

## Using Logic to Make Infinity: Limitlessness in Mahayana Buddhism

This research paper will provide an understanding of Nagarjuna's *Mulamadhyamaka-karika* (*The Fundamental Wisdom of the Middle Way*) as demonstrative of how logic and conceptual thought function within limits in order to disclose the limitless or infinite.

Nagarjuna's work revolves around dismantling the human belief in "essence," that which has inherent, independent existence. He instead reifies the condition of "void" or "emptiness," that which has impermanent, dependent existence. All mental constructions, including those of infinity and even of emptiness itself, are shown by Nagarjuna to be empty. Does this mean that infinity does not fundamentally exist? How can the limitless be limited? And how then do we account for our experiences of the limitless? In this research paper, we will show how infinity is disclosed by the skillful means of emptiness and how Nagarjuna's Middle Way allows for the embodiment of the limitless within humans as limited.

### **Logic as a Confirmation of the Validity of Mental Constructs**

A key component of Nagarjuna's logic is the tetralemma, a fourfold structure of logical reasoning which he uses to systematically prove his theory of emptiness. This form of logic traces back to "Classical Indian logic and rhetoric [which] regards any proposition as defining a logical space involving four candidate positions... The proposition may be true (and not false), false (and not true), both true and false, or neither true nor false" (Garfield & Priest 13). We can see this structure from the very beginning of the *MMK*:

Neither from itself nor from another,  
Nor from both,  
Nor without cause,  
Does anything, whatever, anywhere arise. (Nagarjuna 3)

The first statement negates the concept of independent existence. In order for something to arise from itself, that thing would inherently exist and therefore, "the cause has ceased to exist" and it

could never arise (Nagarjuna 145). In order for something to arise from another, that other would need to arise from something else, and this would create the untenable position of infinite regress. Therefore, both of these positions are untenable. The fourth and final position states that nothing arises without a cause. This rests upon the fundamental Buddhist principle of dependent origination, which posits that “all phenomena arise as part of a causal series, and nothing exists independently in and for itself” (Keown 50). This differs from claiming something arises from another in that dependent origination negates the claim that ‘another’ has some essence of its own. Buddhist dependent origination posits instead that “all phenomena come into being in dependence upon conditions, remain in existence dependent upon conditions, and cease to exist dependent upon conditions” (Nagarjuna 160). If all objects, beings, and conditions arise from other objects, beings, and conditions, then they lack inherent self-existence: they are empty.

One may argue that this is a nihilistic perspective which negates the observable existence of objects in reality. It is important to bear in mind that

what Nagarjuna rejects is not the existence of things altogether, but only the existence of things as *svabhava*, as independently or intrinsically existent entities... he does allow that they exist conventionally, where this conventional existence is conceived as a different way of existing, namely existing dependently on other things and on human knowers (Spackman 151).

Nagarjuna negates the essentializing of intangible concepts as separate from tangible reality. He is in many ways reiterating the logic of the Buddha in the Diamond Sutra: “Therefore anyone who seeks total Enlightenment should discard not only all conceptions of their own selfhood, of other selves, or of a universal self, but they should also discard all notions of the non-existence of such concepts.” Nagarjuna and the Buddha are arguing for the unification of differing modes of existing. We often treat concepts such as ‘selfhood’ as separate and distinct not only from the world but from ourselves, as if there were some ideal self that exists only as an abstraction to

which we should appeal. In another sense, we experience another self— “the conventional selves that we recognize as persisting from day to day” (Garfield & Priest 13). These two levels of reality are not to be prioritized over each other—they are both valid modes of interacting with the world. The fallacy that Buddhism in general and Nagarjuna in particular are attempting to correct is that ultimate reality (the ideal self) is separate and distinct from conventional reality (the everyday self).

This logic can again be traced back to the Diamond Sutra, where the Buddha states that when we refer to self, other selves, living beings, or universal self, ““you are not referring to their actual existence; you only use the words... as symbols. Only in that sense can words be used, for conceptions, limited truths, and spiritual truths have no more reality than have matter or phenomena.”” Using this logic, emptiness, the fundamental property of all things as interdependent, categorizes object and concept alike as identically empty and as equally real. Mental constructions matter—they are real.

