The Infinity of Infinity

By Victor Bivell

Abstract

This paper discusses the author's journey through the concept and reality of infinity. It starts with childhood experiences of space, numbers and beauty, moves to teenage and young adult experiences with poetry, philosophy and spirituality, and then the practical applications of infinity in adult life. It discusses how the author's understanding of infinity has evolved from something far away and abstract to something that is present in every day life and in every moment. The second part of the paper focuses on the intersection of infinity and consciousness. It aims to show that the more we consider consciousness, the more infinity it has, that infinity is an essential part of the function and understanding of consciousness, and that the study of consciousness can make a significant contribution to our understanding of infinity. The paper touches on a large variety of intersections with infinity and uses numerous examples to show the infinite plasticity of the universe, that infinity can express itself in infinite ways, and that infinity is a fundamental part and principle of the universe. There are also brief highlights of some of the ontological and social implications of infinity.

As a young boy I had two experiences with the idea of infinity that made a deep impression on me. The first was with the night sky and the universe, walking at night time and looking up at the stars and the black sky and trying to imagine how the universe could go on and on forever. And ever. And never come to the end, never come to an edge, to a border, a wall, or some other way of stopping. And if it did stop, what was after that? I did this many times, probably starting from the age of about eight or so, as this was the 1960s and space and rockets were in the news all the time. The night sky and the universe were beautiful and full of wonder and as a kid I was full of awe. I was awestruck. But the problem of infinity remained. No matter how hard I tried, I could always imagine that there was more. How could the universe go on and on forever and never end? Trying to understand infinity was hard.

My second deep impression of infinity was with numbers. At school I was good at arithmetic and I used to enjoy challenging myself with big sums and big numbers. In grade three, so again when I was around eight, I remember trying to write really big numbers. I would write

sums with what were probably 30 and more digits that would go right across the page (it seemed a lot at the time), and in my head I would try to imagine the biggest numbers I could. I just kept adding more and more numerals to get what seemed like impossibly big numbers. But no matter how big the numbers seemed, I could always add more. They never came to an end. And I could see that they never would. A few years later when I started reading more about the universe, I really liked the expression 'astronomical numbers' and I learned that there are plenty of them.

The infinity of space and the infinity of numbers were for the next few years the outer limits of my understanding of the idea of infinity. I kept my memories, my curiosity, and my awe about infinity, and every now and then I would go back and think about space and numbers and wonder how something could go and on forever and never end. As I grew older and read more, I came across the idea of infinity in my teenage reading about religion, spirituality, meditation and higher states of consciousness. But, like space and numbers, it seemed to belong to another realm, to places and states of mind that were far away and unreachable. As a kid and a teenager, little did I understand – I had no idea – how big was the door I was knocking on.

As a teenager another big step with infinity was reading William Blake's poem, Auguries of Innocence. The lines that have always stayed with me are:

To see a world in a grain of sand
And a heaven in a wild flower,
Hold infinity in the palm of your hand
And eternity in an hour.

These are wonderful lines. As well as imaginative and beautiful, the lines 'To see a world in a grain of sand/ And a heaven in a wild flower' is to see some of the variety that can lead to infinity. The lines 'Hold infinity in the palm of your hand/ And eternity in an hour' over 50 years later still have me thinking about them. How does one hold infinity in your palm? What was Blake thinking and feeling when he wrote that, what was his personal insight, what was that moment like in his phenomenological experience that inspired him to write those lines?

While we will never know precisely, it is the nature of such beautiful poetry to inspire a great deal of thought and imagination in others. I look at my palm and, thanks to Blake, I do see infinity, and by infinity I mean potential infinity, in several ways. I see that my hands are unique in their size, shape and markings; and how that uniqueness contributes to the ever-growing

variety, the infinite variety, found in all hands of all humans, past, present and future, and in every creature that had, has and will have, versions of hands. Eternity is another name for the infinity of time, and there is eternity in the evolution of my hand, from the hydrogen atoms of the big bang through to life on Earth and the past and future evolution of hands. There is infinity in the atomic and elementary particles that make up, have made up and will make up my hands, all hands, and all animal equivalents; in their number, longevity, interactions and mystery. Blake's poem has many angles to infinity.

