

Emptiness

Michael J. Young

Introduction

In this essay we investigate how the matter-as-awareness (M-A) model (Young, 2016, 2017) relates to the Buddhist conception of emptiness. In particular, this essay compares select Western ideas on cognition and reality to the Buddhist philosophy schools known as Mind-only, or Cognition-only (Sanskrit: Cittamatra) and the Middle Way (Sanskrit: Madyamaka). We take the position that an individual's world does not exist outside of her/his perception of it. Now that is not to say that there is not a universe out there. It is to say that the world you experience is unique to you and that a process that you think of as your mind creates it. We also discuss differences in the Western and Buddhist conceptualizations of emptiness, and how emptiness relates to spiritual growth in the Buddhist tradition. We start by summarizing key ideas about the M-A model.

Summary of Key Ideas from Consciousness and Knowing

We argue that all matter has an attribute or property that is awareness. Basic matter is not alive, nor does it have a sense of self (or the feeling and hopes that frequently go with a sense of self). Further, when physical energy interacts with matter, the state of awareness changes following physical laws. Matter becomes more interesting when it becomes part of living system, to include both flora and fauna. Living systems employ self-production and metabolic processes to create and maintain complex structures for as long as they are alive. Further, living things appear to create “walls” that separate their inside structures from the outside, allowing the inside structures to become quite complex. When an inside structure represents knowledge relevant to the organism, we say the organism possesses consciousness (i.e., there is subjective experience). Importantly, this does not mean a sense of I exists. Plants, for example, do not have a sense of I.

We argue (Young 2016) that the advent of mobility in living organisms is what separated fauna from flora. Mobility in fauna provided an opportunity to develop a sense

of I, or I-ness, as a way of enhancing mobility and increasing evolutionary fitness. I-ness is not a mind (whatever that might be), but rather a set of cognitive and mobility control routines that provide critical information and mobility options to animals.

Humans tend to reify (i.e., make concrete) and anthropomorphize (i.e., make human like) things that change. The thought content of awareness is constantly changing so people believe that there must be a mind that is thinking thoughts. But what if thoughts are actually just changing configurations of matter in a brain? Is there really a need to reify this process and call it a mind? Our perspective is that the concept of mind is a colloquialism. It is a short hand way of acknowledging that our thoughts, goals, and interests are constantly changing. The main problem with the term mind is that it encourages you to think that there is *someone* who is thinking. What if there isn't? What if there are only changing states of matter?

The range of consciousness an organism can experience depends on its neuronal architecture. Different neuronal architectures provide different “windows” on the universe and information processing capabilities. As discussed in Young (2017), plants, and especially animals, have a wide range of sensory systems that differ in the frequencies of electromagnetic energy they process and the depth of processing they do. Animals also differ on whether their sensory system is single modality or integrates multiple modalities of information. In addition to processing electromechanical energy, animals can process a wide range of smells (molecular compounds) and tactile sensations. In general, organisms with more advanced phylogenetic architectures have more sophisticated information processing and complex behavioral responses.

We also propose that the *universe* consisting of all the energy and matter that exists is divided into *realms* that consist of subsets of matter that strongly interact. Our realm is made up of 4 of the 12 mass carrying particles (up and down quarks, and electrons and electron neutrinos leptons). Realms, in turn, are divided into *worlds* that are determined by the sensory abilities of specific animal species (i.e., each species participates in one world). Finally, within a world, every animal occupies its own *reality* that reflects its state of being, to include its current state and other states that it can assume based on learning and potential environmental conditions.

To bring these ideas together we briefly consider the example of a human, a

dog, and an insect experiencing a bush. For the human, the visual system dominates, so the human perceives a bush, and probably smells something as well. For the canine, the olfactory system dominates, so the dog experiences smells and probably a (non color) visual stimulus as well. Finally, the insect probably would not notice the bush unless there was a specific sound or odor emitted by it for which the insect had receptors. Further, the impressions or concepts activate in the three animals would differ based on the phylogenetic sophistication of their neuronal architectures. The insect's behavioral reaction, if any, would probably be hardwired. The dog's behavioral response repertoire would have a few options, and the human's might have several possible responses, and they would probably vary depending upon the context of the situation and the knowledge of the human.

Emptiness

One of the main goals of this essay is to highlight differences between the Western and Buddhist concepts of emptiness. In the West, the concept of emptiness is normally applied to space and is studied primarily by physicists; emptiness is a physical property. In the Buddhist tradition the concept of emptiness is normally applied to perception and cognition and is studied primarily by philosophers; emptiness is a mental property. We expand on these differences below.

In the West the concept of emptiness usually applies to physical space and normally means that there is nothing there. If the object being examined is empty space, one can put things into it. When we apply the empty concept to forms we say that the form is not solid, it is a phantasm. There is nothing there.

