EMPTY AND ENTANGLED

DEVELOPING AN ACCOUNT OF METAPHYSICAL ANTI-FOUNDATIONALISM AND INTERDEPENDENCE

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Abstract

Western metaphysics has been dominated by forms of foundationalism- views that commit to the existence of something fundamental. I contribute to the growing recent interest in challenging foundationalism, and enquiring into the possibility of alternatives. The alternative that I pursue and defend in this thesis, is a position that I call *anti-foundationalist interdependence*. This position refrains from commitment to fundamentalia, by holding that all existing things depend on something else for their existence and identity. I work towards developing an account of this kind, by searching for support amongst analytic metaphysics (especially amongst recent work on metaphysical *coherentism*), Buddhist philosophy (especially amongst the work of Nāgārjuna), and from current physics (especially from Rovelli's relational interpretation of quantum mechanics). Using insight from these areas to produce a picture of the structure of reality which lacks foundations, serves to fill an important gap in the fundamentality debate.

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[1] According to André, I defend the view that reality is like a stew. It is not like a pizza, which has a pizza base as its foundation, and all the toppings resting on the base. It is not like a chocolate fountain, which has no foundation, and has a vertical structure that descends infinitely. It is like a stew- all the ingredients are mixed together and rely on each other for their flavour. A stew has no vertical structure, no top and no bottom…. It is a network of goodness. Reality is structured like a stew.

Contents

Introduction

1. Explaining the Thesis Title

This thesis defends two simple ideas: first, that nothing in the universe is fundamental; second, that there are more dependency relations in the world than we might think. So many more, in fact, that dependency relations don't just exist between some things, they exist between *all things*. These two ideas can be captured by the terms *anti-foundationalism* and *interdependence*. When combined, these two ideas suggest that we focus less on asking metaphysical questions about what things *really are* deep down at their core, or about what lies at the fundamental level of reality. Instead, they suggest that we focus more on *how things affect one another*, and understanding the connections between parts of the world, rather than the parts themselves. No entity can be completely understood in isolation, because no entity can exist in the way that it does completely independently.

I aim to offer an original contribution to the newly emerging metaphysical literature exploring the possibility of anti-foundationalism and interdependence, by investigating how an account that combines these two ideas can receive support both from philosophy beyond the Western canon, and from developments in current scientific theories. The thesis seeks to show that there are promising arguments in favour of anti-foundationalist independence from analytic metaphysics, from Buddhist philosophy, and from interpretations of quantum mechanics.

Insight from Asian philosophy and the Buddhist tradition forms a significant part of my research. Metaphysical ideas about fundamentality from within various Buddhist schools across India and China can fill gaps that remain in Western metaphysical discourse, where foundationalist ideas have been widely entrenched. I draw from the Madhyamaka Buddhist school in particular, founded upon ideas about *śūnyatā* or *metaphysical emptiness,* which offer a unique take on the fundamentality debate. Broadly summarised, all entities are *empty* of any own nature or independent essence. Hence, the structure of reality is *empty*, as the first part of my title suggests.

My research also draws heavily on insights into the fundamentality debate that can come from quantum mechanics (QM). The picture that my preferred interpretation of QM paints is one where all entities rely on interactions with other entities for determination of their properties. No entity has determined properties independently. This points towards reality being structured as a vast web of entanglement, and interactions that relate entities. Hence, the structure of reality is *entangled*, as the second part of my title suggests.

I spend the majority of the thesis gathering support (from emptiness and entanglement, amongst other things) for a broadly connected set of ideas that fit under the heading *anti-foundationalist interdependence.* I then work on clarifying and developing the details of the most encouraging account of anti-foundationalist interdependence, in the latter stages of the thesis. The account I reach and defend, is a species of *metaphysical coherentism*: a recently developed rival to traditional metaphysical foundationalism. Coherentism parts ways with foundationalism by forgoing any commitment to fundamental, foundational entities. Coherentism suggests instead, that all entities form a part of a vast network of dependence, within which no foundational, supportive, or privileged set of entities is required for the existence of the network to be sustained. The variety of coherentism that I endorse is one that Swiderski (2024: 1865) calls *holist coherentism*, which features a maximum number of dependence relations between all entities. The network of dependence that is produced is maximally interconnected, meaning that all entities depend on all other entities. This picture, I argue, is the picture that is best suited to receive support from the Buddhist tradition, and from current science.

2. Thesis Overview

I open the thesis by discussing and clarifying the notions of fundamentality and dependence in chapter 1. Both notions have had extensive philosophical attention, from within the analytic tradition and beyond. The debate around fundamentality amongst analytic philosophers has been heavily dominated by a single position- foundationalism- so much so that it often goes assumed. This position is characterised by its commitment to the existence of some fundamental entity. In search for a wider variety of positions, I look to the Buddhist tradition for another perspective on the fundamentality debate. The Buddhist tradition offers a plethora of different arguments, some that defend foundationalism, and some that challenge it. I introduce the important Buddhist notion of *svabhava*, and discuss its interpretations in comparison with ways that fundamentality has been characterised across Western literature. This discussion sets up the tools and terminology needed for the development of arguments in favour of anti-foundationalist interdependence throughout the rest of the thesis.

Chapter 2 begins by setting out the commitments of the most common position taken in the fundamentality debate: *standard foundationalism*. I then spend the rest of the chapter introducing preliminary reasons for rejecting standard foundationalism's core commitments; the commitment asymmetric dependence, and the commitment to the existence of fundamental foundations. The rejection of these two commitments form the pillars of my preferred picture of reality's structure (anti-foundationalist interdependence).

By this point, I establish what I take to be the characterising feature of fundamentalia, which is their *ontological independence*- their dependence on nothing else for their existence or nature. Hence, the anti-foundationalist picture I seek to defend is one in which all existing things depend for their existence and their nature on something other than themselves. I argue that the best way to realise such a picture is through embracing interdependence, where, for any x and any y, dependence relations can hold in both directions between x and y. I give examples of cases of symmetrical dependence to support this possibility.

Chapter 3 moves on to discussing issues concerning properties and identity, in order to construct an argument against the existence of any ontologically independent fundamentalia, using the tools that analytic metaphysics provides. In this chapter I argue that for any entity to be independent (and hence, fundamental), its properties and identity must be independent of all other entities. The independent existence and identity of an entity is a possibility that is ruled out, if the reader is convinced by the arguments I give for the non-existence of intrinsic properties, the lack of persistence of the identity of an entity over time, and the collapse of the distinction between contingent and essential properties.

Chapters 4 and 5 explore further support for an account of anti-foundationalist interdependence, from places other than analytic metaphysical enquiry. Chapter 4 focuses on the support that the view might receive from arguments made by Nāgārjuna, the founder and key figure of the Buddhist Madhyamaka school. Nāgārjuna argues that all phenomena are metaphysically *empty.* I offer support for an understanding of emptiness, such that 'every entity is empty of its own independent nature, but full of the nature of everything else'. This chapter also offers a relational interpretation of the Buddhist philosophy of the *Middle Way.* I offer support for understanding the *Middle Way* as the mid-point between two metaphysical extremes of independent existence and non-existence. The position of the *Middle Way* is achieved by all entities through their existence-in-dependence-on-something-else. Chapter 5 gives support for anti-foundationalist interdependence, through its consistency with our current best physical theories. I use Carlo Rovelli's interpretation of quantum physics to support the idea that all entities have their nature and existence through dependence on their interactions with other entities, and I argue that phenomena like quantum entanglement can be shown to support the possibility of interdependence. I am grateful to Carlo Rovelli, as the chief editor of *Foundations of Physics*, for giving me permission to reproduce material that is published in the journal (Jaura, 2024) which makes up a significant part of this chapter.

Together, chapters 2, 3, 4 and 5 motivate the need for the development of an account of anti-foundationalist interdependence. They also provide a set of requirements that the account must fulfil, for it to be able to receive support from the arguments explored within

each chapter. These requirements are as follows: i) The account must lack any ontologically independent entity; ii) The account must feature some instance of symmetrical dependence; iii) The account must be compatible with interpretations of Buddhist emptiness; and iv) The account must be compatible with relational quantum mechanics. Chapter 6 assesses possible forms that an account of anti-foundationalist interdependence might take, to find which form meets these requirements to the fullest. The account that I arrive at, which satisfies each of the requirements to the greatest degree, is an account of *metaphysical coherentism*, that features maximal interdependence. I clarify the details of this most promising picture, before defending it against some of its most pressing objections in chapter 7. The final chapter provides responses to challenges regarding vicious infinite regress, and regarding the charge of fundamentality that can made against dependence relations. I conclude the thesis by offering some suggestions of promising applications of the coherentist account I defend, and by pointing towards some directions for future research into prospects provided by anti-foundationalist interdependence.

Chapter 1: Fundamentality, Dependence and Svabhava

My opening chapter introduces the core notions that my thesis addresses, including *fundamentality*, *foundationalism* (the position that commits to the existence of some ultimately fundamental features of reality), and relations of *dependence* that can be understood to 'structure' reality. I begin by exploring what we mean when use the term 'fundamental' in our everyday language (§1.1). These ideas are illustrated by a discussion about the kinds of phenomena that have been commonly considered as ultimately fundamental in the history of Western philosophy (§1.2). I then outline and evaluate the ways that philosophers have defined the concept of fundamentality (§1.3), arriving at what I consider to be the most accurate metaphysical characterisation, in terms of *ontological dependence* (§2). The second part of this chapter moves on to exploring how ideas to do with fundamentality have developed in Buddhist philosophy (§3). I argue that the Buddhist tradition is less attached to the existence of fundamental entities and foundationalist positions in general, when compared with the history of the analytic tradition (§3.1). I then introduce and compare interpretations of the Buddhist notion of *Svabhava*, and its links with fundamentality (§3.2). I finish by clarifying the understandings of fundamentality and svabhava that I take forward to develop my anti-foundationalist account (§4).

1. Fundamentality

1.1. Fundamentality: Folk Understanding and Significance

This opening section explores what we mean by 'fundamental' in everyday usage, in order to inform and identify a target for a metaphysical characterisation of fundamentality. At the heart of the metaphysics I explore in this thesis is fundamentality, a notion familiar to all. I begin by sketching some of the ways we might understand the notion and its connotations. The 'folk' conception likely feeds our intuitions about what a formal notion should capture, prior to our investigating it formally. Pre-theoretical insights into what we mean if we ask 'what does it mean to be fundamental?', thus provide us with concepts that a metaphysical understanding of the term should analyse. This first section explores those common pre-theoretic ideas that are associated with the concept of fundamentality, prior to philosophical analysis, including ideas to do with primitivity, indispensability, importance, the ability to support other things, and the ability to explain other things.