As a student and young man I saw and learned that infinity is a key concept in many other areas of human endeavour, and the list of where it is important kept getting longer: astronomy, arithmetic, poetry, time, evolution, philosophy, religion, spirituality, physics, geometry, engineering, and so on... The intersections with infinity kept growing. As I noticed more angles to infinity, more intersections, I learned to appreciate how important they are, that people use these angles and intersections both in their daily lives and in their working lives. So much so that in both we often take numerous if not unlimited possibilities as an unconscious given. As a journalist, one of my early guiding principles was that the more I looked the more I found. That is a general truth in science where each answer always opens more questions; and in art where there will always be something original. So rich and unquestioned are life's many possibilities that we usually take infinity for granted.

For many years, I did too. Being busy with life and career, for the next few decades I dabbled with infinity, I dipped in and out of infinity, so to speak. Although it was mostly in the background, my interest remained strong thanks to the many advances in astronomy, astrophotography, nuclear physics and spirituality.

In mid-life I had another deep impression of infinity, this time at the intersection of infinity and biology, infinity and people. I was at a large business dinner where I was surrounded by many men and women and all night I was struck by the wonderful variety in their faces. How each face was unique. How all the faces in the world must also be unique. And how all the faces that have ever been and all the faces that ever will be were also unique. If needed, even down to the most minute difference like the length or breadth of a single hair and so on, ad infinitum. I could see astronomical numbers in people's faces. I could sense infinity in people's faces.

All of these impressions have stayed with me and now, instead of taking infinity for granted, I have begun to develop a sense of the every day presence of infinity. If I want to think about it,

when I look at something I can see it has angles to infinity. Even the most ordinary thing has many angles to infinity. This is in an intellectual and perceptual way, in an appreciative way, not in a dramatic or other worldly way. Intellectually and perceptually, possible intersections between infinity and something in the universe are everywhere. Infinity seems to intersect with everything. Every thing, every movement, every moment, is part of infinity. Every thing is infinitely malleable. Every thing is part of the infinite plasticity of the universe.

Numerous philosophers have discussed these ideas over the centuries and recent millennia, and I have learned that the concept of infinity has an interesting history. But some of these ideas also feel newish to me, including some that are not new, because their prominence has grown as my understanding of infinity has grown from the idea that it is something far away and abstract to something that can be part of my personal view of everyday life and things. I have come to understand that in my daily life I am surrounded by infinity.

This way of thinking makes it interesting for me to look back and see how my early impressions of infinity have changed over time.

A big early one was space. As a kid I knew the universe was too big to imagine properly. What I didn't know then has only made it harder to imagine. It was only in 1922, just over a hundred years ago, that Alexander Friedmann put forward the idea that the universe is expanding. It was only in 1929, just under a hundred years ago, that Edwin Hubble proved that the universe is expanding. And it was only in 1998 that two different research teams proved that the universe is expanding at an accelerating rate. The size of space and its numbers have only become more astronomical. The latest estimate is that the diameter of the observable universe is about 93 billion light years. I try hard but I can't really see that in my head in a way that makes me think I have got it.

My interest in outer space also turned to inner space, to microscopic space and atomic space. As a kid at school I learned about how small atoms are – and I was amazed and frustrated trying to imagine their smallness. And, some years later, at how many there must be. This picture didn't change much until I started hearing and reading about the much smaller elementary particles such as quarks, neutrinos, photons, leptons and bosons, and I better understood that as there are astronomical numbers in macro space, there are astronomical numbers in micro space. At some point I learned about the Planck length, the shortest, smallest length that scientists can measure. A Planck length is 1.6×10^{-35} metres; that is 1.6 metres divided by ten 35 times, or a