To help concretize this idea consider the make-up of the sun. When I was much younger, I once heard a scientist say that all of the matter in the sun, which comprises 1.4×10^{27} cubic meters of matter, if compressed (i.e., if they squeezed out the empty space between atoms), would fit into a thimble. And that was before they discovered that the components of atoms (protons and neutrons) were mostly empty space; that is, this was before they discovered quarks. Now, we understand that all of the matter of the sun, if compressed, would probably fit on a pinhead. Further, the quarks comprising atoms do not seem to actually exist before you observe them. Their location and whether they are

waves or particles is determined at the time you measure them. So something that seems to have form can be essentially empty.

On the other hand, modern physics postulates a field of energy/matter that extends throughout the universe from which matter arises (*Economist*, 2015). From this perspective, there is actually no space anywhere that is “empty” . The empty space we perceive is actually matter/energy, but of a type that allows other matter/energy to move into that space (e.g., when you fill a glass with water, you displace the air that pervaded the “empty” glass).

It is interesting to note that the density of matter varies greatly in the universe. Between the stars the density of matter is minimal, a few atoms per cubic meter, while on a neutron star atoms are stripped of their electrons and the remaining nuclei are packed in almost to the point where any emptiness between them is almost eliminated (e.g., in this form our sun would only be a few meters across).

In Buddhism, the concept of emptiness is normally applied to perception and cognition (rather than space). One tries to experience the world without invoking our normal, automatic conceptualization of it. That is, one tries to experience the world empty of concepts. The reason for this is that the perception of forms triggers the activation of concepts, which in turn cause thoughts to arise, and Buddhists believe that these thoughts prevent us from experiencing the true reality.

One Buddhist method for studying emptiness and changing cognitive processing is to contemplate the sameness of objects and space by using the well-known saying from the Heart Sutra: “Form is emptiness and emptiness is form” . When we look at the world we see solid things and “empty” space. The solid things are forms and the empty space is just background that we mostly ignore. The Heart sutra suggests that we try to see the empty space as a form, to elevate it to the same level of perception as the objects/forms that we naturally perceive. Buddhist teachings suggest that this can change our perspective of reality

Buddhists also believe in relative and absolute truth. Relative truth is the world we perceive; the world that affords us opportunities, and that we share with our conspecifics (i.e., those who have sensory and cognitive capabilities similar to ours). It is the world of separate objects with empty space between them. It arises from the way

we have evolved, and from what we have learned. Absolute truth is mostly an unknown, although it is said to pervade all of reality. It is a state beyond duality and intellectual understanding. It cannot be understood by reading or thinking about it, rather it must be experienced. Developing an understanding of emptiness is a major step toward that goal.

Buddhists believe that the automatic processing of information locks us into a world of relative truth. The automatic activation of concepts produces a continuous stream of thoughts that obscure the absolute truth, sometimes also called the Ground-of-All-Being. It is called the Ground-of-All-Being because different realms arise from it. Buddhists believe that there are six distinct realms of being (Kalu, 1997). Individual realms are separated by the emotional tenor of the cognitive processing of the individuals that comprise the realm. Some beings' information processing is dominated by anger and they experience a hell realm, others are dominated by desire and they experience a human realm, while still others are dominated by stupidity (i.e., they refuse to look at situations intelligently, but instead try to block them out), and they experience the animal realm.

Buddhists believe that one of the best ways to loosen automatic cognitive processing (and rediscover the ground) is to meditate and contemplate on the selflessness of self and others. Buddhist believe that all things are impermanent, and that the objects that we perceive consist of several independent things coming together temporarily (i.e., there is nothing that is permanent). In contrast, a beginning mediator typically believes that the self is permanent over time, singular in nature (i.e., consisting of one thing), and independent of others. These beliefs, combined with the automatic cognitive processing, are what prevent us from discovering our original nature (i.e., the absolute truth). The study of emptiness is believed to be an excellent method to weaken self-based perception and cognition (Gyamsto, 2001).

The Buddhist teaching on emptiness is complex and consists of several gradations or stages of understanding. These stages usually reflect the understanding of a specific Buddhist school of philosophy, and over time these understandings became more sophisticated. The normal approach to studying emptiness is to start with the earliest definitions and contemplations, and once these are mastered, move on to more difficult conceptualizations.

Buddhist Stages of Emptiness

Buddhist Stages of Emptiness in Different Schools	
Selflessness of Person	Shravaka
Cognition Only	Cittamatra
Autonomy	Svatantrika-Madhyamaka
Consequence	Prasangika-Madhyamaka
Empty of Other	Shentong-Madhyamaka

In the usual contemporary curriculum, five stages of emptiness are studied covering the most important schools of thought (Gyamsto, 2001, 2010)¹. In the first stage one meditates on the selflessness of the individual by contemplating the five aggregates, which form the basis of the self. The five aggregates are collections of things that we experience including Forms, Feelings, Discriminations (opposites), Formations (ingrained patterns of thought), and Consciousness. The main point in this type of contemplation is that the self is neither permanent nor singular in nature since the forms we see and cognitions we experience are constantly changing. Further, when we see an object at different times we frequently associate different attributes with it, demonstrating that reality is not fixed (e.g., your reaction to food changes whether you are hungry or not hungry). So neither ourselves nor the world is permanently stable; both are constantly changing, and from a Buddhist perspective this means they are *empty*.