Given the nature of Nagarjuna’s arguments, this conclusion should be intuitive. Garfield and Priest note that

it is quite a general feature of theories that try to characterize the limits of our cognitive abilities to think, describe, grasp, that they end up implying that they themselves cannot be thought, described, or grasped. Yet it would appear that they can be thought, described, and grasped. Otherwise, what on earth is the theory doing? (3)

Nagarjuna’s entire work uses logic to demonstrate how logic is, like everything, impermanent and void. The function of logic in this case is to draw our attention to the limits of conceptual thought as interdependent in reality, and to allow us to use conceptual thought as a means to transcend limits by proving these limits to be empty. If we began by assuming that all conceptual thought was invalid, then we would never think. The only way to prove that conceptual thoughts are empty is to think conceptually.

By examining Nagarjuna's logic in this way, we have shown two things: 1) that emptiness creates a set where ultimate and conventional reality are interdependent and 2) that therefore, conceptual thought can be useful for the purposes of understanding all forms of reality, including that which is not limited. With this in mind, we can now begin to see how infinity, as a concept, can be embraced by the logic of Mahayana Buddhism.

### **Emptiness as a Mental Construct in Relation to Mathematics**

We will now assume that infinity is a concept best comprehended through mathematics, and, therefore, it stands that we should contextualize emptiness as a mathematical term in order to adequately compare the two concepts. This proves more difficult than one may suspect, since the nearest concepts to the connotation of 'emptiness' are zero and the empty set and neither of those terms seems sufficient to fully represent the concept of emptiness. Given that the value of zero as a digit was developed in India and that the Sanskrit for 'zero,' *sunya*, also means 'empty,' it would seem the perfect candidate for our translation. The Oxford Concise Dictionary of Mathematics defines 'zero' as "the real number 0, which is the additive identity, i.e.  $x + 0 = 0 + x = x$  for any real number  $x$ " ("Zero"). Zero, in this sense, has no additive value. However, emptiness as a concept is useful and additive, as we have shown. Zero would therefore seem to be disqualified as an equivalence for emptiness.

'The empty set' is "the set, denoted by  $\emptyset$  with no elements in it" ("The Empty Set"). This gets us closer to a mathematical equivalence of emptiness. Emptiness' seeming negation of inherent existence parallels the empty set's lack of identifiable elements; however, this understanding of emptiness is superficial. As we have shown, emptiness embraces the existence of things at the level that we experience them. As Nagarjuna describes, emptiness is all-

pervasive, but within that emptiness things do have “some properties and cannot be identified or characterized independently of them” (Nagarjuna 150). In this sense, emptiness is not empty.

We therefore are left without our original prospects. Perhaps we should consider reversing our logic and working from emptiness to a mathematical equivalent, rather than mapping a pre-existing concept onto emptiness. Graham Priest uses this same logic in his essay, “The Structure of Emptiness,” where he states that “to be empty is to exist only as the locus in a field of relations” (473). From here, Priest proposes a new set of objects, “ $X_0 \dots$  and a bunch of relations between them” (473). It is important to note the importance of relationality in the theory of emptiness, which asserts that “without relation there is no existence because existence is empirically and ontologically relational” (Laude 653). After securing the existence of the field of relations, Priest then argues against the inherent existence of the objects themselves, re-defining a locus to be “determined by a non-empty bunch of instances that bear the [identical] relation to each other” (473). Priest thereby creates a set in which “we may dispense with objects and the relationships between them, and operate equivalently in terms of loci and the relationships between these” (474). In short, emptiness as a mathematical term involves a set in which there are no terms, but rather loci in a vast and interconnected network of relationality. Moving forward, we will refer to this as “the set of emptiness.”