decimal point followed by 34 zeros and then 16. Coincidentally, 1.6 metres is close to the height of an average human being. A few years ago I was very surprised to read that proportionally, in terms of the number of zeros, my size as a human being is roughly but not quite about half way between a Planck length and the radius of the known universe. I don't know where Earth is positioned in the big picture of the universe, but the 'edge' of the observable universe is about 46.5 billion light years away. That number is 4.4×10^{26} metres or in approximate terms around 44 with 25 zeros after it. I marvel how it can be that the distance from my finger tip to the edge of the observable universe has two digits and 25 zeros before the decimal point, yet inside my fingertip the distance to a Planck length has 34 zeros and two digits after the decimal point. I have spent my life marveling at how far away the 'edge' of the universe may be, and now I am still getting used to the idea that there are more zeros in my fingertip. I look at my fingertip and I see another way that Blake was holding infinity in the palm of his hand.

My other childhood glimpses of infinity, and occasional stares into infinity, were with numbers. With the discovery of other galaxies, our view of the universe has continued to grow. We are already up to two trillion galaxies. How many zeros do we add for the billions of stars in each galaxy, and for the trillions and zillions and more of planets, moons, asteroids, comets, space dust and so on. If the universe were to live forever, these numbers would continue to infinity. But the big numbers don't stop there. Astronomy.com reported that a team of scientists at Clemson College of Science calculated that the number of photons emitted by stars throughout the history of the observable universe is 4×10^{84}, that's 4 with 84 zeros after it. How many more zeros would be needed to measure how many kilometres, or how many Planck lengths, all those photons have ever traveled, and ever will travel? How many cubic Planck lengths, known as Planck volumes, are there in the observable universe? Scientists have estimated about 9×10^{184}, 9 with 184 zeros after it. There are areas of physics and maths, such as string theory, with many hundreds of more zeros. It is a beautiful paradox that some of the biggest numbers are about the smallest things, that there is infinity in the infinitesimal. Combining macrospace and microspace with time gives even bigger numbers that we may never estimate. Whether about the small like quantum mechanics, the big like energy, the new like dark matter and dark energy, or about more everyday life, scientists and mathematicians seem to have an astronomical number of astronomical numbers.

Another seminal childhood experience was learning about Socrates, although his angles to infinity I only saw much later. In the same grade 3 class where I made up long sums, the teacher told us that the Jews killed Jesus and the Greeks killed Socrates, and that Socrates was made to

drink hemlock. I don't know why those comments stuck in my head, but they did. Perhaps because I knew that Jesus was important and by comparing them she conveyed the idea that Socrates was also important and a top philosopher. Later, still in primary school, what really attracted me to Socrates was when I learned that he said something like 'Other people think how much they know, I know how much I don't know'. That is not the exact quote but at the time that is how I understood it. Among various translations, the actual saying was along the lines 'He knows nothing, and thinks he knows. I neither know nor think I know'. I liked the saying and I thought Socrates was different and clever. I learned that Socrates was always asking questions. And at university I learned that he never ran out of questions. Nor questions about the answers. That he had a constantly questioning mind, an insatiable desire for the truth, a tenacious technique for seeking it, and the courage to uphold and defend it, even when it cost him his life. Will humans ever run out of questions? Socrates helped to make that a rhetorical question. As an adult, I came to see Socrates as standing at at least three important intersections: infinity and truth, infinity and courage, and infinity and humility. Since my teenage years, Socrates has been, as he is for many people, my number one go-to philosopher for truth; not only because he discussed so many intersections with truth, opened so many angles to discovery, and gave us a technique for examining and finding truth, but also because he did so much to raise the importance of truth to the level it deserves. He put truth at the pinnacle of importance. He turned truth into a constant guiding light. And he did it with courage, practicing truth to power, truth to everyone, and truth to himself when he respected the truth of his death sentence. He stands at the intersection of infinity and humility because of his comment that he knew that he didn't know. This is not a self-flagellating humility but a sensible, logical and practical humility. Thanks to Socrates I came to understand that the many things I have learned in my lifetime barely register among the infinity of things that I don't know.