In the second stage, one meditates on the concept of self-awareness, empty of perceiver and perceived (i.e., with the understanding that there is no perceiver or perceived objects). With respect to objects of perception, the Mind-Only, or perhaps better named, Cognition-Only school (Skt.: Cittamatra; Powers, 1995) argues that the only way we know external objects is through our senses. Since different classes of beings have different sensory systems, each class of beings perceives objects differently.

¹ In creating our summary of emptiness we have drawn extensively on two works by Khenpo Tsultrim Gyamtso Rinpoche (Gyamsto, 2001, 2010). Our summary does not do justice to the depth of knowledge in these book and we encourage the interested reader to study either book to gain a much deeper understanding of the Buddhist concept of emptiness.

For instance, different species of animals perceive reflections of different frequencies of electromagnetic radiation, or hear different frequencies of sound. Further, no one can completely see all aspects of an object, because all sensory systems that we are aware of are limited to select energies. Since no one can wholly see an object, this means the true essence of an object cannot be known (i.e., and therefore it is empty).

The Cognition-Only school further argues that since different classes of sentient beings perceive us differently, our own fixed existence also cannot be established (e.g. insects and tigers see us as food, while others see us as friends; Gyamsto, 2010). They further note that happiness and suffering do not really exist either; rather they are interpretations applied to situations based on our own individualized perspectives, and all creatures have unique knowledge and experiences. In addition, they maintain that external objects are *appearance/emptiness* created by the mind because they are comprised of matter that does not permanently exist. Finally, the Cognition-only school divides experience into three natures. The imaginary or imputational nature, which comprises objects that we think we perceive, the dependent nature which comprises objects whose perception relies on activating multiple concepts simultaneously, and the thoroughly established nature which is the perception of the absolute truth.

Overall, the Cognition-only school argues that we do not perceive reality, but create it through cognitive processes that use specific sensory systems, combined with individualized associations, thereby creating momentary experiences. As to reality itself, they argue that all dualistic appearances that include a self and other are confusion and that one should meditate on the non-dual field known as Dharmata (i.e. absolute or fundamental reality).

The next two stages, Autonomy and Consequence approaches, are derived from the Middle-way Empty-of-Self School (Gyamsto, 2010). The Autonomy tradition describes the true nature of all phenomena (internal and external) as being empty like space. A contemplative approach used by the Autonomy tradition to discover this emptiness is to consider the arising of phenomena. No phenomena arise by themselves, but rather all phenomena are mutually dependent. That is, they depend upon other phenomena to come into existence. The traditional example is a flower that depends upon a seed, water, sunshine, and soil all coming together at the right time and in the

right measure for a plant to come into existence and grow. The Autonomy school holds that all phenomena are like the flower and therefore are not independent entities, which means they are empty.

In addition, the Autonomy tradition examines the role that concepts play in perceiving objects. The perception of physical objects normally triggers the activation of concepts (i.e., we do not see raw forms; we see clouds, chairs, cars, and all sorts of categorized things). Importantly, concepts do not exist by themselves, but are dependent on other concepts to provide their meaning: *Big* doesn't exist without *small*; *light* does not exist without *dark* (or *heavy*). From an Autonomy school perspective, the relative nature of concepts means that the attributes we apply to objects are not really real because they depend on other factors to fix their existence. They note that clinging to the concepts we assign to things binds us to Samsara and they admonish meditators to see all objects as emptiness (i.e., to see without assigning concepts to objects).

The Consequence school took the ideas of the Autonomy school further by freeing the contemplative of all concepts, including emptiness itself. The Consequence school realized that there is a human tendency to want to intellectualize knowledge and that practitioners might be just replacing one set of concepts about reality with another. Hence, the Consequence school's goal is to refute all concepts, including absolute reality, and not assert anything in their place.

Finally in the fifth stage, the Empty-of-Other tradition, there are three types of emptiness, two of which are similar to earlier schools. The first type of emptiness is imaginary, or imputational (which is similar to Cognition-only). When we look at the world we impute a reality to it that is not real. The way we are embodied determines what we perceive. Further, what we perceive is based upon the concepts our neuronal architecture can distinguish and encode (i.e., learn). These concepts, as discussed above, are dependently related to each other. They arise together and need each other to exist (which makes this approach similar to the Autonomy school). Finally, the Empty-of-Other tradition argues that emptiness is not really empty but consists of *Suchness* or *Buddha Nature*. Buddha Nature, also known as absolute truth, is a luminous clarity, free from all fabrications of the mind. From this perspective, concepts and the thoughts they help generate are like clouds that cover the sun. By letting go of attachment to

appearances and concepts, the meditator begins to uncover the true nature of reality, which is luminous clarity. No other school puts forth this position.