### **Emptiness Disclosing the Infinite**

We now possess the proper mathematical context in which to discuss how infinity can be described by emptiness as a set of loci and relationships between loci. We have approached the concept of infinity in this manner primarily because infinity, as previously stated, is best comprehended through mathematics. Historically, infinity’s “relatively stable denotation coincides with a stable mathematical definition of the concept” by Georg Cantor in 1874 (Feder

171). Although this may be merely coincidental, we contend that the field of mathematics presents the most logical method of understanding the concept. We have passed into the realm of mathematics in order to discuss how emptiness discloses infinity within finite human experience and to approach infinity in its most cogent form.

Having successfully turned the question to mathematics, we must now define infinity as a mathematical concept. Rachel Feder locates one source of the crisis to define mathematical infinity in Newtonian calculus. Since “calculus is based on the idea of limits, and limits require their opposite—that which is not bounded,” Newton devised Fluxion theory, which allows “for recognizing and predicting infinity effects” despite being based on an “unfounded infinity” (Feder 171). This theory of devising infinity before infinity was mathematically defined resounds with our theory of emptiness in two significant ways.

Firstly, we see how interconnectedness exists between the conventional and the ultimate. Newton is only able to utilize infinity’s relational existence rather than its supposed essence. The concept of infinity, therefore, has a locus in our set of emptiness as defined by Priest; infinity, like our other loci, has no real existence in and of itself, but it has relationships with other loci and therefore its general existence as an empty concept is necessarily interconnected with other empty concepts (such as limits and zero). Garfield, in his commentary on the *MMK*, argues that “what we are typically confronted with in nature is a vast network of interdependent and continuous processes, and carving out particular phenomena for explanation... depends more on our explanatory interests... than on joints nature presents to us” (113). Our interest in the concept of infinity does not arise naturally, but rather from the confluence of such concepts as limits, continuity, and “infinity effects.” The ultimate can only possibly be approached by way of the conventional.

Secondly, continuing in this logic, we see how infinity is best understood affectively. Newton's fluxion theory is more interested in "the affective experience of infinity" rather than the actual definition of infinity (Feder 173). Infinity, in this sense, is not a static concept with inherent existence, but rather, an emotive sensation which arises from the conventional. The Buddha's teachings are explained similarly, as "an internally intuitive process which is spontaneous and is part of [students'] own inner nature" (*The Diamond Sutra*). Infinity is not something to be grasped or held, but intuitively felt. This contradicts "Western philosophy" which "traditionally favors theoretical reflection over praxis and devotes most of its intellectual effort to *solving* metaphysical problems" (Schroeder 560, my emphasis). The role of praxis, of practice and embodied concepts, rather than "intellectual effort" is central to both Buddhist philosophy and, it would seem, to the Newtonian concept of infinity. Feder writes that "fluxion theory operated as a highly successful set of tools rather than a paradigm—a *praxis* rather than a bona fide theory" (172, my emphasis). Common language aside, these two quotations seem to be approaching the same argument: that the infinite, limitless, or ultimate can only be fully comprehended as it is embodied by the subject who comprehends it.

Therefore, we would seemingly need to revise our earlier statement about mathematics being the best way to comprehend infinity, since we have concluded that affect, emotional resonance, is in fact the best method for understanding infinity. However, we used mathematics to reach this goal and, therefore, mathematics is useful, as we originally stated. We need to understand that infinity is a locus in the set of emptiness, where mathematical reasoning, along with other methods, form a conceptual nexus of relationships with the infinite. The effectiveness of these relationships brings us to the Buddhist philosophy of *upaya*, "skillful means." This concept is best represented in a common Buddhist image taken from the Diamond Sutra: "The

Buddha always uses these concepts and ideas in the way that a raft is used to cross a river. Once the river has been crossed over, the raft is of no more use, and should be discarded.” As beings in the conventional world, we utilize conventional thought (“concepts”) to realize the ultimate truth about reality free from conceptions.

One such conventional framework is that of language. We can see how language operates as an empty concept: “adjusting language to ‘fit’ can never be complete, since we are constantly searching for the relevant joints and it is the language systems with all their semiotic baggage... that guide us toward these focal points” (Innis 109). This quite easily compares with our set of emptiness, where “things, objects, are only focal points of a here and now in a whole that stretches out indefinitely” (Dewey in Innis 112). Language is another plane of our set of emptiness, with relationality to all objects and conceptions in the original set; it cannot always completely define each entity, since each entity has an uncertain locus for language to describe. Infinity, as one of these loci, is therefore just another element of conventional reality in that, like all objects and experiences, it cannot be completely described by language.