Another important intersection for me was that of infinity and beauty. As a kid I remember learning that beauty is in the eye of the beholder, and that other people see beauty in places I wouldn't think to look. I feel lucky that visual beauty caught my eye early in life and I continue to be amazed by it. My childhood appreciation of the beauty of the night sky has grown. It was fed with fantastic photographs in books and then jumped to another level with the Hubble and James Webb telescopes. There is beauty in the size, contents and movements of the universe. It is no wonder that people try to capture beauty. On Earth there are countless ways to paint or photograph or film a landscape, a portrait, a still life. How many more countless ways are there to paint, photograph and film the beauty of the universe – the galaxies, the nebulas, the stars, planets, moons and other celestial bodies? And because each object is moving and changing there are an

infinite number of variations in these movements and events, large and small. There are countless viewer locations and compositions, with countless colorings in the visible spectrum and countless more across each gradient of the other parts of the electromagnetic spectrum that our eyes cannot see but our technologies can. The intersection of infinity and beauty is everywhere. We will never see and never count, never get to appreciate, the beauty in the infinite angles and viewer locations of all space and all time. If all of our scientists and photographers and artists and all of our wonderful space telescopes and microscopes and other technologies had infinite time, they could still not capture more than an infinitesimal fraction of the beauty in the universe. Not just because so much of the beauty is in the unreachable past, but also because new and unique beauty is being created at perhaps infinite quantities every moment.

Infinity and Consciousness

In recent years I have begun to wonder more about the intersection of infinity and consciousness. The same principle seems to apply. The more we consider consciousness, the more infinity it has.

One of the early and great thinkers on infinity and consciousness was the philosopher Siddhartha Gautama, better known as Buddha. In a discourse he spoke of beings who "think 'consciousness is infinite' and who have reached the plane of infinite consciousness." There are many ways to think about those comments. The phrase, 'the plane of infinite consciousness' can sound other-worldly or a hard-to-reach place or state of mind. Is it simply thinking about the idea, or is it an experience of infinite consciousness? I have not been to or experienced a 'plane of infinite consciousness' so, regretably, I cannot comment on what that experience may be like. That 'consciousness is infinite' is easier to grasp, and Gautama among many other things gave the Noble Eightfold Path and mindfulness as ways to explore consciousness and to reduce and end personal suffering. He discussed infinity when he said that everything is always changing. And he applied it to consciousness when he said that the contents of the mind – sensations, thoughts, feelings and our reactions to them – are always coming and going, always changing. His technique of vipassana meditation, among other things, is a way to observe and become more aware of that process. He also said it can lead to deep peace of mind and other states of consciousness. His ideas increased my curiosity and knowledge about other states of mind, including day-to-day consciousness and higher states of consciousness. His ideas also increased my curiosity about consciousness and reality, and consciousness and what ultimate reality may be. Unfortunately, I have not had an experience of ultimate reality. But over many decades his ideas

and meditation technique have helped me to better understand the difference between unhealthy and healthy states of mind, and to better understand my sense of self, even though I am still not certain what my 'self' is. Perhaps most existentially, his ideas helped me to find a deeper peace.

Buddhism, Christianity, other religions, philosophy and science all offer many ways to explore how 'consciousness is infinite'.

One place to start is the number of individual consciousnesses. If we assume that each consciousness is individual, that each person, being or creature has its own consciousness, we see that Earth is an extraordinarily fecund place for consciousness. And that fecundity increases if we include all of Earth's past and future conscious people and creatures. Is the universe also fecund for consciousness? If so then the number of individual consciousnesses could continue to explode to infinity if we could include all possible conscious life in the universe over all time.

In panpsychism, at the micro panpsychism level, if each micro thing may have its own consciousness, how many tiny particles are there that may have some form of consciousness? There is a converse of this in cosmic panpsychism. If there is only one consciousness in the universe, in how many individual consciousnesses, in how many segments and aspects, can that fundamental consciousness express itself? Both micro panpsychism and cosmic panpsychism seem to have no limit. Whether there is an infinite number of consciousnesses or one consciousness that can express itself infinitely, in both theories consciousness is infinite.