It is natural to think of fundamentality as something that applies in different degrees to different features of the world. We may think of some entity as more fundamental than another. The beans used in my cup of coffee could be said to be 'more fundamental than'

the drink they are used to create, since the process of turning them into a drink and adding extras like hot water and milk might dilute the coffee in its 'purest' form. Coffee beans might thus be thought of as 'more fundamental' relative to the drink they are a key ingredient in, and 'less fundamental' relative to the molecules that make up each bean.[2] In this way, *relative fundamentality* can be thought of as a property that can vary and be compared amongst the phenomena we encounter in the world, like molecules and coffee beans.

To reach an understanding of what is being compared in judgements of relative fundamentality, we need to think about how we understand the notion of the maximal degree of fundamentality - the gold standard to which we would attribute this property in its entirety- what it is to be *ultimately* fundamental. It is what we conceive of to be this highest degree of fundamentality that I focus on in what follows. This notion of ultimate or absolute fundamentality is what might be attributed to the 'building blocks' of nature or whatever might exist at the most basic level of reality. Our common understanding of what it means to be absolutely fundamental has multiple aspects. I consider each in turn, in order to paint a comprehensive picture.

(1) First, we often associate being fundamental with being basic, pure, and underived. It seems the fundamental has a special nature, in the sense that it does not rely on anything other for its existence. It is primitive, primary, and elementary, needing nothing else to be what it is. Such an implication can be found in an application of the concept 'fundamental', when used to describe 'fundamentalist' ideologies. 'Fundamentalism' when used to describe an ideology implies extreme adherence to the most 'pure', untainted or unmodified parts of a belief system. Those who are attracted to fundamentalism are those who desire a return to basics, simplicity, and what they believe to be the 'core' elements of their belief system, and are often opposed to development, adaptation, or new layers of meaning that might be added to these core pillars of their belief.

(2) Understanding what is at the fundamental level of reality as the 'basic building blocks' of reality has a second implication. As well as being basic and underived, this metaphor implies that what is fundamental also has the ability to 'build' or support a structure. This second aspect of fundamentality suggests that other parts of reality are derived from what is fundamental. Whatever a fundamental level

[2] Each of the components that go into making a cup of coffee (including the coffee beans, water, milk, heat and so on) may be naturally thought of as more fundamental than the cup of coffee. Each of these components is may have more components (including molecules, sugars, energy and so on) which may be understood as more fundamental still.

consists of acts as an underlying foundation, responsible for producing and maintaining other less fundamental parts of reality.

> (2a) and (2b) This capacity to support the existence of other things can also be broken down into a pair of implications. We might understand the function of the fundamental to be both *producing* and *maintaining* these other things, or in more metaphysical language, to both *cause* and *ground* other entities. The distinction here, is that the fundamental might be assumed to be responsible for the creation of some parts of reality, as well as to be responsible for sustaining, constituting, or supporting those other parts.[3]

(3) Let us now turn to aspects to do with the nature of the fundamental, and the value of the fundamental. Being basic, primary, and underived, may suggest that whatever is fundamental must be fixed and unchanging. If something changes and develops, then that change introduces questions about why such change occurs. If x changes, then in virtue of what does it change? A fundamental entity is resistant to such questions, of course, because (at least *prima facie*) its existence and nature are independent of the existence of any other entity. Therefore, at least at first pass, it is likely that a fundamental entity is unchanging.

(4) If such basic building blocks are *essential* to support other parts of reality, then this implies their nature must be intrinsic, and objective. Without fundamental entities having a fixed existence and nature, the entities that they support would not be able to exist in the way that they do. Fundamentality suggests indispensability, not only to underpin the existence of other things, but also to feature in *explanations* of these other things. It is common to accept that fundamentalia are unexplainable, whilst playing an important explanatory role in accounts of less fundamental phenomena.

(5) Being essential or indispensable comes along with a value judgement that is often attached when we talk of things being 'fundamental'. Being regarded as fundamental suggests being supremely important, of the highest status, or

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[3] Causation and grounding are two types of dependence, the former diachronic and the latter synchronic. These are concepts I will return to in much greater detail. For now, I will note that the metaphysicians understanding of fundamentality focuses much more on the latter aspect: the capacity to ground or synchronically support parts of reality. Most often, causation is reserved as a distinct metaphysical topic. That's not to say discussions within the topic of causation don't play a big part in fundamentality debates, as will become evident.

universally significant. To be of 'fundamental importance' implies being crucial to the maximum level. Being in a 'fundamental position' might mean being in the most senior, executive, or exclusive position, having the most responsibility. Perhaps in principle, the founder or CEO of a company might be considered as a position that is fundamental to the company's existence and maintenance. This connotation of importance gives a certain weight to potential ways of answering questions about what is fundamental. Especially when this fundamentality isn't being contained to a certain domain, like within a company, but instead we are asking the broadest question of the fundamental elements of all reality.

In summary, the concepts commonly associated with *the fundamental*, include being basic, supportive, unchanging, essential and important. Identifying these connotations allows us to understand how they might feature to various degrees on a scale of relative fundamentality, as well as to their maximum degree in the elements at the most fundamental end of the scale. Absolute fundamentality sets the gold standard, which phenomena at all other degrees of relative fundamentality fall short of. Perhaps due to the connotation of being valuable, important, or significant, it is natural to imagine a scale of fundamentality as a hierarchy. Just as the CEO of a company might play (or like to think that they play) the most fundamental role in the running of the company, and the company is structured hierarchically, so to can fundamentality be thought of as structured hierarchically. This idea of hierarchy will play an important part in my metaphysical discussion of fundamentality, and ultimately will be a notion that I reject.

With this sketch of the object of the search in mind, I proceed with a brief rundown of where the search for the ultimate fundamental constituents of reality has taken thinkers in the Western world, before pinning down a more philosophical definition of fundamentality.

1.2. A Brief History of the Fundamental in Western Philosophy

In this section I outline the development of trends throughout Western history, to find the sorts of phenomena that have been considered fundamental. This process helps give background to philosophical accounts of fundamentality, as well as set up a point of comparison for Indian philosophical ideas about fundamentality, that I explore later in the chapter. By identifying some key stops on the road throughout the history of Western metaphysics, we can pin down some paradigm examples of what has been generally considered as fundamental. Taking this tour will help strengthen and clarify the kinds of phenomena that a good account of fundamentality should aim at capturing.

1.2.1. Atomism

Perhaps the most natural place to begin is in Ancient Greece. The 5th century BC saw a shift in attention away from searching for fundamental answers in mythologies or the teachings of religious traditions. Prior to this development, a commonality across ancient Western civilisations was the assumption that the fundamental must lie within a higher realm, the occupants of which must be responsible for all movement, change, events and reality on Earth.

One of the first important philosophical ideas to challenge the search for the fundamental amongst the actions of powerful Gods and demons, and direct it towards phenomena in the natural world, can be attributed to Leucippus and Democritus. They are most often credited as developing the earliest version of an idea that simplifies the 'ultimate explanation' of existence, and remains highly respected throughout modern physics- the *atomic hypothesis* (Berryman, 2022). Democritus recorded his teacher, Leucippus, who first suggested that small pieces of indivisible matter make up the world, and are responsible for the existence of all other existing things. All of reality can be reduced down to tiny elementary substances that come together in different ways to form the varied phenomena we are familiar with in everyday life. They move freely within a void, colliding, arranging and joining with each other to produce the complex reality that we perceive.

'… Early atomists theorized that the two fundamental and oppositely characterized constituents of the natural world are indivisible bodies—atoms—and void. The latter is described simply as nothing, or as the negation of being. Atoms were said to be intrinsically unchangeable; they can move about in the void and combine into different clusters, which give rise to the macroscopic bodies of the perceived world.' (Berryman, 2022)

This was the first documented time that fundamentality was connected to the simplest of things- basic particles that cannot be broken down into anything smaller. Aristotle cites Democritus' use of an analogy with letters of the alphabet, combining and arranging to form comedies, tragedies, epic stories and poetry, to illustrate how elementary atoms combine and arrange to form the variety of everything in the world (Rovelli 2017: 8).

Democritus' naturalist ideas survived throughout periods lasting centuries, dominated by monotheist religions that condemned any idea which could be an alternative to the fundamentality of one supreme God.[5] The atomic hypothesis has remained so relevant, in

[5] For example, a period dominated by Christianity and anti-pagan policies between the 4th-6th century condemned any ideas that involved anything other than a single God being considered as fundamental

fact, that it was the great twentieth century physicist, Richard Feynman's answer to his own philosophical question: In an apocalyptic world where all human knowledge was destroyed, what would be the one statement, containing the most information in the fewest number of words to pass on to a new generation of creatures? Feynman introduced his lectures on physics by offering that the atomic fact - that the world is made up of particles that attract and repel each other - would contain a huge amount of information about the rest of reality, putting particles as strong contenders to be called fundamental.[6]

1.2.2. Minds and Consciousness

The second stop on the tour of fundamentality in the West, is with noting the minds have also often been considered as existing that the fundamental level. Some philosophers, including most famously, Descartes, have argued that accounts of the fundamental level that contain only physical things, like particles, are missing a key, important ingredient- the mental. As early as classical and medieval periods, there were those who argued that minds and mentality could not be explained by a fundamental ontology containing only physical and material substances. Therefore, we must commit to minds as a second category of fundamental phenomena. Those who commit to two kinds of fundamental substance, the physical and the mental, are commonly known as *substance dualists*.

A classic argument made in favour of substance dualism, and the fundamentality of mental phenomena, refers to intellect and imagination as resistant to explanation in terms of physical phenomena. For example, this kind of argument can be made in terms of a critique of Democritus' alphabet metaphor. A disanalogy might exist between letter of the alphabet and atoms. Whilst letters can be combined to produce books, poetry and plays, it is apparent that these things may be resistant to explanation purely in terms of elementary physical atoms. It is not straightforward to understand how great music, artwork or works of imagination can be reduced simply down to the collisions of particles. Those who are convinced by such reasoning, may be more inclined to commit to mentality as part of the fundamental level of reality.

Descartes' dualist arguments, put forward most famously in his seventeenth century work, *The Meditations*, focused more on consciousness as resistant to physical explanation, as opposed to intellect or imagination (Robinson, 2023). Perhaps the key problem faced by dualists like Descartes was that of how the two fundamental substances could interact with (and influence) each other. This issue is directly addressed by Chalmers (1995), in his

(Rovelli 2017: 20) Many monotheist religions that consider God as fundamental, refer many attributes of God that could be considered as connected to God's fundamentality, including infallibility, and being the first cause, and sustainer of life.