The above paragraphs have provided a brief introduction to the Buddhist concept of emptiness. Next we consider the M-A model of consciousness developed in *Consciousness and Knowing* (Young 2017) which grounds the Buddhist conceptions of emptiness in a Western scientific perspective. As will be seen, there is significant agreement about the structure of the universe and our mind's role in defining it.

Consciousness and Knowing, and Emptiness

We review the Buddhist stages of emptiness from simplest to most complex by comparing and contrasting them with the M-A model. In the first stage of meditating upon emptiness (selflessness of individual), one focuses on how the self is not permanent, primarily by acknowledging that the self is constantly changing, so it is not singular or fixed in nature. The emphasis here is mainly on the existence of constantly changing mental states. From the M-A perspective, these changing mental states are changing states of matter that reflect changes in consciousness (i.e., subjective experience).

However, not only are the mental states constantly changing, but the matter that comprises them are changing as well. Scientists in the West have established that all matter in your body is being replaced approximately every seven years (New York Times, 2005; Bionumbers.org). This replacement occurs on two levels. On the cellular level, all cells except those that make up the central nervous system (CNS) die and are replaced every few years. On the molecular level, all matter in the body is replaced every seven years (including the matter that makes up the CNS). This knowledge complements and strengthens the idea that the self is not permanent. Further, it brings new insight to the phrase that “one cannot step into the same spot in a stream twice”. Just as the water is constantly moving, so experiences are constantly changing and they can never be exactly repeated because the material components underlying them are continually changing as well.

In the second stage (cognition-only), one meditates on self-awareness empty of perceiver and perceived. As I look out my window this autumn morning, I see a gray sky and lots of trees with brilliantly colored leaves; the ground is also covered with leaves.

The self-ness in me enjoys the scene, while the scientist in me wonders what is truly real in the scene.

We have previously mentioned that our world is made up of up and down quarks, and electrons and electron neutrinos leptons. Everything in our world is made of these particles, and nothing else. So how is it that I perceive leaves in various shapes and colors hanging from trees of several types? A Buddhist might say that the world I perceive is created by my mind, and is nothing more than that. However, I would say neuronal processes in my CNS (central nervous system) create the world I perceive. So why do I not perceive just quarks? Why do I perceive colored leaves and trees?

The M-A model introduces the concept of aggregated matter to explain the diversity of things that we perceive (Young, 2016, 2017). Aggregated matter is complex matter built using quarks and electrons as building blocks. It includes all the elements of the periodic table and all compounds you can create with those elements. As matter becomes more complex, it can interact with other matter in more complex ways. An atom can interact with other matter by emitting or absorbing photons, and/or gaining or losing electrons. In contrast, a compound can interact with other matter by exchanging complex molecules.

Further, the M-A model proposes that all matter is also simultaneously awareness. As the matter becomes more complex, it increases the richness of the awareness (i.e., subjective experience) associated with it. The change in awareness triggered by an odor (i.e., complex molecule) is richer, for example, and more complex than the transduction of a photon (even though the transduction of a photon can trigger a change of events). The photon in many cases may not produce any noticeable effect in the receiver (i.e., it may not set off a chain reaction of state changes in the receiving matter). When I look out the window, it is aggregated matter (me) perceiving other aggregated matter (the sky, trees, and leaves). But is it real?

The world we perceive is only real to our species. All species are unique configurations of M-A. Each species has been tailored by evolution to attend to some things and ignore other things based upon the opportunities afforded by these things. Distinct species have evolved with specific types of sensory and information processing capabilities. Humans, for example, perceive electromagnetic radiation that allows us to

judge the emotional state of others by their expressions (Changizi, 2017), but we cannot see heat. The universe offers a vast range of types of information (e.g., molecular, visual, tactile, etc.) at different time and size scales that can be collected and used by living systems. The specific subset of information that you utilize depends on how you are embodied (i.e., how your species has evolved sensory and cognitive systems). This is what defines your world. Nature seems to have devised creatures to take advantage of many of the possible worlds that can be defined by diverse information extraction and utilization processes.

The Western perspective expressed in the M-A model is very much in accord with the Buddhist cognition-only approach that focuses contemplation on the empty nature of perceiver and perceived. The perceiver (self) and the world are both empty.

The matter that underlies the self is a constantly shifting configuration of quarks. These changes in configurations (at the molecular and cellular levels) correspond to shifts in subjective state of awareness (i.e., consciousness). Further, (as discussed above) all the matter that comprises living things (i.e., all the quarks) is constantly being replaced. The quarks that you consist of today are not the same as the quarks that you will consist of next year (or last year). These changes in current configuration of matter and component elements of matter make it impossible to see the self as permanent.

In addition, the objects that are seen by a species are imaginary, or imputational: Their reality depends upon the way the species is embodied. Further, the identity of objects perceived are dependent upon a whole range of interrelated concepts. They do not exist in and by themselves (*per se*).

Finally, the cognition-only school argues that there is no difference between mind and matter. This is similar to the fundamental M-A postulate that matter is really matter-cum-awareness. It is not clear, however, if the Cittamatra philosophers thought of the external world actually as mind (i.e., a non-material substance), or if they were acknowledging that the way humans are embodied determines the world we perceive and participate in. We return to this topic below in the general discussion section.