Also at the intersection of infinity and consciousness is the potentially infinite number of conscious experiences. This is about the aboutness of consciousness – what consciousness is conscious of. Consciousness is so receptive, so impressionable, so malleable that there seems to be no limit to the number and type of experiences it can give awareness to. If I could live forever there seems to be no limit to how many different experiences I could have. That receptivity is shared by all consciousnesses. How many phenomenological moments have been had by all the consciousnesses that have existed and could be had by all the consciousnesses that could exist in the future? How is it that consciousness can hold so many phenomenological moments, so much life, and never fill up, never run out of room for more moments? In a similar way, mirrors and water are full but never fill up with reflections.

There is infinity in the structures that enable and correlate with consciousness. Each brain is physiologically unique. Neuroscience has begun the massive task of describing many of the

different physiologies across human and other brains and their correlations with consciousness. Although they are a long way from completing the task, in a short period of time neuroscience has explained much of the incredibly complex workings of brains, nervous systems and the senses. The variety of brains is extraordinary in many ways. One way is brain size. Brain Facts and Figures says sperm whales have the largest brain at an average weight of 7.8 kilograms, then fin whales at 6.9 kilograms, killer whales 5.6 kilograms, elephants 4.7 kilograms, humpback whales 4.6 kilograms, gray whales 4.3 kilograms, bowhead whales 2.7 kilograms, pilot whales 2.6 kilograms, bottle-nosed dolphins 1.5 to 1.6 kilograms, and then humans with 1.3 to 1.4 kilograms. At the other end of the scale, biology author Eric Cassell says 'The nematode worm Caenorhabditis elegans has the smallest brain in a free-living animal... The hermaphrodite brain contains only 302 neurons and the male 385 neurons.'

Another variable is brain to body weight. Writing in Frontiers in Human Neuroscience, Osvaldo Cairo says 'As might be expected, brain size tends to vary according to body size (brain size usually increases with body size in animals), although the relationship is not always proportional.' And that the research so far 'somehow suggests that relative rather than absolute brain size coincides much better with observed cognitive abilities in animals. It is interesting to compare these ratios for humans, dolphins, African gray parrots, and chimpanzees, supposedly the most intelligent animals of the sea, sky, and earth.' He lists the human male brain at 1.4 kilograms to have a body weight ratio of 1.86 per cent, the bottle-nosed dolphin brain at 1.5 kilograms to have a ratio of 1.25 per cent, the chimpanzee brain at 0.4 kilograms to have a ratio of 0.88 per cent, and the African gray parrot brain at 0.0057 kilograms to have a ratio of 1.72 per cent. In their study of ants, Seid, Castillo and Wcislo said 'The smallest ants had brains that constitute around 15% of their body mass'. Conservation biologist Cesar Medina Davila says that although the human brain is not the largest in absolute size, 'our brain-to-body ratio and cerebral cortex development make us unique.' For our purpose here, all these numbers help to illustrate the great variety in Earth-grown brains.

There is more variety in brain design and in brain chemistry. Octopuses have nine brains: a central brain and a smaller brain in each of their eight arms. Davila says two-thirds of the octopus' brain is located in their arms. Differences in brain design pose new questions. Does this form of distributed brain also give a form of distributed consciousness? Do such different physiologies also effect the 'quality' and the experience of awareness, do they enable variety through other forms of awareness? We are a long way from exploring and mapping the endless variety in brain structure and brain power of Earth-grown brains and their relationship to consciousness. Perhaps

another intersection to infinity is plant physiology and possible plant consciousness. Although many philosophers say plants are not conscious as they lack a brain and neurons, others argue they have a form of 'awareness' as they receive information and display complex behaviours. There are a lot of plants on Earth. That could be a lot more consciousness and a lot more awareness chemistry. And whether they are animals, plants or something else, if there is conscious life elsewhere among the still-being-estimated number of planets in the universe, learning about their 'brain' equivalents, their 'brain' chemistry, and their neural or non-neural correlates of consciousness would be fascinating. If only we could also get a glimpse of their phenomenology. Meanwhile, only the endless imagination of science fiction can populate those voids.

