first thing necessary is to renounce all former creeds and to proceed by means of the method in the search for truth.

We must not start, for example, from any dogmatic ideas which we may happen to have held upon the subject of child psychology. Instead, we must proceed by a method which shall tend to make possible to the child complete liberty. This we must do if we are to draw from the observation of his spontaneous manifestations conclusions which shall lead to the establishment of a truly scientific child psychology. It may be that such a method holds for us great surprises, unexpected possibilities. (1912/1965, p. 29)

The method employed by this research was to videotape myself giving a particular lesson. The nature and content of the lesson was not as of much importance as was the observations that followed. With that said, I choose an introductory lesson to comparative world religions because I thought that it integrated nicely with the topics and themes of my exploration in this paper.

The observations that followed the videotaping were two-fold. In the first viewing of the lesson, the observations focused on the third-person account of the lesson. In this way I am observing what the participants in the lesson are experiencing. I believe this aspect of the research to address Montessori’s need for objective, scientific observable data. By observing the natural spontaneous phenomena that occur between the guide, participants, and the environment, I am attempting to remove my personal preconceptions and “self.” The second part of the

research is to view the video again while recording observations from the first-person perspective. This is my own experience of presenting the lesson.

The purpose of this method of research, as I see it, is to eliminate bias on either the first- or third-person perspective by manifesting the two into existence. In this way, perhaps it is possible to arrive at a truth that is more fundamental than one that relies solely on one perspective. By suspending the first- and third-person perspectives next to each other, it may better separate the thought from the fact, because although it is necessary that thought enter the process of bringing forth fact and experience, to do so unconsciously is to invite confusion, misconception, and inflated sense of ego. David Bohm warns of this process of manufactured facts:

Thought then begins apparently to prove itself, and to create “facts” which are not really facts. The Latin root of the word “fact” means “what has been made,” as in “manufacture.” In some sense we have to establish a fact, but this sort of fact is being made wrongly...It’s being made in the wrong way because we are mixing up thought into the “fact,” and not knowing that we are doing it. (1996, p. 57)

Autopoiesis, Structural Coupling, Enaction and Neurophenomenology

The term autopoiesis was coined by Chilean biologists Humberto Maturana and Francisco Varela in the 1970s. It comes from the root word “auto” meaning “self” and “poiesis” meaning “making”; self-making. Autopoiesis is Maturana and Varela’s response to the question of defining life. Although Maturana and Valera initially developed the concept of autopoiesis in a quest to define living organisms (such as a eukaryotic cell), it has since been used to describe and more deeply understand the nature of all manner of systems. The autopoietic system is truly self-creating because the sum of the relationship of its parts is the system’s own self-organization and reproduction. Because an autopoietic system does not exist in isolation, but rather within a

greater holarchy, it can interact with and be influenced by its environment. It does so through the process of structural coupling.

Structural coupling refers to how an autopoietic system interacts with its environment and responds with changes to the structure of its own internal system. The application of this understanding of how living autopoietic systems are structurally coupled to their environments sheds light on the process of adaptation over time in the course of evolution. An autopoietic system is therefore influenced by the structural changes that have resulted from every interaction it has had with its environment. A living organism is structurally coupled to the environment and can be disturbed by interactions with the environment but responds with its own autonomous internal structure. In response to their own question of whether autopoiesis is a prerequisite for life, Capra and Luisi state that, “in order to determine whether a given system is living or not, it will be sufficient to see whether it is autopoietic” (2016, p. 138).

Developing an understanding of human experience through the concepts of autopoiesis and structural coupling led Varela, Evan Thompson, and Eleanor Rosch to develop and propose the cognitive science of enactment. From *The Embodied Mind*:

We propose as a name the term enactive to emphasize the growing conviction that cognition is not the representation of a pre-given world by a pre-given mind but is rather the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs. The enactive approach takes seriously, then, the philosophical critique of the idea that the mind is a mirror of nature but goes further by addressing this issue from within the heartland of science. (1991/2016, p. 9)

Enaction takes a systems approach to understanding consciousness and its relation to the environment. To me, the enactive approach fits squarely within Montessori’s view of the role of observation, and the necessary transformation of the teacher. When Montessori spoke of the importance of the prepared environment and an individual child’s interaction and absorption of it, I believe she was taking an enactive approach to cognition.

Biology and cognitive science were arriving at the same idea—that human cognition is not the grasping of an independent outside world by a separate mind or self, but instead the bringing forth or enacting of a dependent world of relevance in and through embodied action. Cognition as the enactment of a world means that cognition has no ground or foundation beyond its own history which amounts to a kind of ‘groundless ground.’ (Varela, Thompson, & Rosch, 1991/2016, p. xviii)

Through the enactive lens, Varela developed a new approach to the study of human consciousness and experience: neurophenomenology. Neurophenomenology is the fusion of two previously separate approaches to the study of consciousness, the first-person experience (phenomenology) and the third-person objective scientific study (neuroscience). Phenomenology is a branch of philosophy developed first by Edmund Husserl in the beginning of the twentieth century with many later important contributions by Maurice Merleau-Ponty. It attempts to take seriously “the disciplined examination of experience, and the hope...was that a true science of experience would eventually be established...” (Capra & Luisi, 2016, p. 263). It did so within the constructs of Western philosophical traditions. Through neurophenomenology, Varela was attempting to marry the commitment to scientific acknowledgement of first-person experience present in phenomenology with the cognitive neuroscience commitment to understanding neural patterns and processes, with the goal being that this approach, “...will generate reciprocal constraints, so that research activities in the two domains can guide one another in a systemic exploration of consciousness” (Capra & Luisi, 2016, p. 263).

There is a third leg on which the neurophenomenology stool rests, and that is the Buddhist traditions of mindfulness meditation and non-dualism.

What Buddhist practices have to contribute to this conundrum is that there is a different mode of knowing altogether in which the mind is neither absorbed nor separated but simply present and available. There is no longer that observer...experience is simple and self-known. This is the mind that can actually know first-hand the groundlessness of the enacted edifice in which humans live, thereby clearing the way for transformative wisdom to emerge. (Varela, Thompson, & Rosch, 1991/2016, p. xi)

Many enactive thinkers have critiqued phenomenology and its confinement within the Western philosophical traditional notion of the self. By incorporating the traditions of Buddhist understandings of the nature of consciousness, Varela was able to resolve these issues in his development of neurophenomenology. Montessori herself, I believe, was calling such a new approach in *The Formation of Man*:

The basis of the reform of education and society which is a necessity of our times must be built upon the scientific study of Man the Unknown...