Indeed, one of the struggles with using language to disclose ultimate truths is that “the ultimate truth is, in some sense, ineffable in that all words and their referents are by definition conventional” (Nagarjuna 275). What we can say about the limitless is always limited by conventions. Innis discusses the limits of language in relationship to infinity, stating that the limitless “may nevertheless only be accessible in a language, nondiscursively used, that attempts to go beyond itself and in so doing shatters or self-consciously denies its ‘fit’ to its object” (108). In disclosing the ineffable, we necessarily define it as “ineffable” and have therefore described its limitlessness through a limit which recognizes its own inadequacy. This is an important procedure that we will see repeated again and again in the logic Nagarjuna utilizes. If we stop

here, then we are left with the understanding that language can never disclose the infinite. However, the Vimalakirti Nirdeśa Sūtra suggests an alternative: “words also have that [illusory] nature, and thus the wise are not attached to words, nor do they fear them. Why? All language does not ultimately exist, except as liberation. The nature of all things is liberation.” We can use language, and mathematics as a language of its own, as a skillful means to access the inaccessibility of infinity.

This same procedure of using conventional means to disclose the ultimate is precisely the same used in Nagarjuna’s logic. Garfield and Priest describe Nagarjuna’s contradictory logic: “the first part is an argument to the effect that a certain view... transcends that limit... This is Transcendence. The other is an argument to the effect that the view is within the limit— Closure... Together, the pair describe a structure that can conveniently be called an inclosure” (4). One of these inclosures arises from the argument “that there is no ultimate truth [which] is itself a truth about ultimate reality and is therefore an ultimate truth!” (Garfield & Priest 11). Nagarjuna asserts that “in the end, our conventions and our conceptual framework can never be justified by demonstrating their correspondence to an independent reality. Rather, [Nagarjuna] suggests, what counts as real depends precisely on our conventions” (Nagarjuna 88-89). In other words, ultimate reality is dependent upon conventional means to express it and, therefore, it is another way of looking at the set of emptiness. The infinite is dependent upon the finite for its comprehensibility.

As we stated earlier, Nagarjuna uses logic to disprove the inherent existence of logic. By “penetrating to the depths of being, we find ourselves back on the surface of things, and so discover that there is nothing, after all, beneath these deceptive surfaces” (Garfield & Priest 15). Nagarjuna’s work creates a paradox, a closed loop which uses limits to discredit the inherent

existence of limits. By so doing, these limits are used to express the infinite as a dependent concept; when limits and the limitless alike are shown to be empty, belonging to the set of emptiness, then we have shown infinity to be an element in conventional reality, dependent upon conventional means of expression. This does not mean that infinity needs humanity to think of it, nor that infinity must exist for humanity to conceive of it. Rather, the two exist in harmony. We see this same argument in Nagarjuna's explication of desire and the desirous one.

If prior to desire  
And without desire there were a desirous one,  
Desire would depend on him. ...  
Were there no desirous one, moreover,  
Where would desire occur? (Nagarjuna 16)

Nagarjuna concludes that desire and the desirous one are neither simultaneous nor non-simultaneous; they exist in equilibrium, mutually dependent upon each other as distinct but inseparable entities. The Vimalakirti Nirdeśa Sūtra likewise states that "to say that this is conventional and this is ultimate is dualistic. To realize that there is no difference between the conventional and the ultimate is to enter the Dharma-door of nonduality." The conventional and the ultimate are two ways of looking at the same set of emptiness, and these ways rely upon each other to make sense of reality; the finite and the infinite are similarly two viewpoints of the same reality which rely upon each other. Infinity is thereby an empty concept interdependent with all other elements in the set of emptiness.

We have therefore shown that mathematics, as an element of conventional reality, can be utilized as a language to express the inexpressible; that conventional logic can be used to prove the ultimate; and that limits as defined by the capacity of the human mind can be used as a tool to disclose the limitless.