[6] *The Feynman Lectures on Physics* Vol, 1. Eds Leighton, R and Sands, M.(London, Basic Books, 2011).

discussion of the 'hard problem of consciousness'. Chalmers highlights that there is an 'explanatory gap', between physicality and consciousness, that we are yet to be anywhere near bridging. Reasons such as this are what often lead to a preference for one rather than two kinds of substance at the fundamental level- with physicalists preferring the physical, and idealists preferring the mental.

1.2.3. Fields

The third stop takes us back to the naturalistic project, which accepts that only physical phenomena exist at the most fundamental level. This was given a shake up in the nineteenth century, when physicists Michael Faraday and James Clerk Maxwell (1865) introduced fields into fundamental physics. Before that, it had been widely accepted that only time, space and particles made up the physical fundamental level (Rovelli 2017: 38-39). Faraday was the first (Rovelli 2017:39-46) to suggest a way to fill in the gaps in Newton's existing particle physics, such as how particles can attract and repel each other. This was by adding fields, consisting of 'lines of force' that fill space into the picture at the physical fundamental level. This idea was developed by Maxwell, who provided the mathematical equations to support the theory, and produced the concepts of the electric and magnetic fields. These are still used to produce communication technology such as radio, television, and telephones (Rovelli 2017: 44). This addition to the scientific understanding of what exists fundamentally, pushed towards an understanding of reality as *continuous* as opposed to *granular.* The fundamental level may not be something that can be divided into individual 'bits', but may instead be something that is equally distributed, and field-like, pervading across all space.

1.2.4. The Whole Universe

A final stop on our tour and potted history, is a philosophical move that reflects this idea of the fundamental as all-pervading: *priority monism*. This is the idea that reality is a whole that is fundamental. This idea has cropped up in multiple places throughout the history of Western philosophy, for example, appearing amongst the works of Plato and Spinoza.[8] Perhaps the most thorough defence of this idea is provided in 2010 by Jonathan Schaffer who argues that the cosmos as one single whole is the only fundamental thing, by universalising the idea that wholes are always more fundamental than the parts that make them up.[9]

[8] See Schaffer 2010a and 2010b for discussion of these historical examples of priority monism.

[9] See either later in the thesis (Chapter 1, §1.3; Chapter 5, §3.2; Chapter 6, §2.2) or Schaffer (2010) for the details.

1.2.5. Reflective remarks on the suggestions so far

At this point, it is worth taking a step back from the survey, and making some general remarks about the options that have been identified by theologians, philosophers and scientists for what might exist at the fundamental level of reality. The project of finding what is ultimately fundamental, is a project of breaking down what we can observe and know, and pushing further for explanations, until we cannot push any further. When we reach the point where phenomena cannot be explained further, these phenomena can be accepted into a fundamental ontology.[10] Conclusions about what one's fundamental ontology should consist of that have been surveyed here have included *theism*, *atomism*, *physicalism*, *dualism*, *idealism* and *monism*. These 'isms' all refer to domains of what should be included in our fundamental ontology- or what the fundamental level of reality consists of- whether that be physical phenomena, mental phenomena, divine phenomena, or all phenomena.

Another point to note following from the whistlestop tour, is that, often, the process of finding what is fundamental, has followed a common pattern. A new discovery has often suggested that the most popular candidates for what the fundamental level consists of do not have the special status or privileged position that we thought it did. Here are some examples to illustrate:

(1) The most ancient roots of science that developed in 6th century BCE Greece, suggested to us that the 'heavens' (outer space) were not more fundamental than the Earth, in the way that it would've previously been common to think. The 6th century was when it was first suggested that physics and nature act in the same way across the two (Rovelli 2017: 4-7). This suggestion meant that the stars do not exist at a greater level of fundamentality than earthly phenomena. So, what was previously thought of as fundamental- the heavens- no longer had such status.

(2) Darwin suggested that man is not 'ontologically above' the animal kingdom- if anything, the animal kingdom is more fundamental, as man is the product of primates. Again, a popular option for fundamentalia- humanity as fundamental- gets undermined.

[10] This kind of connection between fundamentality and explanation is made by Bliss (2024), Jenkins (2013), Fine (2012), Audi (2012), Schaffer (2012) and Thompson (2016). Importantly, the 'point where phenomena cannot be explained further' should not be understood as a point where our limited epistemic capacities fail, resulting in the end of explanation. Rather, it should be understood as a point where there is no further metaphysical explanation available to give.

(3) Advances in psychology and neuroscience can be interpreted to suggest that the mental is not ontologically 'above' the physical- all mental phenomena may be reducible to physical phenomena. This may be another example of a candidate for fundamentalia coming under doubt.

(4) A final example to end this section, bringing us close to the up-to-date state of physics, is Einstein's undermining of the fundamental distinction between space and time. Einstein provided a theory which suggested that space and time are not two distinct, special cornerstones of reality. The success of his theory of special relativity showed that they are interwoven- temporal location depends on spatial location and vice versa. Due to the curvature of spacetime, which is greater wherever there is mass (general relativity), time passes more quickly at higher altitudes on Earth, and more slowly at lower altitudes. The passage of time is not a fixed fundamental that remains constant across all space, as we might have previously imagined. Space and time are best thought of together as 'spacetime', a term which captures their interdependence.[12] Therefore, the idea that space and time are two distinct fundamental substances, also gets called into question.

Together, these examples illustrate what could be perceived as a pattern, that popular ideas about what might be fundamental often get undermined by some new discovery, or trend in philosophical thought. This should be kept in mind when I come to providing arguments against anything being fundamental at all. If it is correct to call this a pattern, and the pattern continues, then it could be the case that something that exists fundamentally is never located or agreed upon.

1.3. Fundamentality: The Philosophers Notion

At this point, I turn to the ways that philosophers have characterised fundamentality, and I work on pinning down exactly what we're looking for in the search for what exists at the fundamental level. It is important that whatever formal definition the notion of fundamentality is given, it captures at least some of the ideas going on in the common understanding, described above. This is so that it can be utilized and applied in contexts beyond metaphysics seminars, and so that it can be used to clarify common understanding of fundamentality. A good philosophical definition of fundamentality must also function in a way that points us towards being able to identify the kinds of phenomena that have been considered ultimately fundamental, surveyed in the previous section. Bennett points

[12] In Minkowski spacetime, there is no time and space to be interdependent. Relations between points, outside of lightcones, just have a 'spacetime' separation. Points themselves do not have spatiotemporal locations. Similarly, this renders the result that spacetime is not fundamental, and our prior understanding to the contrary may have been misguided.

out that a good account of what *fundamentality is*, should be internally coherent, and should be distinguished from accounts of what *fundamental things actually are.* An account of *what fundamentality is* should be compatible with various positions on what elements of the world, if any at all, are fundamental (Bennett 2017: 104, 129, 135).

This section develops a taxonomy of those features metaphysicians have identified to mark out what makes something fundamental. The potential marks of fundamentality that I discuss include the presence of an entity with a certain nature, function, or dependence status. I begin by discussing the idea that an entity's **nature**, namely its nature of being mereologically simple or complex, is the indicator of its fundamentality. Second, I discuss a group of ideas that surround an entity's **function**, the function of being supportive of the rest of reality, as what makes it fundamental. This is the idea an entity's presence amongst a set of entities that together form the ultimate support that reality stands upon, is what indicates its fundamentality. Finally, I discuss various positions that take an entity's place amongst a structure of ontological dependence relations, or **dependence status** to be indicates its fundamentality. This third set of views associates fundamentality closely with ontological dependence relations, and characterises what is fundamental as whatever is, in some relevant sense, ontologically independent. Importantly, all three approaches to fundamentality that I discuss, imply that 'being fundamental' is something associated with certain phenomena or entities. There are some things that are fundamental, and some things that aren't. In this way, *foundationalism* is defined as any metaphysical position that commits to one or more fundamental entities.

The current section will be structured thus: §1.3.1 addresses a prior debate as to whether fundamentality can be characterised in terms of any other notions, and concludes with a positive response, that fundamentality can and should be analysed and defined. §1.3.2 outlines the ways that fundamentality has been characterised in the existing literature, addressing each row in Figure 1, which can be grouped into the three approaches introduced above- nature, function and dependence status. §1.3.3 will then compare the merits and flaws of each of the three approaches, offering an evaluation in order to find which of the options is most appropriate to be carried forward as the notion of fundamentality that the rest of the thesis will employ. I conclude the section by defending that associating fundamentality with an entity's dependence status is the most promising option, since this approach is most broad and flexible, and subsumes the ideas present in the other two approaches.

Figure 1

Mark of Fundamentality	**Way of Being Fundamental**
Nature	Being mereologically minimal
Nature	Being ontologically minimal
Function	Being part of a supervenience base
Function	Being indispensable (or part of a complete minimal basis)
Dependence status	Being ontologically independent
Dependence status	Being reflexively self- dependent

1.3.1. Fundamentality is Primitive

'*Fundamentality cannot be characterised using any other terms*'

Before entering into a debate about the most appropriate definition of fundamentality, it is worth noting that there is a prior debate over whether fundamentality is something that can be defined at all. Here, the two camps can be roughly characterised as those who think fundamentality can be talked about in other terms, and those who think fundamentality is primitive.[13] The two most influential proponents of primitivism about fundamentality are Fine (2001) and Wilson (2014). They defend the view, generally put, that fundamentality *is fundamental*, meaning it cannot be defined. It is a notion that is resistant to characterisation using any other terms.

In this debate over whether fundamentality can or cannot be defined, I take Bennett (2017) to have provided convincing reasoning against primitivism. She suggests several good responses to the primitivist's reasoning for conceiving of fundamentality as indefinable.

[13] It may also be argued that there is a third camp: those who do not accept 'fundamentality talk' at all, since the notion is intellectually bankrupt. Those who reside in the third camp go further than claiming that 'fundamentality' cannot be defined using any other terms, by claiming that there is nothing that can be captured by the term 'fundamentality' in the first place. Daly (2012: 92) expresses this kind of sentiment, by arguing that 'fundamentality' can only be understood in terms of 'grounding', and vice versa, so that no further understanding is advanced. Neither term can be properly understood. I reject this reasoning, as the discussion in this chapter will show.