...As we mentioned, however, there is a great obstacle to the scientific study of man. This obstacle is formed by the prejudices accumulated during thousands of years and which have become as solid, as majestic and almost as inaccessible as glaciers. A courageous exploration is therefore needed, a struggle against adverse elements, for which the ordinary weapons of science, i.e., observation and experiment, do not suffice. (1955/2007, p. 9)

I view the method of research and observation undertaken in this lesson, my teaching, the participants, and the environment to be a neurophenomenological approach. It takes the third- and first-person perspectives as data and then allows for both perspectives to influence and create a new model of reality; a model that is based on the foundational understanding of enactment. In its approach, I believe neurophenomenology takes direct aim at the center of the primal paradox because it seeks to, “embed contemplative practice and mind science into a larger framework based on the primacy of lived experience” and its “ultimate and hardest task is not to solve an abstract mind-body problem, but rather to live the mutual dependence of experience and embodiment with benevolence, mindfulness, and care” (Thompson, 2018).

The Environment

The environment in which this research took place was my Upper Elementary classroom at Hudson Montessori School. There are two Upper Elementary classrooms, one in which I am the lead teacher. There are 33 total students between the two classrooms, 17 in my room. Although there are technically two separate rooms, it functions more as one large community

rather than two separate classes. The students have freedom of movement between the classrooms and many community activities and gatherings are shared between the classrooms. The students range in age from 9-12, encompassing grades fourth, fifth, and sixth.

As the lead teacher, I am responsible for presenting the mathematics, geometry, and language sequences and lessons to my students; as is my colleague to hers. We have found that these lessons require the most individualization and so this arrangement allows us the ability to tailor the sequences to the needs and developmental processes of our own students. We share responsibilities for the other subjects: geography, biology, history, reading, and writing. In specific regards to geography, biology, and history, the students move through the sequences over a three-year period. All of the students will receive their lessons in these three subject areas together with their grade level across both classrooms.

The Lesson, Sequence, and Materials

The particular lesson I choose for this research was a fifth level geography lesson on world religions. I am responsible for presenting the fourth and fifth level geography lessons and my colleague is responsible for teaching the sixth level geography lessons. Before giving a description of the lesson used in this research, I believe it is useful to give a description of the larger sequence it is contained within for context.

The fourth level students begin their studies in geography by learning about maps. They investigate the different types of maps, how they are used, how to read them, and how to create them. They then go on to do an extensive study of the major biomes of each continent. For each continent they create a map of the biomes and major physical features of each continent. They then focus in on a single biome within that continent and learn about the ways in which humans, plants, and animals interact with and create an ecosystem. By learning about how humans,

plants, and animals meet their fundamental needs within biomes, the students are integrating their work in biology into a greater understanding of the interdependency of the biosphere and discovering basic ecological principles. It also enables the students to learn about human cultures around the world through an ecological lens.

The fifth level geography sequence begins by investigating human demographics. The students start by receiving lessons and researching the story of human population over time: how we arrived at 7.5 billion people. It also looks at current population trends at the level of continents, countries, and cities. This works integrates their studies of early humans and human civilizations, as well as the mathematics of graphing and representing data in the form of graphs. From there the lessons presented focus on the ways in which humans divide themselves culturally: race, religion, language, and sex/age. The fifth level students finish their sequence in physical geography by investigating some of the natural phenomena involving wind and water systems.

The sixth level students begin their sequence by learning about economic geography. They investigate the methods of studying and understanding economics (GDP, income, tariffs, imports/exports, per capita, etc.). The next part of their studies involves looking at some of the health and economic issues confronting developing countries and different ways those issues are, and may be, addressed. The sixths then study agriculture, including the different methods employed around the world, global trade, the industrialization of agriculture, nutrition, and the potential pitfalls of our current agricultural systems.

The particular lesson I have chosen for my research is an introductory lesson on world religions presented to the fifth levels. In the past the religions lesson was one lesson that looked at the major religions of the world and where the majority of followers were located

geographically. I personally felt that there has been a great opportunity lost in not giving the students a chance to delve deeper into understanding more about the religions themselves, so this year I adjusted the sequence to make room for such an endeavor. I took what was a one-week study and expanded it to encompass seven weeks: one introductory week and six weeks of study on individual religions. The religions covered would include (in chronological order): Hinduism, Judaism, Buddhism, Taoism and Confucianism, Christianity, Islam, and Sikhism. Taoism and Confucianism have been combined into one week as a comparative study between Taoism, Confucianism, and Buddhism.

The subject of this research, the introductory lesson, began with establishing some epistemological principles. This was done through the use of the epistemology card material. The basic principles were Fact, Opinion, Belief, Superstition, and Faith. The aim of this work was to introduce and define these terms in order to be used to interpret religions. A second aim of the epistemology cards was to give the students the tools with which to see and discuss the ways in which humans use these different principles and be able to know when they are being used irrationally. For instance, when someone is giving their opinion and attempting to state it as a fact; or understanding the difference between an individual's beliefs and opinions. The second part of the lesson was an introduction to the world religions. It started with a brief discussion concerning religion, atheism, and agnosticism. I then presented the Timeline of Religions, a material that chronologically introduces each of the religions covered and their respective founders and/or important literature.

Collected Third- and First-Person Observation Data

The lesson was presented to eleven fifth level students. The lesson lasted 29 minutes and was given at 1:00 PM on November 1, 2018. Students' names have been changed.

Third-Person Observations

- Bobby is working on a sketch of something as the lesson begins. This does not appear to impede his ability to listen, as he contributes immediately to the dialogue.
- Students are eager to respond to initial questions regarding the nature of religions in humanity, especially after it is tied to their previous studies of early humans.
- When the first epistemology card is laid out (the Fact card), only the students closest to it respond to it.
- After an example of a fact is given by the teacher, “Bengal tigers have stripes,” the student’s first reaction is to refute the fact. Donna, “But what if they evolve not to have stripes?”
- Keith continually readjusts himself on the floor.
- During the first example of a belief, “Some people believe that there is one God who created the universe,” the students have a bit of a hard time engaging in the thought. When asked to give their own example of a belief they hesitate for a bit and then Jerry comes up with the natural antithetical example to a single God: multiple gods. The next student example, “Some people believe in unicorns,” immediately draws a physical and verbal response from all the students. They are now eager to come up with more examples and dialogue about the nature of beliefs.
- When the topic of beliefs leads to aliens, students (Phil in particular) is eager to discuss the potential biology of aliens.
- When the Faith epistemology card is presented, Donna immediately states that she previously gave its definition when attempting to define the belief card.