The intersection of infinity and the senses is interesting because experiences start with the senses and the phenomena they give to consciousness. Science tells us that we receive and process a massive amount of sensory data each moment and, even though only a small fraction of this makes it to our consciousness, as individuals we believe that we have a rich sensory life and as societies our economies are based on that richness.

Yet the infinity of human sense-based phenomena is modest when seen as part of what other conscious creatures may experience. There are estimated to be about eight million animal species on Earth, all with their own sensory systems. Some philosophers have argued that only humans are conscious, others that only a small subset of species such as mammals are conscious, and many ponder where to draw the line between conscious and non-conscious species. My view is that it would seem extraordinarily inefficient of nature to waste so much time and so many resources in developing sensory systems for eight million species when only one, humans, or only a small group, say mammals, have consciousness in their daily lives. It would seem even more extraordinary given that so many other species have senses that are far superior to those of humans. So it is helpful to briefly explore the intersection of infinity and the senses to help put human sense phenomena in perspective, to better appreciate the wonderful capabilities of animals, and to wonder at what phenomenology they may experience.

While vision is the main sense for humans, many animals do it better. Eagles have superior vision to humans with far sharper long distance vision, better color resolution, and perhaps the ability to see ultraviolet light, which we can't except through a camera. Eagles can see a small furry meal three and more kilometres away, whereas at that distance I can't tell if a much bigger sign says Hungry Jacks or McDonalds. What phenomenology do eagles experience with their

better vision? A zoom camera may give us something of the long distance optics, but not their visual phenomenology nor their full eagle phenomenology.

Many creatures have a sense of hearing that is superior or different to humans. Thomas Nagel asked what is it like to be a bat and primarily perceive the world by sonar or echolocation. We don't know. A sonar system may give us some of the information but not the phenomenology. The greater wax moth is said to have the best hearing among animals with a hearing range up to 300 kHz. Bats using echolocation can hear up to 200 kHz. Humans can hear to only 20 kHz. Again, their infinity is bigger than our infinity, so to speak.

Dogs have a far superior sense of smell, which is thought to be from around 10,000 to 100,000 times and more better than that of humans. This suggests an infinite world of smells and experiences. The canine sense of smell can be trained to detect a wide variety of odors and substances with tracking humans and sniffing work such as drug, explosives, accelerants, and disease detection among the better known examples of humans utilizing this exceedingly superior skill in an animal. It would be interesting and perhaps humbling what dogs would make, for example, of the analyses of our best wine judges. And while we could not experience them, it would be even more interesting what hypothetical recipes and art dogs could achieve if they had the means to express their potentially infinite olfactory experiences.

For humans, touch is always there even if unconsciously, and we use and enjoy touch in many ways. So too animals use and presumably enjoy touch and many of their ways are far different to our's. How does it feel to be a worm crawling through solid soil? Or to be an elephant that can feel seismic waves – environmental vibrations and elephant sounds or rumbles – through its feet and bones and use these for gathering information about the environment and for communicating with other elephants? And the blue whale is interesting for both touch and proprioception. How does it feel to be a blue whale in water and have a skin with a surface area of up to around 400 or 500 square metres? That is 200 to over 300 times the skin area of an average human. And how does their tactile phenomenology change as they move between the surface and the deep, between Antarctica and the equator? And on proprioception, how does it feel to have a massive body that can weigh, for the largest blue whales, up to around 200 tonnes? That is around 2,500 times the weight of a human. The variety of animal tactile experiences also seem to have no end.

Humans enjoy the sense of taste and we have a wide and still growing variety of food experiences. But the currently-predicted eight million other animal species on Earth also enjoy eating. And they eat a lot of things that humans would never touch. How do these foods taste? For most, we will never know as we can't or don't want to have those phenomenological moments. If we don't know what most things on Earth taste like, nor how they taste to other creatures, how far could we go tasting hypothetical menus on other planets? Again, humans contribute only a minuscule fraction of all taste-based phenomenology.