For example, take Wilsons's (2014: 560) reasoning, for understanding that the lack of a definition is itself the definition of fundamentality. Wilson argues that what it means to be fundamental is to not be metaphysically defined:

'The fundamental is, well, fundamental: entities in a fundamental base play a role analogous to axioms in a theory—they are basic, they are 'all God had to do, or create'. As such—again, like axioms in a theory—the fundamental should not be metaphysically defined in any other terms, whether these be positive or negative' (Wilson, 2014: 560).

Bennett clearly identifies the problem with the reasoning above. Defining 'fundamentality' and 'fundamental entities' are two distinct tasks. Wilson seems to confuse the two. To say that fundamental entities can't be defined is precisely to say that they're independent- they cannot be defined in terms of any other entity, because they do not depend on any other entity. This does not prevent there being a definition of fundamentality, but instead encourages us to define fundamentality as some sort of ontological independence. 'Fundamental entities' may allude definition, but this does not mean that defining 'fundamentality' is impossible (2017: 135-136).

Let's now turn to an argument in favour of primitivism about fundamentality from Fine (2001). One of the common understandings of fundamentality, touched upon in §1.1, is that whatever is fundamental resists explanation. We might understand explanatory relations to exist between some parts of the world but not others. For example, the flavour of my coffee is explained by the flavour of the coffee beans. There is some way in which the drink and the beans are connected through an explanatory relation - the property of one explains the property of the other. We can imagine an explanatory structure connecting different parts of the world. Then, fundamental entities might be identified by their position in the structure: a position which means that their existence and nature are unexplainable.

Fine (2001) expresses the worry that fundamentality cannot be defined in terms of an entity's position in a structure of explanatory relations. The fundamental cannot be conceived simply as the point where explanation ends. Identifying the fundamentalia with the endpoint of explanatory chains made up of explanatory relations is inadequate, Fine argues, as explanation cannot affect the way the world is. Fine associates fundamentality with his concept of *reality,* with things that are more fundamental being *more real.* The objection that Fine raises is that explanatory relations, or 'relational underpinning', should not be understood as having an impact on the *reality* of things. Being able to provide an explanation of the flavour of my drink in terms of the coffee beans it contains is not something that has an influence on the existence or nature of parts of the world.

'How can explanatory connection be determinative of what is or is not real? We may grant that some things are explanatorily more basic than others. But why should that make them more real? What I would suggest, in the face of this difficulty, is that we reject the idea that the absolute notion of fundamentality is in need of relational underpinning.' (Fine 2001: 25).

Bennett responds to Fine's worry by emphasising a distinction that should be made between epistemic and metaphysical senses of 'explain'. X *epistemically explains* y if it 'sheds light on it', whereas x *metaphysically explains* y if it generates or makes it happen (2017: 135). Fundamentality cannot be defined using epistemic explanation, as epistemic explanation relations can have no impact on the way that things are. However, Bennett suggests that there is no reason why fundamentality cannot be defined using metaphysical explanation. This is because Bennett argues that 'metaphysical explanation' can be understood as akin to other productive or generative metaphysical relations, like *grounding* (a notion that I will say more about later in the chapter). In the objection above, Fine says nothing to prevent fundamentality from being defined in terms of this kind of metaphysically productive relation. Bennett's response touches upon a deeper debate over whether a relation like 'metaphysical explanation', with its power to affect how the world is, actually exists, and how it is possible that it does its job. This is an issue I respond to in detail later in this section. For now, it is enough to follow Bennett's response to Fine's objection, in highlighting that Fine does not provide any argument for why there can't be a productive, generative relation that determines what is and isn't fundamental.

Aside from Bennett's strong responses to Wilson and Fine's primitivist reasoning, there are two further reasons to resist primitivism about fundamentality. First is the primitivist's lack of tools to track differences in relative fundamentality between entities. As already outlined, we have intuitions that give us an indication of what parts of the world are more or less fundamental than others. If we were to accept that fundamentality is primitive, then these intuitions cannot be based on any other notions, and must be purely based on an intuitive sense of fundamentality itself. If this were the case, it would be difficult to account for where these intuitions come from and how they are produced. We have no way to identify what fixes the direction of priority ordering from less fundamental to more fundamental entities, because there is nothing that fundamentality tracks, other than fundamentality itself. Further, without any other terms to capture fundamentality, we have greater difficulty accessing what might be at the fundamental level, since we have no criteria to go by.

What I hold to be the greatest concern with the primitivist approach, however, is its twofold failure when it comes to explanation. A core reason for my interest in anti-foundationalism, is because it can avoid a point where explanation must end. Any view

that commits to fundamentalia commits to some thing(s) that are brute and unexplainable. This, to me, is already a reason to search for revision. Those who hold fundamentality to be primitive take this lack of explanation even further. Not only do they hold that there are entities that represent a point where explanation stops, but, further, they lack an explanation of what fundamentality consists in.

Explanatory projects could be considered as the bread and butter of metaphysical enquiry. So, it is odd at best, for metaphysicians to accept that there is a point where explanation must simply stop. Explanation must stop when positing fundamentalia. Even more odd than accepting the existence of some entities that resist explanation, is the acceptance that there is no way for us to characterise what it is that makes these entities so unlike any others, in any terms other than fundamentality. If fundamentalia are to be posited, the least the metaphysician can do is provide reasoning as to what it is that makes them fundamental. To this end, I embark on working through the options presented in Figure 1, of ways in which we can shed more light on the notion of fundamentality. I begin with the idea that there is something about an entities *nature* that can make it fundamental.

1.3.2. Simple or Minimal Things

*'An entity's **nature**, such as its size, simplicity, or minimality, is what indicates its fundamentality'.*

The first row in Figure 1, contains the first option for characterising fundamentality in some other terms: fundamentality can be understood as tied to mereological complexity, and absolutely fundamental entities are identifiable by their complete mereological simplicity. Widely prevalent throughout discussion of fundamentality, both historic and contemporary, is a tie with mereology. A good example is the kind of ancient atomism discussed in §1.2.[14] A pervasive and intuitive thought is that fundamentality tracks mereology, with entities that are more fundamental being at the smaller end of a mereological spectrum. On this view, ultimately fundamental entities are those that are mereologically simple. We can picture the rest of reality as structured like a pyramid or hierarchy of composition, built out of the most small and simple things. Such a pyramid of mereological composition mirrors that of fundamentality.[15] If x is a part of y, then y is made up of x (among other things). And, or so goes the intuition, in that case y is less fundamental than x.

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[14] See Berryman (2022) for further discussion of ancient atomism, Schaffer (2003), (2010), Markosian (2005) and Bennett (2017) for alternative takes on mereological fundamentality.

[15] Mereological fundamentality is associated with being mereologically independent. Kim (2010: 183) defines mereological dependence as follows: 'The properties of a whole, or the fact that a whole instantiates a certain property, may depend on the properties and relations had by its parts.'

This intuition, that parts are more fundamental than wholes, often leads to an atomistic account of the fundamental level. Atomism, introduced earlier, associates the fundamental level with mereologically minimal, indivisible parts of the world. These parts that have no proper parts of their own, and cannot be divided into anything smaller. The endorsement of atomism commonly leads to a picture on which there are multiple parts of reality that are fundamental - *priority pluralism*.[16] If parts are more fundamental than wholes, then it is more likely that there are multiple fundamental parts of reality (as opposed to just one fundamental part of reality). Such a view is supported by the naturalist thought that we have reached the fundamental 'building blocks' of the universe when we are sure that a complete science has identified the smallest, indivisible particles. 'It is generally thought that there is a bottom level, one consisting of whatever microphysics is going to tell us are the most basic physical particles out of which all matter is composed (electrons, neutrons, quarks or whatever)' (Kim 1993: 377).

There is another alternative way to hold that fundamentality is tied to mereology, without accepting that fundamental entities are mereologically minimal entities. This is by reversing the direction of priority between wholes and parts. Schaffer, for instance, offers a view that retains commitment to a foundational level, but that identifies it not with mereological minimality, but instead with a 'supervenience base' of all other things. I return to discuss what Schaffer means by 'supervenience base' in the next subsection. What is important for now, is that the idea of fundamentality as equivalent with a supervenience base allows Schaffer to reverse the direction of priority that is associated with mereology, so that the mereologically *maximal* element can be thought of as the most fundamental. To be mereologically maximal is to be as complex as possible- to be a maximal whole. This leads to Schaffer's famous *priority monism*—the view that the one whole (the Cosmos) is fundamental and prior to its parts.

Tahko defines a mereological understanding of fundamentality, which does not take a stance on the direction of priority between wholes and parts, as follows: 'The world is organized into mereological levels and there is a fundamental, mereologically independent level which is at one end of the mereological scale' (2018: 240). He notes, that this mereological understanding of fundamentality that is neutral regarding which end of the mereological scale is more fundamental, tells us only that '(absolute) fundamentality [should be equated with] mereological independence' (2018: 241).

[16] The view that parts are more fundamental than wholes often comes hand in hand with priority pluralism, but does not entail it. The choice between the direction of priority between parts and wholes is often reflected be the choice between priority monism and priority pluralism, but they need not always come together. See Tahko (2023) and Tallant (2013) for discussion.

Moving on from an understanding of fundamentality that is tied only to mereology, we get to the second row of Figure 1. An understanding of fundamentality in terms of *ontological minimality* is introduced by Tahko (2018). Ontological minimality resembles mereological minimality, by identifying fundamentalia with their position at a minimal end of a scale. Being mereologically minimal means existing at the minimal end of a scale that considers mereological dependence as the only relevant kind of dependence. In contrast, being ontologically minimal means existing at the minimal end of a scale that considers a more general understanding of ontological dependence as relevant. An understanding of fundamentality in terms of ontological minimality suggests that there are more kinds of dependence that are relevant to fundamentality than just mereological dependence. Tahko gives a statement of *Generic Ontological Fundamentality* thus: 'The world is organized into 'levels' of ontological elements and the fundamental 'level' consists of ontologically minimal elements' (2018: 245).

Whilst a mereologically minimal entity is an entity that has no proper parts, an ontologically minimal entity has no components (understood in a broader sense than proper parts). As Tahko suggests, 'this more general notion of 'part' may allow one to avoid the unintuitive consequences of infinite chaining of parts more narrowly understood, that is, construed according to classical mereology. On this view, all manner of things, from sentences to symphonies to sets, can be composed of other things' (2018: 246). An example he uses to illustrate the idea involves sets and members. Tahko highlights that members cannot be understood as parts of sets in the mereological sense, yet they could still be understood as components. Broadening an understanding of fundamentalia from mereologically minimal elements to ontologically minimal elements means opening up the possibility that fundamentalia could be the kinds of things that do not enter into 'part-whole relations'. To refer to Tahko once more: 'this opens the possibility of interpreting ontologically minimal elements quite liberally indeed: the smallest, minimal 'parts' of reality do not need to be mereological elements at all, they can be anything that count as components, such as structures, relations, objects, or whatever' (2018: 247).