- Bobby is attempting to have a side-conversation during Klara's response to the Faith card. The teacher looks at him and says, "Hey Bobby." He immediately ceases and returns to his sketch. This is the first time he has gone back to the sketch since the beginning of the lesson.
- During the teacher's explanation of the definition of a Faith, Bobby raises his hand. The teacher glances at Bobby and continues with his explanation. After about seven seconds, Bobby lowers his hand.
- As the lesson transitions from the epistemology cards, Linda asks the question, "Are atheists considered a religion because they don't believe in anything?" The teacher acknowledges this as a great question and continues, "So first of all let's define atheism." Donna, "It's a nihilist." The teacher then makes the distinction between nihilism and atheism.
- The teacher asks, "Another great question is, is science a religion?" Donna, "Well almost everything in science can be proven." The teacher comments that science also has many traditions and values as well. Bill, "What are the traditions of science?" The teacher references the scientific method and peer-reviewed journals as examples, he then goes on to transition, "it is a good conversation, but typically science is not considered a religion." He then proceeds to define the difference between an atheist and agnostic.
- As the Timeline of Religions is laid out, students adjust to see it better. Many prop themselves up on their knees.
- As another lesson wraps up, many students transition between classrooms, but the students remain focused on the Timeline and the lesson.

- During the introduction to Confucianism, Bobby asks, “Didn’t he hear the teachings of Buddhism or something?” The teacher goes on to explain that we are going to spend a week on each religion and he will be able to investigate that question himself.
- As soon as he hears the word “Taoism,” Bobby looks up and shakes his head as if that was something he had been trying to think of.
- After presenting the Timeline of Religions, the teacher asks for any initial thoughts and/or observations. Phil quickly answers first, “They all have some sort of teachings or book that consists of teachings or lessons.”
- Bobby begins a story with “My dad and I were talking about stuff like this...” The other children start to fidget a bit, knowing that Bobby tends to tell long, drawn out stories or personal anecdotes to make his point. As begins his story, Bobby has a difficult time stringing sentences together leaving gaps of several seconds between coherent sentences. He then turns his thought towards a National Geographic magazine he recalls. Once he gets his main point out, “Stories do get altered over time,” he begins to string sentences and thoughts together with greater ease. When Bobby is in between talking points, the teacher interjects and brings his point back to the epistemology cards used the begin the lesson.
- Bobby attempts to continue his thought and the teacher stops him, “I’m going to stop you there. If you would like to have an individual conversation with me afterwards, we can absolutely do that, but right now I need to continue with the lesson. Thank you.” Bobby takes a deep breath and directs his attention towards his sketch.

- The teacher transitions into talking about what the follow-up for this lesson will look like. Jerry immediately grabs her planner and prepares to take notes. Mickey witnesses Jerry doing this and proceeds to do the same.
- The teacher describes the process for taking notes, writing a rough draft, and getting it edited. “Should you try and get your rough draft edited next Thursday morning right before the lesson?”
- After the follow-up is explained and the lesson is for all intents and purposes over, Linda asks a question about Christianity, “So in Christianity, they have a God, but also everyone else, they have a God, but in some of the prayers they say that there’s one God. So, do they know that there’s other Gods?” The teacher explains that there are aspects of religions that are not compatible with each other. He then goes on to say, “But I think there are teachings throughout all religions that are similar. I think there are some core teachings, and we’ll see if we can get the bottom of some of those, that are similar between all religions.”
- Bobby begins to verbalize another thought and the teacher stops him to dismiss the rest of the students from the lesson, “Alright let’s stop the lesson right there and I do want to talk to you more Bobby, or anyone can ask individual questions, but I don’t want to take up everyone’s time, so if you don’t have any questions, you are free to go.”

First-Person Observations

- At the beginning of the lesson I was very cognizant of making sure that all of the students were in a good position to be able to see the lesson and the materials presented. This shows in the video as I guide the students to places in which they would better be able to actively engage.

- I start by also asking the students to put their planners behind them. I have found that at times the planners become an added distraction for the students.
- I did notice that Bobby had a pencil and a small strip of paper that he was sketching on as I was starting the lesson. This is reaffirmed by the video in which I glance over at him to observe this. I choose to not intervene as I know that he gets “fidgety” and having something in his hands helps him. He has also proven in the past that he has been able to have something in his hands and be engaged in the lesson simultaneously. I remember thinking to myself that I will need to monitor this throughout the lesson to make sure it does not become an impediment to his engagement.
- Before lessons, I typically review the last lesson and/or follow-up work associated with it. I remember feeling during this particular lesson’s review that I may have dragged it on a bit longer in an effort to give greater context to the videotaping. After having watched the video, I do not believe that I necessarily took the review too far, however whereas I would typically ask the students themselves to lead the review, this lesson I dominated the review. In retrospect I believe that this is due to the fact that I knew it was being taped and I wanted what I thought were the important parts of the previous lesson to be on record. I now feel that I certainly could have shown more faith and confidence in the students to be able to express their recollections and understandings.
- When I pose the first introductory question to the group, “What do you think religion means? What is a religion?”, I notice that Linda is eager to answer the question and is clearly very engaged and intrigued by this topic. I note this to myself at the time as somewhat of an aberration because she is typically somebody that does not interject

herself into the dialogue willingly and is harder to engage in topics. At this point I remember making a mental note for myself to encourage her interest in the topic.