The sense of self is a little more tricky. We each have an individual sense of our self. But what is a self? After hundreds of thousands of years we still don't know. Is it just our body, our mind, our consciousness, our memories, our feelings, our reactions, our beliefs, our heart and soul, or some or all of these? Perhaps we don't have a self, perhaps there is no core thing that is our 'real' or 'deepest' self. Some philosophies and philosophers say there is no self. Perhaps all we have is our conscious sense of self? Either way, even the sense of self can come in several forms, among them our day-to-day functioning sense of self, our social sense of self, our introspective sense of self, our meditative sense of self, our lack of a sense of self during sleep, and sometimes a partial sense of self during dreams. Nor is our sense of self always stable or guaranteed as it can range from normal wakeful self-consciousness and variations such as elated self-consciousness, embarrassed self-consciousness, and drug and alcohol induced senses of self through to acute, abnormal and psychotic forms of self-consciousness. And then there are the questions about whether infants and animals are self-consciousness and if so what their sense of self may be like. The existence of the self, the nature of the self, the experience of self, our personal history of our sense of self, the loss of the sense of self, and the relationship and perceived relationship of self to others and the world are more roads to infinity.

As the infinity of sensory experiences continues to grow, where do we place extra sensory perception? There are many forms of it – a hunch, intuition, premonitions, clairvoyance, clairaudience, psychometry, telepathy, out-of-body experiences, near-death experiences, and others. If even only one of these is genuine, it creates another road to infinity. What do we do if most or all of them are real?

Another intersection is infinity and the unconscious. We have begun to explore the human unconscious but how far have we got? How can we measure our progress when the nature of the unconscious is to be unconscious? Neuroscientist Stanislas Dehaene wrote 'most of the brain's operations are unconscious. We are unaware of most of what we do and know... A wild profusion

of unconscious processors weaves the texture of who we are and how we act.' Biologist Marian Dawkins also phrases this well. 'Although consciousness seems to dominate our own existence, much human behaviour is in fact carried out quite unconsciously.' And among all that unconsciousness is our psychological unconscious. So the human unconscious is big. Brain studies indicate that many animals also have brain capacity for an unconscious, but proving and studying the animal unconscious is also hard. Do plants have an unconscious? If so, what is in them and how big are they? How far have we come and how far could we go trying to understand these possible unconsciousnesses? What other and how many other different forms of unconsciousness does Earth have, does the universe have?

There are angles to infinity in the many questions and problems about consciousness, some of which have been under discussion for thousands of years. Mention a philosopher and their name comes with a range of philosophical questions they raised or worked on. Among recent examples, David Chalmers highlighted the hard problem of consciousness – why do we have subjective experiences? This is a great and wide-ranging question and it is fascinating that despite the huge commentary philosophers still don't know for sure. Other examples that sound very different yet may be connected are the highly specific questions about the properties of the many brain chemicals, often with names 10 and more letters long. These are among who-knows-how-many-more thousands of other problems and questions about the why, what, how and who/it of consciousness. They may not yet have reached infinity, but already the hypothetically complete list of questions around consciousness is too long to detail and it continues to grow.

As there is infinity in the many questions of philosophy, there is infinity in the many answers of philosophy. The answers also show how practical philosophy can be.

One of these infinities is the consciousness of others. Jesus the philosopher was brilliant at social philosophy and he left us with many insights and answers into how people and society can get along, manage and improve their social relations. Among others: 'Do unto others as you would have others do unto you', 'Love your neighbour as yourself', 'Love your enemies, do good to those who hate you', 'Let he who is without sin cast the first stone', 'If you hold anything against anyone, forgive them', 'It is more blessed to give than to receive', 'By their fruit you will know them', and 'The truth will set you free'. These sayings are at the intersection of infinity and wisdom expressed in poetry. They highlight the consciousness of others, and that the core message of Jesus the philosopher was love. This message makes Christianity a religion of love and among the Christian God's infinite attributes is said to be infinite love. Omnilove. In words

and deeds, Jesus showed many forms of love – kindness, compassion, understanding, appreciation, non-judgementalism, forgiveness, mercy, generosity, protectiveness, truthfulness, self-deferment and more – and he encouraged others to do so too. And mostly we do. The intersections of infinity and love have been explored by everyone: saints, poets, artists, lovers, philosophers and normal people living normal lives. But how much of the intersection have we touched? The infinity of love means we will never run out of love stories and stories about love.