1.3.3. The Bare Necessities

*'An entity's **function**, such as its role in supporting the rest of reality, indicates its fundamentality'.*

The second group of options (rows three and four in Figure 1) suggest that it is not a *feature* of entities or objects themselves that makes them fundamental, but it is their presence amongst a set of entities that together perform a certain *function.* This is a group of views that associate being fundamental with being a part of a certain privileged group, without which the rest of reality could not exist in the way that it does. Fundamental entities are what determine or support everything else. Tahko summarises this kind of view: 'x is

fundamental if and only if x belongs to a plurality of entities X and X forms a complete basis that determines everything else. The complete basis is minimal if no proper subset of the entities belonging to X is complete.' (2023: §1.3). Entities are fundamental if they are included in a set needed to provide a complete minimal description of reality. This set, that forms the 'complete minimal basis', must include all and only fundamental entities (Tahko 2023: §1.3).

Schaffer's (2003) suggestion of characterising the fundamental level in terms of a 'supervenience base' could be understood as an account of this kind. Schaffer discusses the option of identifying the 'fundamental level' with a set of entities that all other supervene on and explains how this supervenience base need not be a set of mereological simples. In this way, the view parts ways with the mereological account of fundamentality discussed previously, as it suggests that an entity may still be considered fundamental, even if it is not mereologically minimal. 'There can be a supervenience base at a non-atomic level if there is a point in the mereological hierarchy below which all mereological divisions are boring.' (Schaffer 2003: 509).

Accounts of this kind claim that what makes an entity fundamental is being part of a set of entities that determines everything else. The details of what it means to be part of the complete minimal set are clarified by elaborating on what it means to 'determine' everything else. Tahko suggests that this could be a placeholder for other notions like "grounds", "realizes", "composes", or "builds" (2023: §1.3). Each of these suggest that the relation between this set and the rest of reality is stronger than one of supervenience, suggested by Schaffer.[17] Characterising 'determines' in terms of grounding, means that a complete set of ultimate grounds, together, are 'all grounding' in regard to the rest of reality.

A final way in which this kind of account has been put, is in terms of indispensability (Swiderski 2022: 1875-1877). Together, fundamental entities form a set that is *indispensable* to the rest of reality. 'We widely agree on a rough, intuitive sense of the fundamental facts [or entities] as those which serve as the basic constituents for the possibility of all else, or as the bare minimum which God must have created when He created the world, or which a perfectly concise yet complete description of the world cannot do without.' (2022: 1876). Entities that are indispensable to the rest of reality play an integral role in supporting it. They are required in order for the rest of reality to exist in the way that it does.

[17] By 'stronger', I mean that each of ways that Tahko suggests we might understand the term 'determine' imply that fundamental entities play a more active role in determining the rest of reality. For this reason, it could be questioned whether Schaffer's fundamentality in terms of supervenience base is accurately categorised under the heading 'an entity's *function* is the marker of its fundamentality'. Without playing an *active role*, a supervenience base may not *function* as a fundamental set of underpinning entities.

1.3.4. Ontological independence

*'An entity's **dependence status**, for example, whether it is dependent or independent, indicates whether or not it is fundamental'*

Rows five and six of Figure 1 associate fundamentality with some kind of ontological dependence status. A connection between fundamentality and ontological dependence has frequently been drawn in the literature (for example, see Schaffer 2009, Bliss and Priest 2018, Bennett 2017). According to Tahko (2023), a definition of absolute fundamentality in terms of ontological independence is among the most influential. Such an account holds that reality has a 'relational underpinning', and that fundamentality is intimately caught up the dependence relations that structure reality.

Row five of Figure 1 presents the view that what makes an entity fundamental, is its dependence on no other entity. There may be multiple kinds of dependence relation deemed relevant to fundamentality, for example, grounding, mereological dependence, existential dependence, or essential dependence (Tahko 2023: §1.1).[18] If an entity is dependent on any other entity in any of these ways, then that entity cannot qualify as fundamental. For example, if an entity is grounded by another entity, then it is a non-fundamental entity. Fundamentalia must be ungrounded. One kind of dependence that is widely regarded as not relevant to the fundamentality of an entity is modal dependence. Since all entities are modally dependent on some other, this would immediately rule out the existence of fundamentalia. (Wang 2016, Tahko 2023: §1.1).

The key difference between characterising fundamentality in terms of ontological independence, and in terms of indispensability (as presented in the last section), is that ontological independence means that a fundamental entity is *unsupported*, whereas indispensability means that a fundamental entity is part of a set that are *all supporting*. Entities that are part of a complete minimal basis, that are together *all supporting*, may also *mutually support each other*, whilst maintaining their fundamentality. Defining fundamentality in terms of ontological independence rules this possibility out, since to be fundamental, an entity must be supported by nothing else.

Row six of Figure 1 addresses the idea that fundamentalia need not be completely independent or unsupported, as long as the only thing that supports them is themselves. They are permitted to depend on something, only if that something is themselves. In this way, fundamentalia are characterised by their complete self-dependence, and dependence

[18] Philosophers can disagree as to what should be considered as the relevant subset of dependence relations.

on nothing other than themselves. Naturally enough, the coherence or intelligibility of self-dependence is open to question, and this will become a topic of discussion later in the chapter as well as later in the thesis.

1.3.5. Evaluating the three approaches to characterising fundamentality

This section compares the merits and flaws of each of the three kinds of approach to fundamentality just outlined, and draws the conclusion that *ontological independence* is the most appropriate characterisation of fundamentality to adopt.

I begin by rejecting row one- the characterisation of fundamental entities in terms of mereological minimality. Support for the view that mereological dependence is the only kind of dependence that is relevant to considerations of fundamentality, is diminishing (Wilsch 2016; Bennett 2017: 8–9; Tahko 2018: 244). This fall from favour could be attributed to at least two reasons. First, because such a characterisation of fundamentality rules out the existence of fundamentalia in a possible world where all things are infinitely divisible; and second, because there are other relevant dependence relations, beyond just the dependence of wholes on parts, that a good account of fundamentality must consider.

To briefly summarise the first reason: if fundamental entities are mereologically minimal entities, and if fundamental entities exist, then this is inconsistent with the possibility of a world that is 'gunky'. Gunk is a term first introduced by Lewis (1991: 20), which refers to some substance that can be divided into smaller parts infinitely. In a world where all things are infinitely divisible, then there cannot fundamental level, when fundamentality is defined in terms of mereological simplicity. Schaffer argues that there are reasons to take a world made up of atomless gunk as a live possibility:

'Infinite divisibility is possible in at least three ways: it is conceivable, logically consistent, and physically serious' (2003: 503). Schaffer contends that a posteriori arguments for fundamental mereological atoms also fail, since empirical evidence does not support the claim that a complete microphysics will postulate a smallest kind of particle, nor that this particle would be a fundamental mereological atom.

He argues that we should assume that future physics will follow the pattern painted by earlier physics, in which most popular candidate for a mereologically minimal entity at any given time will be undermined and replaced by something smaller: "Indeed, the history of science is a history of finding ever-deeper structure. We have gone from "the elements" to "the atoms"… to the subatomic electrons, protons, and neutrons, to the zoo of "elementary particles", to thinking that the hadrons are built out of quarks, and now we are sometimes promised that these entities are really strings, while some hypothesize that

the quarks are built out of preons (in order to explain why quarks come in families). Should one not expect the future to be like the past? Perhaps this stage of history is special? I think it is almost impossible to prejudge." (Schaffer 2003: 503).

If fundamental entities are mereologically minimal entities, and fundamental entities exist, then the possibility that everything in the world is gunky is ruled out. I follow Schaffer's reasoning for maintaining that a gunky world should be treated as a live metaphysical possibility. As indicated earlier, according to Bennett (2017), a good account of fundamentality should be compatible with both the existence and non-existence of fundamental entities- so, the existence of fundamental entities should also be considered as a live possibility. The incompatibility between maintaining these two possibilities gives us a first reason to find an alternative to understanding fundamental entities in terms of mereological minimality.[19]

A similar problem occurs when reversing the direction of priority given a mereological understanding of fundamentality, so that the mereologically maximal element- the cosmos as a whole is considered fundamental. As Tallant (2013) discusses, the existence of one fundamental, mereologically maximal element, is inconsistent with the possibility of a 'junky' world: 'A world v is junky iff every object in v is a proper part' (Tallant 2013: 429). In a similar way, given an understanding of fundamentality where wholes are more fundamental than parts, the existence of fundamentalia is inconsistent with the possibility of a junky world.

Associating fundamentality with either the minimal or maximal end of a mereological scale comes with problems regarding the possibility of gunk and junk. A second reason for rejecting a purely mereological understanding of fundamentality, is because there are other kinds of dependence relation, beyond just mereological dependence, that are relevant to fundamentality. This is the reason why Tahko introduces an understanding of the fundamental in terms of ontological minimality. Adopting an understanding of fundamentality in terms of ontological minimality rather than in mereological terms opens the possibility for fundamentalia to be things that aren't mereological elements. For example, fundamentalia could be structures, relations, symmetries or sets.

According to my understanding of Tahko's account- that says that fundamentalia are ontologically minimal elements- Tahko's account is akin to either an account in terms of indispensability, or in terms of independence, depending on what ontologically minimal elements are. If ontologically minimal elements things like *minimal truthmakers*, that

[19] See Wilsch (2016) and Bennett (2017) for further critiques of characterising fundamentality in purely mereological terms.

together produce a minimal description of the world, then Tahko's account is of the kind that attributes fundamentality to indispensability. On the other hand, if ontologically minimal elements are things that ontologically depend on nothing else (like ontologically simple components, for example), then Tahko's account is of the kind that attributes fundamentality to independence. Either the minimal set determines everything else, or, if determination is understood akin to dependence, then everything else depends on members of the minimal set.