- I tie in the students' previous work with early humans, "Do you think humans have always had religions? All the way back to...you all studied early humans last year, do you think we've always had some type of religion?" Connecting current lessons to their previous experiences is something that I have consciously tried to do. In this particular case I did not have a plan of doing it in this particular way. Upon reviewing the video, I feel that the previous efforts I have made into premeditating these connections has allowed me to insert them more naturally into my lessons, as is the case here. The benefit of doing so is immediately evident, as every student but one reacts physically to this prompting (nodding/shaking their heads, readjusting as if ready to insert themselves into dialogue) and seven of the students begin to simultaneously respond.
- Here I introduce the term spirituality. Although it is something that we talk about in the classroom in group discussions and at our Mindful Meetings, having watched the video, I remember thinking after the lesson that I should have taken the time to establish a firmer foundation of what spirituality is referring to, and the differences between the term spirituality and religion. However now with the benefit of having been working with the religions and having seen the students research, teach each other (and me), and discuss them, I have observed that they have come to individual understandings of what religion and spirituality means to them at this point in their lives. So perhaps it was best that I left it more open-ended and allowed them to explore it for themselves. A more explicit explanation from me could have led to a more confined exploration for them.

- When introducing the epistemology cards, the example I used for a fact is, “Bengal tigers have stripes. It’s a fact because I can take you to a Bengal tiger and it will have stripes today and will have stripes tomorrow.” Jerry and Donna have the same response, “What if they evolved not to have stripes.” What a brilliant rebuttal! I cannot help but be so impressed by their confidence in their own reasoning abilities and knowledge base to be able to have a healthy skepticism. I find it especially appropriate that they are verifying and playing with the concept of fact while I am giving a lesson on what facts are.
- This is my first year giving this particular form of this lesson and using the epistemology cards. As I was reviewing the material before the lesson for myself, I thought that I should change the example given for what an opinion is to something more engaging. Potted plants being indoors or outdoors. It’s an opinion sure, but not a particularly engaging or useful one. The students appear to think so as well because it does not generate much interest. In retrospect I should have just taken the time to create a new example before the lesson. I was thinking in the moment that it went over like a lead balloon so I had to improvise, “I like mushrooms on my pizza.” I figured that would get a reaction, and it worked.
- One of the core ideas that I was hoping the students would pick up on is the idea that many people display opinions as fact and us as individuals have to be able to differentiate between the two. I knew going in the I wanted this to be a core message, but I was trying to craft it and guide the lesson in a way in which the students proclaimed this for themselves. Bobby hits the nail on the head by stating that some people say opinions as if they were fact, “but if you really think about it, you’re like oh, that’s an opinion.” I use this chance to reiterate what he said.

- Bobby tends to speak in long, meandering monologues and it can disengage the other students. His thoughts and interpretations are most of time quite astounding and high-level thinking. In this case I wanted to make sure that the other students are able to hear what he is trying to say. I was also thinking in this moment that I would have to tread delicately between allowing Bobby the time to express his thoughts, but also continue with the lesson. There is a real balance between the two and it is something that I continually attempt to manage and observe. On the one hand I believe it is crucial that Bobby have a chance to express himself thoroughly, because while he tends to start off his verbalized thoughts sporadically, when afforded the time he is able to complete them beautiful and weave them into greater meaning. I also have to keep the other students in mind as well because they cannot be blamed for at times losing interest as Bobby can be hard to follow. They are always polite and respectful, but it is also not fair for him to dominate the dialogue. This lesson in particular is a bit lengthier than our average lesson, so I went into hyper-vigilant of this balancing act. In this particular case I chose to allow him to make his point and then choose to redirect it back to the next epistemology card. I also knew in my mind that there was going to be specific parts of the lesson that he was going to want to comment on. Upon reviewing the video, I believe it worked fairly well. I can tell from his reaction that Bobby is not completely satisfied with my moving on, but he also stays engaged.
- When I raise the question, “What is a belief?”, Donna give the definition for faith. I noted this in my mind and knew that she would be excited to re-contribute her thoughts when I presented the Faith epistemology card.

- The example that I gave the students for Belief is, “Some people believe that there is one god.” When I asked for other examples it was hard for them and the first example was from Jerry, “More than one god?” Emmylou then said, “unicorns”. The students all immediately responded to that statement and in retrospect I think that I could have started off with a more relatable example and led up to the idea of one god as a belief.
- When I introduce the Faith epistemology card Donna immediately states, “It’s what I said earlier.” My initial observation of her during the belief card proved correct.
- After introducing the Faith card and transitioning into the next part of the lesson, Bobby raises his hand in an attempt to say something. I glance at him and make the decision to continue on. While watching the video, this strikes me as a bit harsh and/or inconsiderate. This all goes back to that balancing act and during the lesson and did have in my mind a time and place during the lesson in which I was going to allow him to speak, knowing that it could take a lengthy amount of time. In this moment I made the decision that this was not that place. In reflecting upon this and watching the video I am left with a few thoughts to ponder. Is there perhaps some sort of signal I can give him that this is not the time instead of just continuing on? If I am going to allow only certain time and spaces for him to inject, should I be controlling of when those times are? Perhaps I could have him keep a running list of the thoughts he has during the lesson so that he and I can address them individually afterwards? I attempt to do this with him always because I want him to know that he has a voice and it will be heard, but sometimes the time has passed for him.
- I glanced at Bobby as he returns to his sketching after not being able to inject his thoughts. In an immediate attempt to make sure he stays engaged, I refer to his earlier

point, “You can see, as Bobby said earlier, many of these things can be mixed up.” From the video, there is no clear indication that he reacts to this.

- As I clear away the epistemology cards and prepare to transition to the Timeline of Religions, Linda asks is atheism is a religion. An astute question that I was prepared for but was not sure if it would come up or not. I remember at this moment trying to observe more about where Linda is coming from in her obvious curiosity about the topic of religion. I deduced that she was Christian and most likely Protestant. I also conjectured that she had a lot of questions about things that she may have heard about, but did not know (such as atheism, polytheism, etc.). It seemed to me that while curious, it was somewhat difficult in a way for her to confront questions that she previously did not have. It is at this point that I made a mental note to observe her closely throughout the religions studies to offer support in addressing these daunting questions. I also wanted to immediately positively reinforce her asking these questions, especially considering that Linda typically is reserved during lessons.
- While I was not expecting Donna to equate atheism to nihilism, I was glad to clear up the distinction. Upon reviewing the video, I think that I failed to adequately allow for reflection on this point before moving on. I was conscious of the time frame of this lesson going into it, and throughout it. I think here is an example of that preconception of how I wanted the time to flow interfered with what could have been a more organic unfolding of dialogue and reflection.
- I remember thinking that I was getting too technical when I was trying to clearly distinguish between atheists and agnostics. After watching the video, I think something as simple as having the words written on cards to present would have helped.