In the third stage of emptiness contemplation (the Autonomy tradition), one contemplates the true nature of all phenomena (internal and external) as being empty like space. The focus in this stage is the arising of phenomena: No phenomena arise by

themselves, but rather all phenomena are mutually dependent. As discussed above, the typical example of this is a flower that needs a seed, soil, water, and sun to come together for it to grow.

Further (and similar to the Cognition-only school) one of the goals of the Autonomy school is to refute the existence of the self by showing that it is not independent. The flower example shows how this is true (at least for that case). The Autonomy school's position is that all objects are apart of a larger nexus of causes, conditions, and actions. An individual's behavior is not independent, but depends on the interactions of many environmental factors (both internal and external).

Again, the Autonomy school philosophers generalized this point to include conceptual knowledge as well: All concepts require other concepts for them (the original concept) to have meaning. Not only does *heat* need a concept of *cold* to be understood, it also needs a concept of *difference*, and probably a concept of *measuring* (at a minimum). There is no such thing as a stand-alone concept. This implies that our world—the world we perceive and interact with—does not have any true existence beyond our conceptualization of it. It is just a web of interdependent concepts.

In general, the matter-as-awareness theory agrees with this model, but it places more emphasis on the role of embodiment in defining concepts, as discussed above. Your physical embodiment defines the initial range of concepts that you possess, and it limits what others ones that can be developed.

In the fourth stage of emptiness contemplation (the Consequence tradition), one tries to go beyond the use of concepts all together. Up to now one can look at the study of emptiness as a progressive loosening of the conceptual framework that provides meaning in our perceived and mental worlds. The Consequence tradition encourages the contemplative to go completely beyond the use of concepts and rest one's mind in emptiness. But what exactly is the experience of emptiness? We will discuss this issue and how it relates to the M-A model, in the next section, after introducing the final stage of contemplation on emptiness.

In the fifth stage of emptiness contemplation, the Empty-of-Other tradition, one aspires to abide in luminous clarity, free from all fabrications of the mind. To the degree

that the meditator is successful, he or she uncovers the luminous clarity that is believed to be the true nature, or ground, of reality. The meditator uses the methods they have acquired to release thoughts (i.e., not focus on them nor follow them). This causes the thoughts to dissipate on their own (without additional effort), which uncovers the ground.

The fourth and fifth stages of meditation are very similar in their goals of resting in emptiness, although they differ in how they achieve it. The Consequence tradition negates all concepts, while the Empty-of-Other tradition rests in emptiness by not identifying with or following thoughts. Ultimately, both approaches are trying to discover the Ground-of-All-Being, or the absolute truth.

The Ground-of-All-Being

The Buddhist Ground-of-All-Being goes by several different names in different texts and teachings (e.g., Hinayana vs Mahayana). These names include, Dharmata, Absolute Truth, Ground-of-All-Being, Dharmakaya, and Buddha Nature, among others; in this essay we will use the term Ground-of-All-Being (or occasionally just ground). We use the term Ground-of-All-Being to acknowledge that in the Buddhist view, there is an infinite number of different types of sentient beings (i.e., entities with minds) in the universe, but they all arise from the same ground.

The ground that is uncovered is believed to extend throughout the universe, and nothing that arises ever departs from it because the ground is all encompassing. Therefore, arising must be something like changing the local density of a substance (e.g., think of the density of matter inside a star compared matter in deep space), and/or starting a process like life that restructures the immediate surrounding area, as opposed to the creation of something previously non-existent.

Subjectively, the Buddhist Ground-of-All-Being is described as being a primordially pure quality of radiant intrinsic awareness (Taye, 1995). It is said to transcend limitations of existence or non-existence, and it cannot be reduced to objective features. The ground is portrayed as clear and unobstructed, and not involving a dualistic experience of an observer and an observed object. Experiencing the ground is described as similar to looking into a mirror that reflects back your own features, although you may not recognize them as such. Further, the Buddhist Dzog Chen teachings suggest that the

state of being in union with the field is a state of wonderment. Nothing is perceived as ultimately real or fixed, but rather all is seen as being similar to a dream, an echo, or a mirage (Guenther, 1976). All experience is characterized as being of one taste: a supreme bliss or an intensely "alive" state of being. Finally, the experience of the Ground-of-All-Being is described as being beyond intellect understanding.

General Discussion

In this section we are going to discuss several issues associated with the M-A model and Buddhist views of the universe. We begin by discussing issues associated with the Buddhist Ground-of-All-Being and the Western vacuum field.