If my understanding is correct, then we can set aside accounts of fundamentality in terms of simplicity or minimality, and turn to assessing accounts of fundamentality in terms of indispensability or independence. In order to compare and evaluate characterisations of fundamentalia in terms of indispensability (or supportive function), and in terms of ontological independence, I begin by sketching an illustrative example. Picture a tower block that is built upon ten foundational concrete blocks. These ten blocks are analogous to the 'ultimate grounds' of the structure. There are two features of these blocks that can be described - (1) they play the role of supporting the rest of the tower, and (2), the blocks themselves do not need supporting, due to their position at the very bottom of the structure. When understanding the roles of ultimate grounds in regard to reality rather than a tower, (1) is analogous to the role of ultimate grounds as 'all grounding', and (2) is analogous to the position of ultimate grounds as 'ungrounded'. The distinction between these two connotations of 'ultimate grounds' is highlighted by Leunberger (2020). The difference between being 'all-grounding' and 'ungrounded' underlies the distinction between characterising fundamentalia in terms of their supportive role (indispensability) or in terms of their unsupportedness (independence). An important result of the difference between these two characterisations, is that characterising fundamentalia in terms of being 'all grounding' permits for the set of collectively fundamental entities to mutually ground one another. In contrast, characterising fundamentalia in terms of being ungrounded does not permit fundamentalia that are mutually grounding.

One reason for preferring an 'ungrounded' rather than 'all-grounding' characterisation of the fundamental, is due to consideration of a possible world in which all entities exist independently. Such a possibility has been referred to as 'flatland' (Duncan et al. 2021), where no entity depends on any other, and so, it seems that there is no difference in ontological priority between any two entities. In a flat world case (so called due to all entities being on the same, 'flat' ontological plain, without differing in levels of relative fundamentality) can be shown that a characterisation of fundamentality in terms of independence precedes a characterisation of fundamentality in terms of indispensability. In such cases, all independent entities are in the unique minimally complete set due to their independence, and not the other way round, hence, independence precedes indispensability. Imagine a world which contains only four entities, each of which are

ontologically independent, and none of which are ontologically prior to any other. In this world, all four entities trivially form a complete minimal basis for reality, due to their independence. Alternatively, it may appear that a characterisation of fundamentality in terms of indispensability (or complete minimal basis) is not plausible in this world, since everything is included in the unique minimal set (Tahko 2023, §1.3).

This is one reason why I opt for understanding fundamentality in terms of ontological independence. Another reason, which is purely practical, is because much of the work on fundamentality that my thesis draws upon, comes from a number of essays in a recent edited volume on fundamentality by Bliss and Priest (2018). In the introduction to the volume, they say the following on the subject of how to understand fundamentality: 'The fundamentalia, by definition, depend upon nothing else (except perhaps themselves) and are, thus, without metaphysical explanation (except perhaps in terms of themselves)… Although there are alternative ways of understanding fundamentality, such as discussed by Takho and Barnes (this volume), Fine, and Sider, we are happy to proceed on the independence understanding' (2018: 6). For both of these reasons, I will carry forward independence as the way that I identify fundamentalia throughout the rest of the thesis. In order to utilize the characterisation of fundamentality as ontological independence, I must clarify what I take to be the kinds of ontological dependence relation relevant to fundamentality.

2. Dependence

Tahko (2023) distinguishes between characterising fundamentality in terms of *absolute dependence* and *restricted dependence*. Absolute independence sets the highest bar for an entity to qualify as fundamental, as an entity must be independent by the standards of *all* (relevant) metaphysical relations. Restricted dependence only requires that an entity be independent, according to a certain subset of dependence relations that are deemed most relevant to fundamentality. Tahko notes that restricted independence has often been the preferred standard for fundamentality defended amongst the literature. This is because there are two kinds of dependence in particular, that we would intuitively want to rule out as relevant to whether or not an entity is fundamental. First, as noted in §1.3.4, is modal dependence of the kind 'necessarily, *x* exists only if *y* exists'. If modal dependence of this kind were included within the list of dependence relations relevant to fundamentality, then this would immediately rule out the existence of anything fundamental.

'This is evident if we consider some necessary existents, such as numbers (assuming that numbers exist necessarily), for it is necessarily the case that the number 2 exists if Socrates does. Hence, the existence of Socrates necessitates the existence of the number 2. Moreover,

the number 2 necessitates the existence of the number 3 and the other way around. This obviously generalizes, resulting in no entity whatsoever being "absolutely existentially modally free", as Wang (2016) puts it.' (Tahko 2023: §1.1).

Second, is that characterising fundamentalia as 'absolutely independent', means ruling out the possibility that fundamental entities are dependent on themselves. The issue of whether fundamentality is best characterised as independence or pure self-dependence is yet unresolved, meaning the choice between opting for row five or row six remains open. In order for this flexibility to remain, fundamentality must be characterised in terms of restricted independence. At this stage, dependence between an entity and itself should not prevent an entity from being considered fundamental, therefore we should opt for a definition of fundamentality that does not require an entity to be *completely* and *absolutely* independent.

Now I turn to the kinds of dependence relations that are usually considered as relevant to fundamentality. One important example is *grounding*. Up until this point, I have spoken of grounding without any clarification of what is meant by the notion. Here is where I will put that right. I will first characterise grounding as a synchronic, asymmetric dependence relation. Then I will evaluate it on the grounds of whether it is the appropriate tool for characterising fundamentality. This evaluation will argue that a kind of dependence more neutral than grounding is more appropriate.

Grounding is often considered to be the relation that underpins 'in virtue of' claims (Bennett 2017: 12). An example commonly used to illustrate the idea of grounding is the synchronic dependence between water and H^2O. The two phenomena exist simultaneously, meanwhile, it is intuitive to think that one 'underlies' the other. The phenomenon of water is in some sense dependent upon the H^2O molecules that make it up. This is a dependence relation that goes one way between the water and the molecules, so can be said to be *asymmetric*. Asymmetry, along with synchronicity, are core features of the notion of grounding. Grounding can be understood as a species of dependence, with the notion of ungroundedness corresponding to the notion of independence. Grounding is, thus, a relation characterised by synchronic dependence- dependence between entities at a single moment in time. Dependence that does not involve any delay or difference in time between the dependent entity and what it depends on, is usually thought to capture a difference in level of fundamentality between the two entities.[20]

[20] The alternative form of dependence that is not synchronic, is diachronic dependence. In cases of diachronic dependence, there *is* a time delay between the two phenomena involved in the dependence relation. Therefore, cases of diachronic dependence can be understood as cases of causation. The cause temporally precedes the effects, and the effect is dependent upon the cause.

One evaluative point on which to test the notion of grounding, is its usefulness. Wilson (2014) argues that positing a grounding relation is not as useful as those such as Schaffer and Fine take it to be. She argues that 'small g' relations, which grounding attempts to subsume, are still needed to do explanatory work:

'Gaining even basic explanatory illumination about metaphysical dependence requires appeal to the specific relations (type and token identity, functional realization, the classical mereological parthood relation, the causal composition relation, the set membership relation, the proper subset relation, the determinable– determinate relation, and so on) that are the typical focus of investigations into such dependence.' (Wilson 2014: 553).

If Wilson is right that grounding cannot do the work of capturing the nuances of each of these 'small g' relations, then perhaps the project of subsuming these other relations under one general *grounding* relation, is misguided. To be able to respond, we can look at how other broader notions have been employed to capture synchronic dependence relations, besides grounding. For example, Bennett (2017) introduces the notion of 'building'. Building relations draw a 'family resemblance' between six kinds of relation, including composition, constitution, set formation, realization, micro-based determination, and grounding (Bennett 2017: 8-13). Bennett argues that these show enough resemblance to be unified and spoken about together. However, when using talk of 'building' she makes it clear that she is talking plurally about the relations just listed, rather than about a single privileged *Building* relation that deserves a capital 'B'. Bennett identifies three necessary and sufficient conditions for a relation to be a building relation. It must be '(i) *directed*, (anti-symmetric)[21] and irreflexive, (ii) *necessitating* (roughly, builders necessitate what they build), and (iii) generative, (builders generate or produce what they build). Built entities exist or obtain because that which builds them does (2017: 32). I follow Bennett's style of response to objections like that made by Wilson. A broad, umbrella notion is useful for being able to talk about many kinds of relations at once, but an umbrella notion like grounding or building should not be treated as a single privileged relation.

The broad umbrella notion that I recommend employing is 'ontological dependence', as opposed to grounding or building. The primary reason, is that I object to Bennett's inclusion of (i)- directedness and anti-symmetry, as a necessary condition of a dependence relation relevant to fundamentality. As will become clear, and argued for explicitly in chapter 2, I hold that synchronic dependence relations that are relevant to the world's fundamentality structure need not be an anti-symmetric set. Bennett includes asymmetry as part of her 'directedness' requirement: 'all building relations are directed in that they

[21] The set of all building relations being anti-symmetric means that each individual building relation must be asymmetric.

have an input–output structure; they take in some relatum… and spit out another' (2017: 32). I hold that such directedness need not be restricted to one direction. Using this 'input/output' analogy, an output may also be an input, producing an output which is identical to the original input.

It is for this key reason of preserving the possibility of symmetric dependence relations, that I choose not to talk in terms of grounding or building, which each have asymmetry as a necessary condition. 'Ontological dependence' is the neutral, overarching term I use for talking about the kind of synchronic dependence which structures reality, and is relevant to the fundamentality debate, since it is compatible with symmetrical instances.

There is one final point to make in this section regarding what kinds of dependence relations are relevant to fundamentality. This is to note that I take relevant ontological dependence to include both *existential* and *essential* dependence. In other words, if an entity is fundamental, then it cannot depend on another entity for its existence or for its essential nature - the properties that are essential to its identity. I will come to discuss how an entity's existence and nature are related, and how they are relevant to dependence, especially in chapter 3. For current purposes, it is enough to say that an entity must have independent existence *and* independent nature to qualify as fundamental.

It is here that I finish my introduction of the basics to do with fundamentality, foundational entities, and dependence relations, and how they have been treated by those working in contemporary analytic metaphysics. I have set up the background ideas needed for engaging with the rest of the thesis. In the following section, I continue with setting the scene, by introducing relevant context and concepts related to fundamentality from Buddhist philosophy. This pivot may strike the reader as jarring; however, it is useful to introduce some Buddhist material here as it will feature heavily in later chapters.

3. Svabhava

3.1 A Brief History of Svabhava in Indian Philosophy

At this point, I turn to the treatment of concepts relevant to the fundamentality debate from within the Buddhist philosophical tradition. The differences between the way the concepts have developed can reveal assumptions prevalent throughout the Western understanding of fundamentality, and provide alternative ideas that can help illuminate parts of discourse on fundamentality that remain unclear across the analytic tradition. Throughout the cross-cultural investigation that will be conducted across the coming chapters, I will examine and compare contemporary Western work on fundamentality and

the structure of reality, with insights from metaphysics of the Buddhist tradition. Similar to the potted history and illustrative survey of ideas conducted in §1.2, this section introduces some Indian philosophical context, and explores the changes in what has been regarded as the most important or fundamental feature of reality.