- As I introduced the Timeline of Religions I was trying to be very cognizant not to give too much information or go into too much depth on any of the religion. I wanted to merely introduce them and peak curiosity so that the students could explore them in greater detail.
- At the time of the lesson I remember thinking that the Timeline was rather basic and could perhaps use some updating and more information. However, as I watch the video, I believe that there is an approachability to the Timeline that arises from its simplicity. The desire for more information and greater detail stems from my personal interest in the topic, not from a desire to make it more engaging for the students.
- When discussing Judaism, and the crossover between the Torah and the Old Testament, I am observing now that it is a bit too in depth for this first introductory lesson. These are all details that the students will be able to research and discover on their own.
- Because of my personal proclivity towards Buddhism, I was conscious before and during the lesson to keep my introduction brief. The video shows that I succeeded in this matter.
- As I started to introduce Sikhism I quickly realized that I knew much less about it than the other religions I had introduced. The video shows this as well. I make much more vague descriptions about Sikhism and I misspeak a bit when declaring that Sikhism seeks for common wisdom from all of the different religions. While this is not a completely false statement—Sikhs do not believe that any one religious tradition has a claim to absolute truth, and also do not believe in conversion—I erred in my description and my intentions. I was confusing my understandings of Sikhism with the Bahá'í Faith. I will certainly need to be more diligent in my preparations moving forward.

- After introducing the Timeline of Religions, I remember feeling like it was a lot. I personally felt drained and I was sensing that the students were also at their limit of intake, attention, and stillness. In the video this shown as I take a deep breath and there is a long pause of silence. I remember hoping that this was a mindful, reflective silence as opposed to an unengaged, wandering silence. The subsequent questions and dialogue showed me that it was a reflective silence.
- At this point Linda asks, “When it is talking about Christianity, is it talking about God or Jesus.” At this point I remember further filling in my ongoing observation of her interest and knowledge base in this subject. It began to appear to me that her interest was almost solely focused on Christianity, but that she did not have a great depth of foundational understanding of the beliefs. I wanted to be very cognizant of remaining factual and historical when discussing and introducing the religions and so I attempted to give her an essence of foundational understanding of the Christian understanding of God-Jesus without just answering the question for her. This is evident in the video by my restatement of an earlier answer, “We are going to spend time on each religion, so you’ll be able to research more about what each religion actually believes.”
- It is at this point that Bobby begins a thought with a personal anecdote. I made the decision that this would be his time to do so. I remember thinking as he started that it was asking a lot of the other students to continue to be attentive, especially at the end of a lengthier and intellectually heavy lesson. The video shows the other students getting restless as Bobby struggles to begin his story and string together coherent sentences. I remember trying to figure out where he was going so that I may help him along if he got stuck. When I sensed that he had come to a sufficiently reasonable point, I used one of

his pauses as an opportunity to inject. I reiterated his main point back to him, and then tied it back to a point made earlier during the discussion around the epistemology cards. Bobby at the point would like to continue and I make the decision to keep moving on, “Bobby I’m going to stop you there. If you would like to have an individual conversation with me after the lesson, we can absolutely do that, but right I need to continue the lesson.” I remember making a mental note to be sure I gave him that opportunity after the lesson.

- I knew going into the lesson that I wanted to give the students structure in their research. Since the entire topic of religions was new to them, I wanted to guide them in their approach. I knew for sure that I did not want them using the internet for their research. I think the video shows my preparation in this aspect paid off because the books, maps, calendars, timelines, and research questions I assembled gave them the freedom to research independently within a confined and manageable space.
- I had recently introduced an outline skeleton for note-taking to my students that I wanted them to start using in lieu of notecards. This was my students first chance to use it and the video shows my enthusiasm and nudging for them to do so. I remember thinking that I did not want to mandate this new form, but was more so going with the strategy that, if it really is a better and more productive way for them to take notes, then it will catch on without the need of my authority. I was ecstatic when during the week when I overheard Keith and Donna ask Mickey, “I see you are using the new outline form. Do you like it?” Mickey replied, “Oh my gosh I love it, it just makes so much more sense than the notecards did.” Within a matter of days each one of the students was using the new outline tool instead.

- After introducing the structure of the follow up, I was feeling more than ready to end the lesson. I could see that Linda had a burning question and choose to acknowledge it. I do not think I would have done this for every student, but in that moment I remember thinking that this was important for her. “So in Christianity, they have a God, but also everyone else, they have a God, but in some of the prayers they say that there’s one God. So, do they know that there’s other Gods?” My ensuing answer scaffolds the overarching research everyone is about to embark upon and I pose a sort of meta-question to them, “We will see if perhaps we can find some commonalities between all religions.” Upon seeing the video and reflecting on this lesson, I am glad that she was able to ask that question. It only took me a few seconds to answer, it framed the greater mission of the research, and it was personally important to her personal seeking.
- Bobby attempts to start another thought process and I pause him to dismiss those who would like to move on from the lesson and speak with him individually about his thoughts and questions.