### **Experience of Emptiness as Buddhist Soteriology**

All of this conceptual thought is useful as a skillful means to approach the unapproachable concept of infinity; however, Buddhism stresses that, after conceptual thought (“the raft”) has brought us to insight (“the other shore”) we must leave the form of conceptual thought behind. As the Diamond Sutra states, “a disciple should develop a mind which does not rely on anything.” This does not mean that we drop what we have learned, but rather that we allow it to change our actions and thoughts and we become an embodiment of emptiness. Again, this actively disappoints the Western thinker, who believes that the metaphysical journey ends when the answer is seemingly intellectually comprehended. The “most significant feature of *upaya*, however, is the ability to respond compassionately or achieve liberation does not depend on a metaphysical analysis of the world” (Schroeder 562). After insight or enlightenment is understood, truth is removed from its seclusion in the domain of conceptual thought and brought into the world of phenomenal action and embodiment.

Here Mahayana Buddhism turns distinctly from logic-based philosophy to philosophy-based soteriology, religious doctrine concerning salvation. Given the tendency for salvation to be equated with the infinite, limitless, or eternal, this discussion is pertinent to our thesis of infinity as a concept interwoven with human experience. Laude writes that “Nagarjuna’s perspective can be deemed primarily soteriological since its ontology chiefly responds to the central question of Buddhism, namely suffering and the way to free oneself from it” (650-651). Suffering, like emptiness, is a condition of being “caused by the selfish and appropriative desire of craving” (Burton 328). Buddhism is aimed at liberating beings from suffering, which involves non-attachment. As with emptiness and infinity, non-attachment requires attaching oneself to certain concepts in order to actively detach oneself from what one craves. Knowledge of emptiness alone “does not bring about liberation. On the contrary, the eradication of one’s

craving and attachment requires detailed and systemic attention to and transformation of one's conduct" (Burton 342). We must instead turn towards embodying the principle of emptiness, becoming it in our conventional lives.

Utilizing limits to understand the limitless requires a few simple steps that are easily comprehended through logic and common experiences of the numinous. Utilizing concepts to disengage with concepts altogether, on the contrary, requires strenuous effort. The Vimalakirti Nirdeśa Sūtra advises that "you should absorb yourself in contemplation in such a way that you manifest the nature of an ordinary person without abandoning your cultivated spiritual nature." In Buddhism, the most enlightened person is nothing more than an everyday man or woman, bearing only the mark of "emptiness. They are neither produced nor destroyed, neither defiled nor immaculate, neither increasing nor decreasing" ("Heart of the Prajñāpāramitā" 15). Salvation means treading a non-dual path in which one is constantly occupying both the conventional world of the everyday and the ultimate reality of all-pervasive emptiness. The body is involved in the conventional world, which is empty, and the mind is concerned with constructions which, too, are empty. The body and mind occupy the same position of emptiness—they both belong to the set of emptiness.

This is embodiment, "an existential condition in which the body is the subjective source or intersubjective ground of experience" (Csordas 143). Embodiment is seen throughout Buddhist doctrine, particularly in the Heart Sūtra, which states "form is emptiness, emptiness is form" ("Heart of the Prajñāpāramitā" 15). Earlier, we argued that emptiness and infinity were not concepts which could be grasped, but rather, they must be experienced through the affects they produce. Innis posits that "maybe [the absolute] is just our experience of being embodied in an open multileveled system of symbols in an ever-developing 'fringe' of semiotic relations"

(114). Maybe infinity *is* the experience of being embodied in the set of emptiness, experiencing the simultaneous unity and multiplicity of elements in a relational universe. This is one way to locate infinity in the finite realm of human experience.