What makes an investigation into Buddhist philosophical history so interesting, is that the widespread dominance of foundationalism and priority pluralism are not reflected to the same extent as in the Western tradition. Instead, Buddhist philosophical history has been through periods in which alternatives such as priority monism, and even anti-foundationalism (according to some interpretations) have been favoured. This might mean that intuitions that favour pluralistic foundationalism are not universal and are perhaps better thought of as culturally relative. This provides good initial reason to take its alternatives seriously and put further work into investigating them. Whilst it is appropriate to acknowledge the danger of making such generalisations, it has been suggested (for example, in Ivanhoe 2017, 2018) that the history of Western metaphysics has been predominantly occupied with solving problems that come from how to understand connections in a reality that is fundamentally distinct. Instead, a significant amount of Buddhist metaphysical work has been about questions of how to divide up a reality that is fundamentally unified. Exposing such differences in metaphysical assumptions, can perhaps provide a more neutral starting point for an investigation into fundamentality and reality's structure. With this in mind, I will begin setting the scene.

3.1.1 Early Dualisms and Monism: Harmony Between Parts of the Natural World

Even within the earliest recorded philosophical thought in India that provides context for the development of the Buddhist tradition, we can see contrasts with the development of Western thought. As I remarked on in §1.2, prior to thinking that developed in ancient Greece, the majority of Western traditions believed in another plane which might contain deities, celestial beings and mythological creatures, that was thought to be 'ontologically prior' to what we observe in our world. In contrast, the ancient Indian Vedic tradition largely focussed on maintaining harmony and regularity in the realm we occupy, as a result of locating the most fundamental and important parts of reality in this world. The earliest known Indian tradition which can be dated back to 2000-1500BCE was a sacrificial tradition. Brahmin priests performed Vedic rituals directed towards *devas*[28], which were regarded a fundamental aspects of natural order (Hamilton 2001: 19), such as sun, rain, lightning and wind. These rituals formed parts of the earliest Vedic texts, and their performance functioned to keep the entirety of cosmic order in balance (Hamilton 2001:

[28] In this section and beyond, all untranslated terms are given in Sanskrit.

20). As such, it was natural to consider fundamentalia as contained within *this* world (Altman 1995: 4, 15).

The goal of maintaining cosmic order began to be thought of as achievable through another method. The practise of meditation, or the internalization of rituals through concentration, was thought to be able to bring about the same ends (Hamilton 2001: 27). This transition from outwardly performative methods of ensuring harmony, towards personal, inwardly reflective methods put *the self* in an important, central position of the picture. Person-centred rituals were recorded in the Upanishads (Hamilton 2001: 28), forming the final part of the Vedic canon. They began to be performed in order gain insight into one's true inner self, essential nature or *atman*, as well as in order to sustain harmony in the world (Hamilton 2001: 19; Patton 2008: xv-xvi). At this point, it might be thought that 'selves' were beginning to have fundamental status as much as the wider cosmos, which reflects an important idea in Indian philosophy. This is the idea of unity between the self and the cosmos- the unification between dual fundamentalia, which comes across in the Upanishads teaching that the *atman* is inseparable from all that there is. This idea is stronger than the claim that the self and the cosmos are dependent upon each other- it suggests that the two share the *same identity*. This is evident in the famous teaching, '*Atman is Brahman*'- the self is the same as the impersonal, absolute universe.

It is interesting to note here, that the response to the 'problem' (as it is presented in the West) of how to understand the relationship between dual fundamental domains- the mental and the physical- differed to the response preferred and popularised in the West. Across the Western tradition, it was often regarded that the most appropriate solution was to argue that either the mental domain, or the physical domain are more fundamental, by explaining one purely in terms of the other.[29] In contrast, the solutions preferred in Indian philosophy were to unify the two domains into one, rather than eliminate one of the fundamental domains. This is an example of the theme of unification, which runs throughout this potted history.

Such ideas of unity between the personal and the impersonal that were developing around 500 BCE, lead to metaphysical pictures of *oneness of being*, or *monism* (Hamilton 2001: 29-30). This was a stronger form of monism than the priority monism introduced in in §1.2. It can be understood more accurately as *existence monism* than as *priority monism*. The key difference being that the existence monist holds that the one whole is all that exists and all existing things *are one;* meanwhile, the priority monist holds that one whole is more fundamental than everything else that exists, and all things *depend on the one whole*.

[29] See section on *Dualism*, in §1.2.

The ultimate identification between all parts of the world was made compatible with our everyday experience of diversity and plurality, by offering the position that oneness constitutes *ultimate reality*, that underlies the *conventional reality* that we experience through perception. True understanding of the nature of reality could only be achieved through seeing past the illusion of plurality presented by the conventional world (Hamilton 2001: 31). This distinction between ultimate and conventional reality is one that appears frequently throughout Buddhism, which developed out of these earlier ideas. Characterising oneness and plurality in terms of conventional and ultimate reality puts the position expressed in the Upanishads more in line with an understanding of the world we perceive as derivative and mind-dependent, in contrast to oneness, which is ultimate, absolute and fundamental.

3.1.2 The Buddha's Teachings: Impermanence, No Self, and Co-dependent Origination

By the point of the birth of the Buddha, Siddhartha Gotama, around 485 BCE, there was a broad divide between two schools of thought (Hamilton 2001: 40). First, those who wanted to preserve the importance of the Brahminical ritual tradition, which could only be justified through a view of the world that committed to fundamental plurality. Committing to fundamental plurality means accepting the everyday world of diversity as the true, ultimate reality. Second, there were those who believed in personal meditative and ascetic practises as the true route to knowledge about the fundamental unity of reality, and who often renounced the authority of the Brahmin priests and social hierarchy that came along with the ritualistic tradition. The Buddha provided a 'middle way' between these two routes towards knowledge, that provided a new and unique insight into the true nature of reality (Hamilton 2001: 50).

The Buddha's core teaching of the four noble truths, known to him after his enlightenment, gives an insight into what parts of the world are deemed fundamental. The four noble truths tell us that 'unsatisfactoriness' is deeply rooted in all existing things, meaning that all beings are naturally led to disappointment and suffering. The disillusion that pervades the human condition is worsened by our instinctual attachment and clinging to things that we perceive to have permanence and intrinsic value. The only way of overcoming our natural state of suffering is by recognising and understanding the fundamental impermanence of all parts of the world, so that we refrain from becoming attached to things that are subject to the inevitable cycle of production and cessation.[30]

[30] For further exposition of the Four Noble Truths and their ontological implications. See (Hamilton 2001: 45-48; Oliver 2019: 61-65; Siderits, 2011: §2)

Such a view radically departed from those that dominated prior to the introduction of Buddhist teachings, which committed to either plural permanent parts of the world (Brahminic pluralism), or unchanging essential oneness (monism). The Buddha taught that it was ignorance of the fundamental truth of transience, that leads to dissatisfaction. By seeking our desires that aim for preservation and permanence, such as continuation of personal relationships, youth, or preservation of money or goods, we are inevitably led to dissatisfaction, since all things are ultimately impermanent.

Just as important as the Buddha's central teaching of impermanence (*anitya*), was his teaching of *anattā*, straightforwardly translated as 'no-self'. The teaching is perhaps better understood as the non-existence of any independently existing selfhood (Hamilton 2001: 51; Oliver 2019: 70). This was a direct denial of any self or soul being considered as fundamental, or independently existing. *Anattā* is perhaps the most important example of the Buddha's teaching of universal *co-dependent origination* or *pratītyasamutpāda.* As well as all things being understood as impermanent, the Buddha taught that all things are the product of other things, arising and ceasing due to their dependence and interconnection with other external conditions. Hence, nothing can exist with a completely intrinsic nature, independently from all other phenomena that surround it (Oliver 2019: 78; Hamilton 2001: 51-52). Therefore, according to some interpretations of fundamentality set out in §1.3, this would mean that no part of the world could be considered as fundamental- all things are derived, or arise out of dependence on some other entity.

3.1.3 Theravāda: Mereological Foundationalism and Compositional Nihilism

The Buddha's original teaching of three core doctrines, *anitya* (impermanence), *anattā* ('no-self') and *pratītyasautpāda* (co-dependent origination) persisted throughout the plethora of later Buddhist schools and traditions. The distinctions between these schools arose out of variations in interpretation and places of emphasis amongst these central teachings. The earliest philosophical and scholarly canonical development of the Buddha's teachings took place in Abhidharma schools, which flourished around the 2nd century BCE. Only one Abhidharma school still survives, which is *Theravāda* (The Way of the Elders). Abhidharma philosophers understood the Buddha's doctrines of impermanence and no-self in terms of *convenient designations* (Priest 2018: 128). One should think of a person in the same way as any impermanent inanimate object, for example, a chariot. A chariot is made up of parts that are constructed in a way that interact with each other and with the surrounding environment. They get used and worn out and eventually stop working and are replaced. The parts of people are no different. "We can think of this dynamically evolving bunch of parts as a single thing, a person; we can even give it a name, say 'Bertrand Russell'; but this is just a matter of convenience" (Priest 2018: 128). The Abhidharma school considered anything with parts, whether it be a person or an object,

to be dependent on its parts. They postulated that eventually there will come a point where composites cannot be deconstructed into parts any further. These ultimate parts out of which all things are constructed, were referred to as *dharmas* (Priest 2018: 128, Jones 2021:184). Dharmas were widely debated, but the most common view across Abhidharma schools was that dharmas are just as impermanent as everything else. Meanwhile, they are distinguishable from everything else by being independently existent, and possessing *svabhava,* a concept that I will thoroughly delve into in the next section, and will feature prominently throughout what is to come. For now, the concept of *having svabhava* can be loosely associated with being fundamental. The fundamentality of *dharmas,* regarded as the smallest possible parts that construct reality at the ultimate level is a form of *mereological atomism* (Priest 2018: 132). The phenomena we perceive in conventional reality are really collections of dharmas that are arranged in such a way that we recognise it under a designated concept. For example, a chariot is just a collection of dharmas arranged 'chariot wise'. In this way, the Theravada view regarding the non-existence of composites (in ultimate reality), can be compared with the analytic metaphysical position of mereological nihilism (Jones, 2021). Conceptualisation gives the Theravāda philosopher an answer to the to the question of when two parts compose to make a whole: their answer is that composition occurs at whenever a set of dharmas, or mereological simples, fall under some concept. These concepts, like that of a chariot, must be convenient designations that help us break down, understand and navigate the world that we perceive. "The objects of conventional reality are, then, those non-atoms delivered by the mereological principle of conceptually constrained special composition" (Priest 2018: 134).