The Two Grounds

Is there a relationship between the Buddhist Ground-of-All-Being and the physicist's vacuum field discussed above? From a M-A theory perspective, the vacuum field is simultaneously matter and awareness. It is quite possible that the luminous clarity the Buddhist practitioners aspire to realize is the subjective experience of this field. However, the proposed vacuum field in physics is a relatively new phenomenon and it is not yet fully understood. The ideas behind it are less than 30 years old and still undergoing significant revisions. It was initially proposed (primarily) to address the issue of why there are different amounts of matter and anti-matter in the universe, asserting that greater amounts of anti-matter fall back into the field, perhaps as a result of interacting with black holes (Economist, 2015). More recently within the field of physics, there is a realization that there is a lot of energy in the vacuum field, and that this energy is not particle based (i.e., it does not consist of charged particles that can be combined to create matter). What exactly it is, or what it consists of, is unknown. It might consist of dark energy that is pushing the universe apart, or something else completely. In the terminology that we use, vacuum energy would define another *realm* (Young, 2017) that interacts with our realm in ways we do not yet understand.

Currently, there does not seem to be any way to determine if the two grounds are the same. The physicist's ground is objectively conceived using scientific means, adducing evidence that either supports or refutes aspects of a specific theory. In contrast,

advanced meditators and Buddhas (enlightened beings) subjectively experience the Ground-of-All-Being by progressively traveling the path of emptiness and gaining deeper insight. They eventually reach a point of emptiness and clarity where the thoughts weaken, and they have an experience similar to the sun emerging from behind the clouds. This experience is called *rigpa* in the Vajrayana Buddhist teachings, or *sunyata* in the Mahayana teachings. It is the first glimpse of the Ground-of-All-Being, although there is still a significant way to journey on the path to reach enlightenment. In sum, it is not clear if the Ground-of-All-Being is the same as the vacuum field, nor is there an obvious way to determine this.

The Buddhist Concept of Mind

One of the most fundamental intellectual dichotomies held in the West was that matter and mind are two different substances. In the last several decades, however, scientists have been unable to discover the basis of the substance of mind so there has been a sizable shift among scientists to seeing mind as a collection of physical states (i.e., brain states) made out of matter, and not a separate substance.

The dichotomy between mind and matter does not exist in Buddhist thought: Buddhist philosophers see everything as mind (Gyamsto, 2010). Therefore it appears that both Western and Buddhist philosophers are converging on the idea that there is only one substance in the universe, although in the West they think of it as matter and among Buddhists it is mind.

The Western model of science, as noted above, is fairly well developed in terms of descriptions and explanation of physical interactions. Where it has difficulty is accounting for subjective experience.

In contrast, the Buddhist model of mind deals extensively with subjective experience. The Buddhist model of mind is not well understood in the West, probably because it is more complicated than the Western model, and perhaps because not all of the pertinent Buddhist texts have been translated. In general, Buddhists believe in different types of minds, with the two most important ones being the minds of sentient beings and the minds of Buddhas. In the following paragraphs we will attempt to explicate some of the major differences in the Buddhist model of mind compared to

Western thought.

Let's begin with a definition. According to Dictionary.Com, mind is “(in a human or other conscious being) the element, part, substance, or process that reasons, thinks, feels, wills, perceives, judges, etc.” This definition highlights a central point: mind is a process, that can probably be instantiated in many different ways. An important challenge is to determine the functionality that is needed to call something a mind. Does it need a sense of *I-ness*? Must it embody intelligence? Does it have to be conscious?

In the West, most individuals use the term mind to describe their subjective experience. They use terms like “I am feeling...” , or “I am thinking about...” or I am seeing..., to describe their subjective experience, and they also assume that they have a mind in which these states are occurring. In the M-A-model, we believe that minds are found in mobile living entities that have a sense of I-ness (Young, 2016). We believe that the concept of a mind does not refer to anything special, or magical (i.e., it is not a separate thing distinct from, or emerging from, the physical body), but that a mind is just a set of useful algorithms and heuristics associated with a sense of I-ness. Knowing the size of your body, for example, and its relationship to other objects, and remembering previous actions could be quite useful from an evolutionary fitness perspective.

Regarding the Buddhist conceptualization of mind we think there are two key areas to explore: 1) What do Buddhists mean when they say that everything in the universe is mind; and, 2) What is the difference between the mind of a sentient being and the mind of a Buddha? Let's begin by looking at a two ways to think about the universe as being mind. First we consider the role of physical embodiment plays in “creating” the external world.

We have argued above and in other papers (Young, 2016, 2017) that sentient beings do not really see the universe, but generate their world based on the way they are embodied (i.e., their neuronal architecture and physical characteristics), and the type of matter of in which they consist (i.e., the subset of leptons that comprise our *realm*). These two factors determine to a large extent what a sentient being can subjectively experience and know.

Expanding on this slightly, sentient beings do not perceive the real world or any world. They experience subjectively certain physical changes to the configuration of

matter of which they consist. These changes may be caused by the transduction of energy (incorporating energy into their configuration) or by internal changes (spontaneous state changes). But either way the change is brought about, they do not really see any external objects. For example, if someone says, “do you see that object”, and you look at it, neither of you are actually seeing it; you both are experiencing changes to your internal state (or configuration of matter) brought about through the transduction of energy. However, because your internal states are relatively similar, you can agree on what the object is, and where it is located. You share a *consensus affordance* which enables two people to meaningfully interact.