To reach this embodied state requires considerable mental maneuvering. According to Edmund Burke, “infinity... is a sublime form of self-deception. It involves both a sense of how things might be, and a sense of how to position oneself so as to make things seem as if they were that way... the seeker of the Burkean sublime must position himself such that some finite thing appears to be unbounded if he is to achieve the desired effect/affect” (Feder 176). This absolutely negates the notion that infinity can be intellectually founded, since its discovery requires a willful turn from observable reality. In this pursuit, however, “we gamble to truth to get to the truth;” we reject the notion of an intellectually-perceivable infinity and thereby obtain an experiential embodiment of infinity (Feder 178). In so doing, we are able to occupy the same position as the enlightened bodhisattvas of the Vimalakirti Nirdeśa Sūtra, who “had penetrated the profound principle of relativity and had destroyed the persistence of the instinctual mental habit underlying all convictions concerning finitude and infinitude.” To be limitless is to not cling to concepts of what limits or what is not limited. To not cling to concepts is to recognize and embody emptiness. Therefore, to be limitless is to recognize and embody emptiness.

This conclusion is at the heart of Nagarjuna’s soteriology. The “originality of Nagarjuna’s perspective lies in his connecting nirvana [“salvation”] to an existential recognition of the ‘emptiness’ of all phenomena” (Laude 654). Nagarjuna takes this one step further, however, and makes his most provocative claim, that there is no difference between nirvana, salvation, and samsara, the endless cycle of suffering for all beings. Earlier, we discussed how conventional reality and ultimate reality are simply two methods of viewing the set of emptiness

and that those viewpoints rely upon each other for their very definitions. Likewise, nirvana and samsara are two methods of viewing the same reality which are interdependent. Garfield comments, “when one perceives the constant arising and ceasing of phenomena, one perceives samsara. When all reification is abandoned, that world, and one’s mode of living in it, becomes nirvana” (Nagarjuna 328). Nirvana is simply a matter of abandoning concepts as independent, or of recognizing and embodying emptiness.

Whatever is the limit of nirvana,  
That is the limit of cyclic existence.  
There is not even the slightest difference between them,  
Or even the subtlest thing. (Nagarjuna 75)

Garfield summarizes the implications of this argument: “there is no difference in entity between nirvana and samsara; nirvana is simply samsara seen without reification, without attachment, without delusion” (Nagarjuna 331). Some may interpret this theory as negative, considering that Nagarjuna seems to be saying that salvation is really the same as endless suffering. However, the idea that ‘samsara = nirvana’ is positive when one considers that samsara is all of life and that, if we perceive that nirvana is samsara, then all of life is nirvana. By Nagarjuna’s logic, “transcendence is envisaged as immanent in that the ‘object’ of recognition or ‘ultimate truth’ is the very ‘structure’ of an experienced reality” (Laude 658). When one recognizes that emptiness is all-pervasive, that everything, including infinity, belongs to the set of emptiness, one perceives that reality is ultimately empty; one feels at once reality in its simultaneous unity and multiplicity, infinity and finitude.

## **Conclusion**

Tibetan Buddhists spend days at time creating elaborate paintings or *mandalas* by carefully pouring finite amounts of sand onto a table in an almost impossibly intricate pattern. After the image is complete, the *mandala* is ceremonially destroyed, the sand blown away and

returned to the river. In many ways, the process of writing about Buddhist principles, particularly those of emptiness and infinity, similarly takes time and considerable effort to construct something which ultimately must be abandoned. Buddhist concepts only carry one so far; eventually, these concepts must be embodied as elements in the set of emptiness, an interdependent field of relations and indefinite loci extending on forever. Buddhist doctrine has the potential to ring of nihilism and to seemingly negate the inherent existence of reality. Through understanding the theory of emptiness, however, we have shown that Mahayana Buddhism shows that ultimate reality is more real than abstract concepts and ideals—ultimate reality is the very nature of conventional reality itself. By recognizing the limits of reality, we see that all limits are fundamentally empty and, in belonging to the set of emptiness, they are limitless. Buddhist doctrine such as the Vimalakirti Nirdeśa Sūtra resound with the wisdom that he who embraces the emptiness of limits is limitless: speaking to the Buddha, one adherent prostrates, “I bow to you, who stand nowhere, like infinite space.” To recognize and embody emptiness is the ultimate truth. To recognize and embody the emptiness of the finite is to be infinite.

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