When philosophers and others have not been able to provide answers, when people have ignored answers, and for many others reasons, people have turned to gods or a god. Within the intersection of infinity and metaphysics, humans created the intersection of infinity and our concepts of god. People have been thinking about god for a long time, and that has given us many beliefs and hypotheses but few certainties. If god exists, who knows what god is? God could be anything or everything or something even more – He/ She/ It certainly has a lot of choice. Whatever god may be, if a god, a creator, a universal power, a universal consciousness or something more exists, it is bound to be infinite. Everything else in the universe is infinite. God may as well be too. And according to many beliefs and philosophies, God is.

As a child I was told that the Christian God is omnipresent, omnipotent, and omniscient. These are otherworldly and extraordinarily superlative abilities, even more so together. Omnipresent means God is everywhere, and since space is likely infinite so must God be. Whether God is the universe or somehow suffused with the universe is a different question. Both would make God infinite. Omnipotent means God is all powerful. There is immense power in all the energy in the universe and what it can do, in the four fundamental forces: gravity, electromagnetism, the weak nuclear force and the strong nuclear force, and ‘all powerful’ suggests God may also have metaphysical powers to create, direct or change things at will. An omniscient God would know everything about every micro and macro thing in the universe. Presumably simultaneously! We can’t imagine that. An omniscient God would presumably be conscious of all the infinities we have discussed above and all the rest we could never get to. And we can’t imagine that. It is too big and our minds and our consciousnesses are too small. Which begs several questions. Can human consciousness contemplate an infinite god consciousness and really understand it? Can we presume to? Is it in our power? If there is a God with infinite presence, infinite power and infinite knowledge, then some respect and humility would be appropriate as it seems presumptuous or arrogant to think we could fully understand or speak for such a God.

Infinity and consciousness are two of the key often unacknowledged yet essential ingredients in our lives. Consciousness provides the awareness and infinity provides the ever-changing contents of awareness. As well as intersections, there are three-way, four-way and more-way meetings. A three-way intersection is between infinity, consciousness and god, and a four-way intersection is between infinity, consciousness, god and love. Our discussions above about infinity, consciousness and space are various combinations of intersections: the infinity of consciousness, our consciousness of consciousness, our consciousness of infinity, our consciousness of space, the infinity of space, and others. These intersections seem to fit with mathematician Georg Cantor's theory of infinite sets – of the infinity of groups and groups of groups, each group with its own ways to infinity. Infinity gives angles and depths to the study of consciousness, and consciousness can illustrate the enormity and the ungraspability of infinity. The study of the infinity of consciousness is never ending, with all of the above only a few of the permutations.

And all of this infinity is only within the observable universe. Who knows how much infinity and what kinds of infinities there may be in the unobservable universe, or in unobservable universes?

Conclusion

Over my 68 years I have gone from seeing infinity is space and numbers to thinking that there is infinity everywhere, in every thing, and in every moment. We are surrounded by infinity and are part of it. We are the universe expressing part of its infinity. We are part of the infinite plasticity of the universe.

I am not a child any more, but I am still awestruck by infinity. The more I think about infinity the smaller and more humble I become. Yet paradoxically, the smaller and more humble I become, the more important I become. Because I am a part of that infinity.

From the perspective of infinity it seems that every thing, every creature, every person is equally important. The intersections of infinity and morality, infinity and values follow.

Infinity is a fundamental part and principle of the universe. Like Spinoza's 'Nature... consists of infinite attributes every one of them infinite', and Cantor's 'infinity of infinities', the infinity of infinity is another way to say that infinity can express itself in infinite ways.

Although this discussion is about infinity, I can't and don't want to go on about infinity forever. So I will finish with a suggestion. We call the universe Universe. That is its most common name. If we should ever find another or more universes, should we ever need another name or a nickname for our universe, I would like to suggest the name Infinitia.

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