Reflections

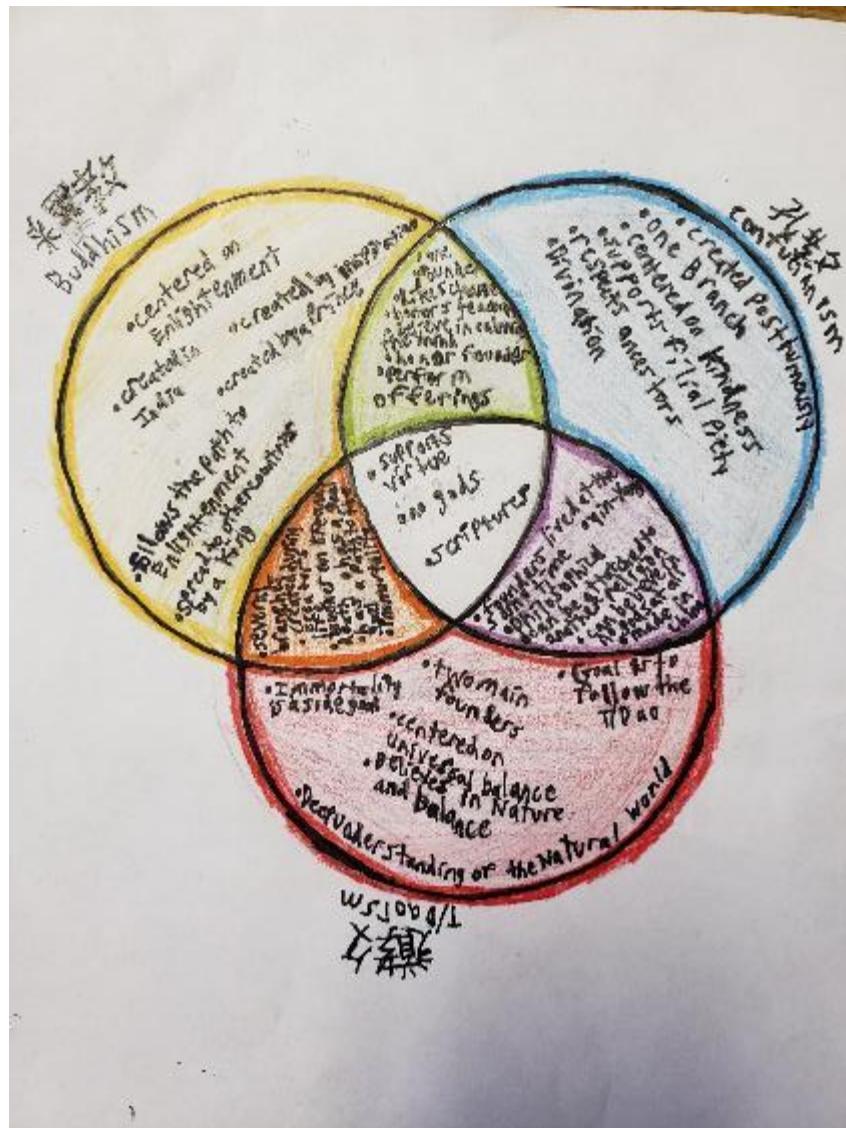
My experience in this method of research and observation has confirmed in me the benefits of the neurophenomenological approach and its applications to the role of the Montessori teacher. I do believe that the chronology of the observations was vital. Making the third-person observations first allowed them to remain as objective as possible. As I was making the third-person observations, I could sense myself beginning to slip into the first-person and it was easier to gently remind myself that, “that time will come.” Knowing that I was allowed space for the first-person made it easier for me to remain committed to the third-person. I have a feeling that if I were to have made my first-person observations first, they would have clouded

my ability to be objective in my third-person observations. I also found that by having the third-person observations precede the first-person, I was better able to integrate the two together to form a more complete picture of the enactive process of the lesson. The third-person perspective gave context within which to place my first-person experience of presenting the lesson. At times it

Figure 9: A student's comparative analysis of Buddhism, Taoism, and Confucianism

also confirmed my experience as valid beyond just my experience and colored my experiences with a greater understanding of the environment and the structural coupling of the experience of the participants.

In my exploration of neurophenomenology, enactment, and in particular the Buddhist influence on both (including my own personal experiences and practice with meditation), I have come to reflect lovingly on the immediate impact these approaches have. It is my experience



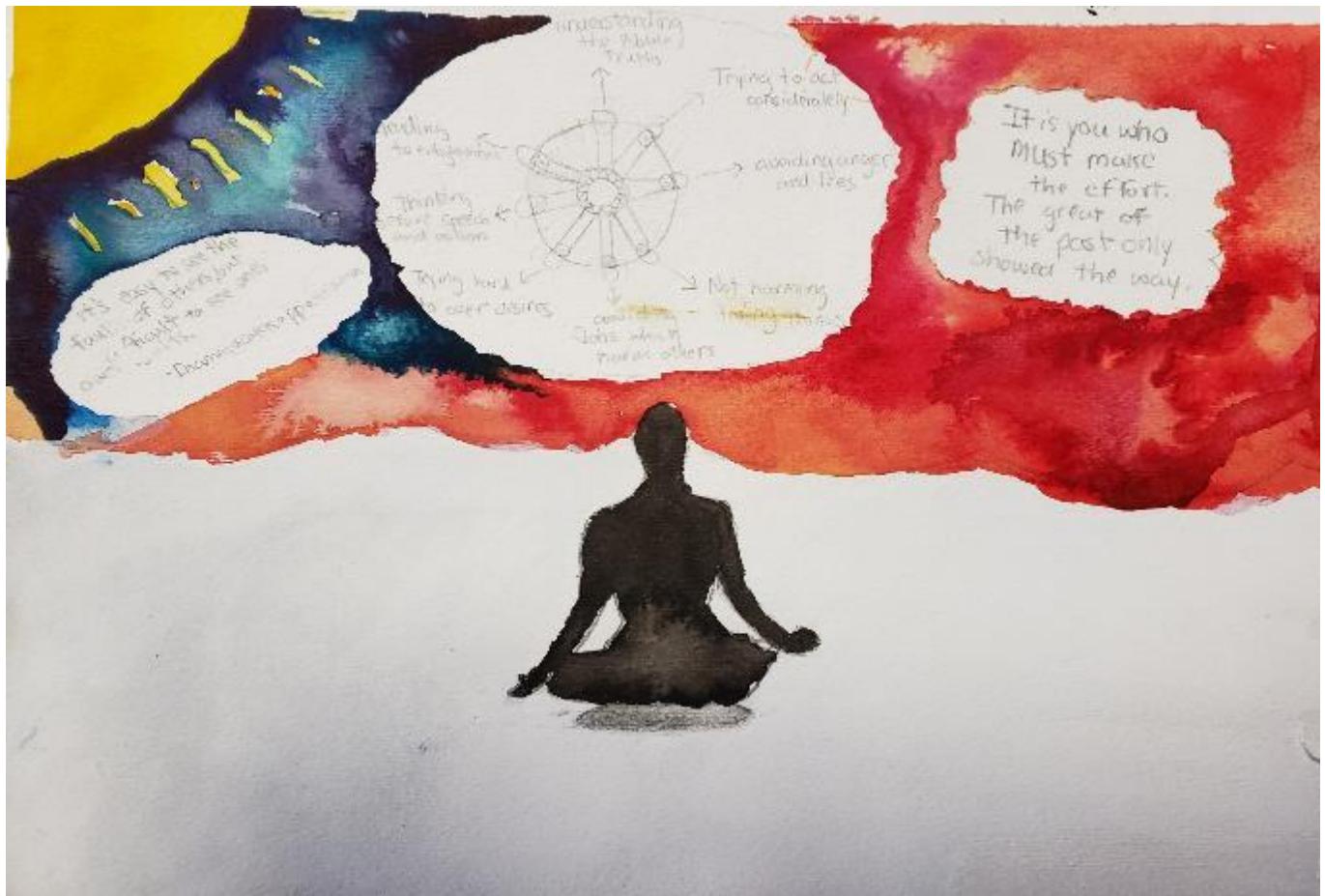


Figure 10: A student's creation culminating from their exploration of Buddhism and meditation.