As another example, consider dreams. In a dream it appears that you are experiencing an external world, while in reality, your external senses are turned off or heavily muted. The world you experience is internal, reflecting changes to the configuration of matter of which you are comprised.

This leads us to the first way we can interpret the universe as mind: the statement that the universe is mind means that the universe you experience depends on how you perceive and interpret it, which depends upon how you are embodied. From a colloquial perspective the world you perceive is your “mind”, or mind’s creation. From a more scientific perspective, your “world” is your subjective state of being to include all the objects you can experience and all the associations you have among them. Again, because you do not perceive the external world, but instead create it, the universe is mind only.

A second way to think about the universe as mind is put forward by Buddhist philosophers and partially incorporated into the M-A model is: What if the substance we perceive as matter is actually mind? The teachings of both Lonchenpa and the Guhyasamāja tantra essentially state this. The teachings of Lonchenpa (1998) state that an enlightened being sees the world as primordial awareness, while the Guhyasamāja tantra states that matter in its subtlest form is *prana* which is a vital energy that is inseparable from consciousness (Dalai Lama, 2006).

We need to be careful about terms, though. We cannot be certain that translated terms mean exactly what we think they do. For example, primordial awareness sounds like it means awareness, but there might be specific connotations that we do not

understand. Detailed language studies are needed to clearly develop an understanding of these terms (and others). However, it certainly appears that these Buddhist teachings argue that matter is awareness, and that awareness is a building block of consciousness.

There are certainly going to be questions about the term *mind*. We have argued that matter is awareness, and that consciousness is a configuration of awareness that enables an entity to make better choices when interacting with the environment. Mind, in our view, is further configurational complexity that creates a collection of computational methods that also enhance fitness. Our definitions of these terms are tied to a specific theory we have proposed. Is it possible the Buddhist philosophers are using the term mind in a more general sense, trying to highlight that what we perceive as matter actually has hidden dimensions that can be realized through the practice of emptiness?

It is also possible that the universe itself is either a mind, or a collection of minds. If all matter is awareness as the Buddhists (and our M-A model) propose, it creates many possibilities about what is life, what is mind, what is consciousness, and when and under what circumstances do consciousnesses merge. As one example of many unknowns, there are approximately a billion bacteria in us at any time. Do they each have separate consciousnesses, or are they part of our consciousness? Or is there some other relationship? There are also a range of questions about matter compared to energy and about various types of matter (e.g., are different types of consciousness associated with different types of matter?). Answering these questions now is currently beyond our ability in the West. Physics cannot currently and probably never will be able to answer some of these questions. However, the study of existing Buddhist teachings, and the maturation of a new generation of meditators might lead to greatly expanded knowledge of the universe. Let us now turn our attention to the differences between sentient beings and Buddhas.

Sentient Beings and Buddhas

Buddhism postulates that it is possible for a sentient being to develop perfect clarity in perception and cognition; such accomplished beings are called *Buddhas*. In this section we are going to look at the types of knowledge available to sentient being and Buddhas. As will be seen by the discussion, we know a lot more about the knowledge

available to sentient beings compared to Buddhas.

Tarhang Tulku (1987) does an excellent job describing the types of knowledge available to sentient beings, and the limitations of this knowledge. He begins by noting that all knowledge is *temporal knowledge*, situated at a specific place and time, and that this constrains what can be known. We cannot perceive other worlds or other times, for instance.

Next he notes that perception involves a person in one location and an object in another. This relationship defines two poles, so he refers to it *polar knowledge*. An important aspect of polar knowledge is that there is a gap between the two poles (perceiver and perceived) that takes time to cross. Therefore, the perceiver is always processing old information. The perceiver's sensations describe the way the world was, not how it is now, even if that time gap is extremely brief.

Polar knowledge activates *descriptive knowledge*, which automatically categorizes the forms in the percepts and activates the appropriate knowledge categories along with their attributes and associations (i.e., a set of concepts is automatically activated). A sentient being's neuronal architecture defines the categories of things he or she can know. It sets limits on the kinds of things that can be perceived and recognized, and for which the sentient being can have knowledge. Experience and learning may modify this limit within some range, which is probably species dependent. Both experience and learning permit new categories to emerge, although what emerges are categories that are combinations of the primitives provided by the neuronal architecture.

It is important to stress that both polar and descriptive knowledge are restricted in the range of information they can process or handle, and this limits what can be known by sentient beings. As an example, polar knowledge can only see the surface of objects, and this is further limited to seeing reflections off objects of select frequencies of electromagnetic energy (Tarhang Tulku, 1987). Further, polar and descriptive knowledge cannot directly see awareness (or sentience); it has to be inferred. This inability to experience awareness facilitates the belief in the construct of empty space, which in reality does not exist from a physical perspective. From a sentient being perspective we see a space that is partly filled with objects. In reality, there exists a field

of energy/awareness that extends throughout the universe, which varies in densities in different locations. We cannot see it or deliberately interact with this field (although, in reality we are probably constantly interacting with it and just do not realize it).