that an individual does not have to travel very far down the path of mindfulness to begin to see the fruits of such efforts. Through my readings I believe this experience to be corroborated by the teachings of those with far more knowledge and experience with such endeavors than myself. In my practice of teaching, I have already noticed how not only the method of my observations has changed, by the physical and mental processes of doing so has. Upon reflection, I believe that this transformation has been the confluence of three forces at work: a fundamental understanding of enaction, the application of the neurophenomenological approach, and the acceptance of Buddhist non-dualism of the self as illusory.

I believe this method of research and observation to preserve the liberty and autonomy of the individual child as Montessori proposed. It does so in part by making the level of the

individual the focus of analysis and balancing the influence between first- and third-person perspectives. Jung alludes to the dangers of what happens when these balances get out of whack and the natural tendency of scientific analysis of education to focus on the abstract collective as opposed to the individual:

Scientific education is based in the main on statistical truths and abstract knowledge and therefore imparts an unrealistic, rational picture of the world, in which the individual, as a merely marginal phenomenon, plays no role. The individual, however, as an irrational datum, is the true and authentic carrier of reality, the concrete man as opposed to the unreal ideal or normal man to whom the scientific statements refer. (1957/2006, p. 11)

This level of analysis allows for the students as autonomous individuals to influence my own self-critique of how I as the teacher conduct myself, present the lesson, and prepare the environment. In an effort to keep the broader picture in mind, I would refer the emphasis on the acknowledgement of students as autonomous individuals back to Montessori's understanding of the balance between the individual and society. The primal paradox,

Education must foster both the development of individuality and that of society. Society cannot develop unless the individual develops, as we learn from observing the child, who immediately uses his newly won independence to act on a social environment. Most of our actions would have no reason for being if there were no other people around us, and we do most of the things we do because we live in association with others. As soon as the child begins to develop in an environment built for him and succeeds in acting on his own, independently of the adult, a harmony is soon established by the child not only between himself and the environment, but also between himself and the adult. (1949/2002, p. 56)

In regard to the specific lesson sequence of comparative world religions, I have found the engagement level and personal importance of this work to the students astounding. The observation data clearly show the deep level of thinking and questioning the presentation of these lessons has sparked. The students have been questioning their own belief systems and expanding their understanding of others. In researching the different religions of the world, the students in turn have been asking of themselves the fundamental questions of human existence that are at the

core of Cosmic Education. This exploration fulfills a deep need within all humans to develop spiritually as well as physically, intellectually, and emotionally.

Epilogue

I would be remiss if I did not mention the absolute importance the natural world plays in the processes discussed during this exploration. Prior to my work in the Montessori classroom, I spent years as an outdoor educator, as well as working across the United States for the National Forest Service, California State Parks, and Student Conservation Association. Through my own personal interactions as well as my experiences with children, I can personally attest to the importance of children being outside experiencing the natural world. There is vast evidence to support this claim (Berry, 1999) (Brown Jr., 1988) (Brown Jr., 1983) (Cornell, 1989) (Cornell, 1978/1998) (Louv, 2005). In particular, children need unsupervised out-of-doors free play to properly develop (Lukianoff & Haidt, 2018) (Louv, 2005). We as a society have cultivated a culture of fear, perpetuated by the twenty-four-hour news cycle and a media in which the most sensationalized and dramatic stories receive the most press. This has caused the amount of time children are granted to spend with free play time and exploration out-of-doors to plummet. The reality is that the risk of something terrible happening such as the news depicts is minuscule compared to the chance of coddled and sheltered children not developing properly and exhibiting many of the issues that afflict individuals in today's society such as hyper-anxiety, depression, addiction, nihilism, and general apathy (Lukianoff & Haidt, 2018) (Louv, 2005). This topic

could be an entire thesis exploration in and of itself, but it was too important for me not to include it here.

Consilience is a word given new life by biologist Edward O. Wilson to describe the converging on a truth through the lens of many different fields and perspectives (Wilson, 1998). Throughout my experience and research in this exploration I have at times felt lost within a tributary of what I thought to be my main route. I tried to be honest with the process and trust that it would lead me down a meaningful path. This notion of consilience has been an affirmation of my efforts and sets the framework for how my exploration was structured. I attempted to probe at the primal paradox and self-transcendence from a variety of viewpoints and disciplines. Looking back, I feel a sense of deep gratitude towards all of those who have come before me seeking a deeper understanding to many of the questions I have contemplated, as well

as the guides and mentors that surround me today to nudge me along my path. I have always been confident that by giving myself fully to the present moment my optimum trajectory would play itself out without me having to constantly look up for it. If perhaps this exploration can be a microcosm for a greater exploration in life, then I am strengthened by the work and comforted in knowing that



Figure 11: A student's artistic representation of the integration of Buddhism, Taoism, and Confucianism.

commitment and dedication on the present moment does lead to a meaningful future. Be here now (Ram Dass, 1971).

As I reflect upon my exploration I notice that in many ways I have been trying to understand the nature of consciousness itself. Mathematician Ralph Abraham and physicist Sisir Roy framed this question in *Demystifying the Akasha*, “Besides its more common meaning of individual mental awareness, [consciousness] may also include the personal unconscious system, and the collective mind, conscious and unconscious...cosmic consciousness” (2010, p. 1). It is this reference to a greater cosmic consciousness that has captured my full attention, and that full attention has led to a personal transformative process. Undoubtedly I am changed by the process of this exploration, research, and writing; it would be impossible not to be, for as Aldous Huxley said in *The Perennial Philosophy*, “Knowledge is a function of being. When there is change in the being of the knower, there is a corresponding change in the nature...of knowing” (1944/2009, p. vii). It is not the change itself that I am reflecting upon but rather the color and texture of that change. Part of the reason for that is because I am exploring concepts that I believe to be true, both in a noetic and a primal way. This research has allowed me to name many of the concepts that previously were instinctual and ineffable to me. It has also allowed me to be at ease with the paradoxical nature of reality, which returns me to the original thought of the primal paradox. Just as self-actualization cannot occur independently but must occur through the process of self-transcendence, the individual can reach his or her potentiality without the context of a society. There is no solution to the primal paradox because it was never a problem to be solved in the first place. It is a dynamic process that allows for creativity, self-organization, complexity, compassion, awe, and beauty. Throughout this process, I have again and again returned to the idea of the individual and the most crucial aspect of the individual is

that of the agent of change. While the community is where that change can be manifested, it is within the individual that it lies. Jung spoke to this as well,

As can easily be seen, ‘community’ is an indispensable aid in the organization of masses and is therefore a two-edged weapon. Just as the addition of however many zeroes will never make a unit, so the value of a community depends on the spiritual and moral stature of the individuals composing it. For this reason one cannot expect from the community any effect that would outweigh the suggestive influence of the environment—that is, a real and fundamental change in individuals, whether for good or for bad. (1957/2006, p. 28)

As an educator, it is my responsibility to take seriously my own path towards self-transcendence while simultaneously fostering environments that allow for children to autonomously and independently develop towards their own path. Montessori is clear throughout her writing about the commitment necessary to individuality:

Young people must have enough freedom to allow them to act on individual initiative. But in order for that individual action should be free and useful at the same time it must be restricted within certain limits and rules that give the necessary guidance... From all this the result will be not only self-discipline but a proof that self-discipline is an aspect of individual liberty and the chief factor of success in life. (1948/2000, p. 73)

Through this commitment to the intrinsic development within humans, perhaps the path of self-transcendence can begin (or continue) from a younger age, leading to the paradigm shift in the greater human consciousness and relationship to each other and our world. As Sir Julian Huxley stated in his reflection upon Pierre Teilhard de Chardin’s seminal work *The Phenomenon of Man*, “We, mankind, contain the possibilities of the earth’s immense future, and can realize more and more of them on condition that we increase our knowledge and our love” (Chardin, 1959/2008).

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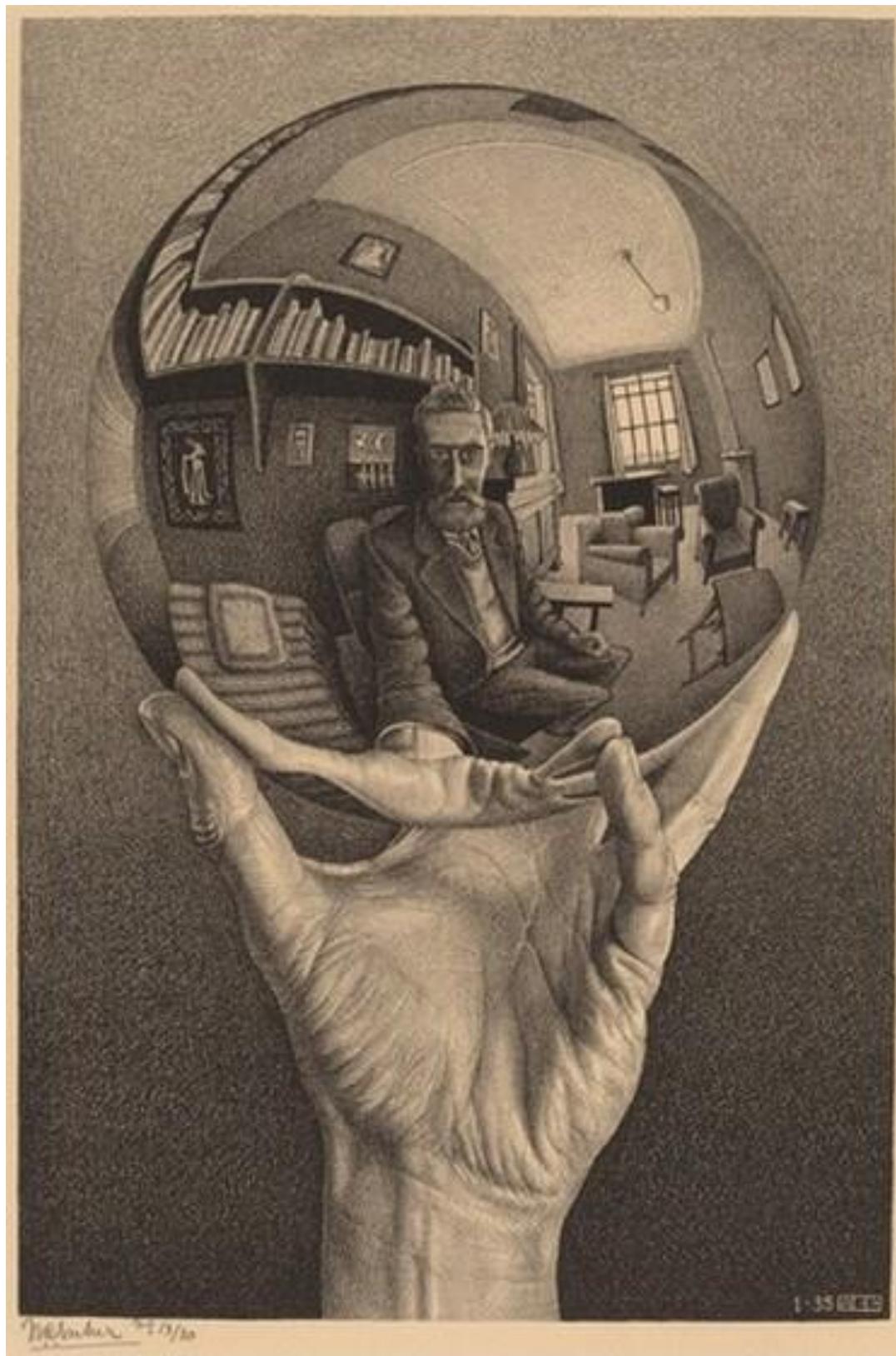


Figure 12: *Hand with Reflecting Sphere*, 1935. M.C. Escher
(Photo: <https://www.nga.gov/features/slideshows/mc-escher-life-and-work.html>)