Tarhang Tulku (1987) also describes another class of knowledge, *intentional knowledge*, that captures the intentions of sentient beings. Conceptually, it can be thought of as physical (brain) states that reflect desires and motivations of an entity. Intentional knowledge activates behavioral scripts, which may have cultural overlays influencing their execution (i.e., different cultures pursue the same goals differently).

Finally Tarhang Tulku (1987) defines *collective knowledge* as all of the knowledge of individuals along with all the artifacts that they have created. This corresponds to combined worlds 2 & 3 in Popper's (1979, 1981) framework. Obviously many classes of sentient beings do not create artifacts, so in that case collective knowledge is the combined knowledge of all members of the species.

In total, sentient beings are entities that take in and react to information from internal and external sources. Their neuronal structure determines what types of energy they can react to and the way in which they will react. While objectively living in the physical universe, their subjective experience is a world of their own making that is unique to them. They share most experiences with their conspecifics (those who have similar neuronal architectures), but also are individuals who have unique experiences, interpretations of situations, and memories of events.

As noted, sentient beings do not under normal conditions see or experience the Ground-of-All-Being. The Tarhang Tulku (1987) describes sentient beings as being similar to beings in bubbles within an ocean. Within the bubble there is an environment of air that acts as a wall and separates the sentient being from the ocean. If the bubble were to burst the being would merge with and discover the water (i.e., awareness) on the outside. For the moment, however, they are locked in a world of their own creation that only selectively corresponds to reality. Buddhist teachings do say that sentient beings can escape from the bubbles and discover the whole universe. Once again, the emptiness teachings discussed above are critical to accomplishing this goal. In the next section we consider the types of knowledge available to a Buddha.

A Buddha is described as someone who has exhausted both emotional and

cognitive obscurations (Samdrup, 2012). The clouds of conceptual thoughts have dissipated and the sun of luminous awareness shines forth. A Buddha has also developed enlightened qualities. Two of the most important qualities are the omniscient wisdom of seeing things exactly as they are in their ultimate nature, and the omniscient wisdom of seeing things perfectly in their multiplicity (Samdrup, 2012). The first wisdom enables a Buddha to directly perceive the unelaborated ultimate nature of all phenomena. This wisdom might involve an ability to directly interact with the Ground-of-All-Being. The second wisdom enables a Buddha to see the karmic interdependences of all phenomena (i.e., the causes that underlie all things). It is purported that a Buddha sees multiple realms and worlds as well (i.e., not just the ones their neuronal architectures should enable them to see). The experience of the state of Buddhahood is described as being unimaginable. It is beyond the intellect and might involve alternative ways of knowing than those available to a sentient being. Like the Ground-of-All-Being, it is described as being of one taste: “[the ultimate] is of a character that is every where one taste” (Powers, 1995). (See the above description of the Ground-of-All-Being for additional detail).

The idea that a Buddha may be omniscient is controversial (Naagapriya, date unknown). Some schools argue strongly against it (Analayo, 2006). The key issue appears to be types of knowledge that are available to a Buddha. Does an omniscient Buddha know all the knowledge in all the libraries of the world? Probably not and this is what most schools arguing against omniscience believe. Our position is different, though. We suspect that there is some type of transformation in a Buddha’s “cognitive processing” that enables her or him to connect to the Ground-of-All-Being. We believe that this makes new types of knowledge available to Buddhas.

Significant intellectual work is needed to fully develop these ideas. Through effort by philosophers such as the Trathang Tulku, and others, we have a good idea what knowledge is available to sentient beings. To a large extent it is determined by one’s neuronal architecture and it involves the interactions of aggregate matter (recall the discussion of fall leaves above). But what is not clear is what specific knowledge a Buddha has available. What does it mean to clear away cognitive and emotional obstructions? In a Buddha the cognitive processing appears to have been modified in

such a way that cognition does not lead one astray, but lets the Ground-of-All-Being shine through. This leads us to ask how would a Buddha could commune with the ground? One of the conjectures of the M-A model is that if two objects are sharing matter, then their consciousnesses merge. We are constantly exchanging matter with the rest of the universe. Perhaps in some way that might enable us to commune with the ground, if we could relax the sense of I-ness.

Summary

In this essay we have compared different Buddhist conceptualizations of emptiness to the mind-as-awareness model and found that the two approaches agree in many ways about the nature of awareness. The Buddhist approach goes further, though, and suggests methods to modify our cognitive processing so that we can perceive the Ground-of-All-Being. In general, these methods involve attempts to disrupt perceptual processing by stopping the automatic linking of perceptual forms to concepts. This is believed to let “additional light in”; or to uncover some of the ground.

What is not clear is whether the proposed Buddhist ground is the same (physically) as the ground that physicists have proposed underlies all matter (or the ground from which all matter arises). In the M-A model, all matter is awareness, so it is quite possible that they are the same. From this perspective, the two views—that of a physicist and Buddhist philosopher—simply represent two different ways to think about the ground.

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