3.1.4 Mahāyāna - A plethora of other positions

The reification of dharmas exposed the Abhidarmikas, including the Theravāda school, to serious critique from those who emphasise the lack of 'full-blown realism' as well as 'dependent origination' in the Buddha's earliest teachings (Hamilton 2001: 93). These critiques gave rise to a pan-Buddhist movement that began to flourish around the turn of the common era, known as *Mahāyāna* Buddhism (Oliver 2019: 26). Mahāyāna schools sought to set the Buddhist view of reality back in line with that taught by the original Buddha, and remain consistent with his core doctrine of dependent co-origination. The schools within Mahāyāna Buddhism were unified in their view that to take the idea that all things are co-dependent seriously, means rejecting the idea that anything can have its own individual essence, *svabhava* (Hamilton 2001: 93). As I will argue, this could also mean rejecting the existence of anything fundamental. They also emphasised, contrary to the Abhidharmikas, that the no-self doctrine should be understood as universally generalisable- it is not just humans that lack an essential nature or selfhood, but all phenomena that exist in conventional reality. They formulated this generalised no-self doctrine in terms of 'all things (*dharmas*) being empty *(śūnyatā)* of 'own-being' (*svabhava*)' (Hamilton 2001: 94).

Schools within Mahāyāna Buddhism included the Madhyamaka, Yogācāra and Huayan, all of which I will explore in greater detail in the coming chapters. My particular focus will be within the Madhyamaka school (followers of which are called Mādhyamikas), founded in India by Nāgārjuna (150–250 CE), who is widely regarded as one of the greatest and most influential Buddhist thinkers (Westerhoff, 2024). Nāgārjuna's ideas provide a unique and compelling alternative when it comes to fundamentality (or lack thereof, as I will argue). These later Buddhist schools developed across many centuries, both during the spread of Buddhism across central and East Asia, and during the decline of Buddhism in India. As a result, some schools which emerged, including Huayan Buddhism, were distinctively Chinese forms of Mahāyāna Buddhism, due to their influence from Confucianism and Daoism, each with their own metaphysical ideas about fundamentality.[32] Mahāyāna schools range in philosophical interpretation, across positions such as priority monism, idealism, and also commonly, *anti-foundationalism*.

It is at this point I will pause the sketch of the positions in the fundamentality debate that have been taken in Indian philosophical history, to reiterate the central observations, before discussing in more detail the Buddhist concept of *svabhava*. It seems reasonable to claim that the history of Indian philosophy has not been so heavily dominated by varieties of *priority pluralism*, when put in comparison with the history of Western philosophy. There is a greater emphasis on connections, integration and unity between phenomena which counteract forms of foundationalism based on divisions and deeps distinctions. The vast majority of positions that have enjoyed popularity in the West, including standard atomistic foundationalism, commit to multiple, distinct fundamentalia. In contrast, the history and context of Buddhist metaphysics emphasises the importance of interdependence, and questions the existence of discrete phenomena with 'own being' and their own independent, intrinsic nature.

3.2 Svabhava and its Interpretations

In this section I properly introduce the Buddhist notion of svabhava and examine its connections with fundamentality. I explore how insights from various interpretations of the term can be used resolve incomplete issues to do with the notion of fundamentality, such as the issue of self-dependence. Connections between the notions can be drawn out by comparing the ways that svabhava has been characterised, with the three kinds of characterisation of fundamentality set out in §1.3: being simple or minimal; functioning as reality's support; or being ontologically independent. Once I have shown that the ways that svabhava has been translated that can be compared closely with each of these

[32] I will discuss the influence of Daoist ideas on Huayan Buddhist metaphysics later in the thesis.

characterisations of fundamentality, I turn towards focussing on the differences between the notions of svabhava and fundamentality. It is only by separating the notions, that one can illuminate the other. I contend that enquiry into the further meanings and implications of svabhava can provide a unique insight into how to resolve some of the murky issues surrounding the notion of fundamentality.

Traditional translations of the term *svabhava* immediately relate it to the idea of ontological independence or self-dependence. Etymologically, the concept can be understood as 'inherent existence' or 'own nature' (Westerhoff 2007: 17) - 'svabhava… literally means '[its] own (sva) existence or being or nature (bhava)' (Ames 1982: 161). If something has svabhava, it has its existence and nature, seemingly from within. It does not depend on any other entities, surroundings or environment to be able to exist in the way that it does. Literal translations imply that things with svabhava neither *existentially* nor essentially depend on anything other- both their existence and their identity is inherent. 'They are what they are in and of themselves' (Priest, 2020). Priest explicitly links svabhava to both independence and simplicity- two of the characterisations of fundamentality set out in §1.3: 'Something that has svabhava is something which is what it is independently of anything else. It's kind of a metaphysical atom, if you like.' (2020).

Priest has also offered an understanding of svabhava as 'self-being', 'self-nature' (2020) or 'intrinsic nature' (Priest 2009: 467). These imply that things with svabhava do depend on something- they depend only on themselves. This is an issue I will return to shortly.

Other translators have linked the concept of svabhava with essence, (Garfield, 1995: 89) and with substance (Lopez,1987: 445–446). Such connections imply that possessing svabhava makes an entity amongst the foundations upon which the rest of reality is built, one of the building blocks on which all other things are ultimately constituted or dependent upon. It can exist in the way that it does, even if everything else was taken away. Recall, in the previous section, the Theravāda view that *dharmas* are entities that possess svabhava. According to Harvey, dharmas are identifiable by their possession of svabhava: 'they are dhammas because they uphold their own nature [sabhaava]' (2013: 97). Harvey's language, including 'uphold', implies that svabhava has a supportive role, which can be compared the characterisation of fundamentalia as ultimately supportive, discussed in §1.3.2.

Despite these clear connections that can be made between svabhava and the Western characterisations of fundamentality in §1.3, there are important nuances of svabhava which are useful to expound. In what follows I explicate the multiple meanings of svabhava by considering its usage in Buddhist text, and use these to clarify some of the issues left unclear by the existing notion of fundamentality. Westerhoff (2007) draws out multiple ways in

which svabhava should be understood, from commentaries by Candrakīrti, a key figure from the Madhyamaka tradition and commentator on Nāgārjuna's texts. I explore the two most important understandings - *substance svabhava* and *essence svabhava* below.[33]

3.2.1 Substance Svabhava

Substance svabhava is an understanding of svabhava most closely aligned with notions of metaphysical substance, and with possessing a certain position in a dependence structure. Substance svabhava is characterised by ontologically prior status - having primary existence (independence) as opposed to secondary existence (being dependent upon something else). 'To have svabhava means to exist in a primary manner, unconstructed and independent of anything else' (Westerhoff 2007: 6). An entity has substance svabhava if it could endure the removal of all other parts of the world, relying on nothing else for its existence and nature.

'Svabhava is not artificially created and not dependent on anything else.' (MMK Chapter 15: 2 Trans. Westerhoff 2007: 6*).* Substance-svabhava is the most common way that svabhava is used and understood within the work of Nāgārjuna, which I will discuss in detail in Chapter 4. Enquiry into the notion of substance-svabhava can shed light on the issue of whether fundamentalia are ontologically independent or self-dependent. The Madhyamika's use of substance svabhava arguably has the notion of self-dependence built in. The idea of a fundamental 'substance' implies that an entity that can exist independently, with its own intrinsic, self-producing and self-sustaining identity. Aitken (2021) supports this interpretation. She suggests that a Madhyamaka dependence structure could not include any reflexive dependence relations[34] since such relations would introduce svabhava of the kind that a Madhyamika would reject. "Madyamakas unequivocally affirm irreflexivity [of dependence relations], because being self-grounded [or self-dependent] is tantamount to having independent being" (2021: 15).[35]

A qualification that Aitken makes, is than an entity can be self-dependent, yet lack svabhava, if the entity is dependent on at least one other entity. Since the Madhyamaka rejects reflexive dependence, yet accepts cases of symmetric dependence (as I will show in detail in chapter 4), they will accept the possibility of dependence loops of non-zero length. Given that the Madhyamika rejects the existence of anything with svabhava, we can gather

[33] Westerhoff also presents a third understanding- *absolute svabhava*. However, he presents an argument to show why absolute svabhava should be understood as essence svabhava, and hence there are only two different senses of svabhava to be distinguished (2007: 26). Therefore, I stick to presenting and discussing just the two.

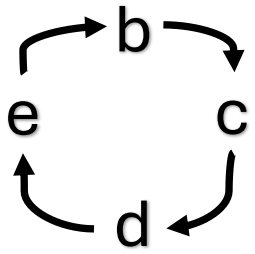
[34] Reflexive dependence implies self-dependence, since reflexive dependence relations hold between an entity and itself.

[35] Buddhist textual evidence for this comes from *Mulamadhyamakakarika* 3.4; 7.1; 7.8.

that svabhava is present in cases of reflexive self-dependence, but not in cases where dependence loops of non-zero length arrive back at the starting entity, which could be understood as indirect self-dependence. To illustrate, in Figure 2 below, (where D stands for 'depends on') entity [a] would be understood to possess svabhava, since it depends only on itself. Figure 3 is a case of a dependence loop that contains more than one entity. In the case of Figure 3, each entity [b], [c], [d], and [e] would not be understood to have svabhava. For example, despite [b] being something that [b] depends on, [b] does not have svabhava, since [b] also depends on [c], [d], and [e].

D[a, a]

Figure 2



D[b, c], D[c, d],
D[d, e], D[e, b].

Figure 3

This insight from Buddhist philosophy might be able to shed light on the unresolved issue in analytic fundamentality literature regarding whether self-dependence makes an entity fundamental. If svabhava resembles fundamentality, then this suggests that the difference between foundations and non-foundations turns on whether the entity depends on any other entity aside from itself. Ontological independence may be identifiable with pure self-dependence - dependence on no other entity apart from the entity itself. What is fundamental depends on nothing other than itself. This means that an entity being self-dependent is not a sufficient condition for being fundamental. Self-dependent entities must depend on no other entities in order to be fundamental. Fundamentalia would depend on themselves in a reflexive way without any other factors to mediate or interfere in their self-sufficient support. They play an active role in determining the existence and nature of themselves, without any other external influence.

3.2.2 Essence Svabhava

The understanding of svabhava in terms of essence was most commonly found in Buddhist literature from earlier than the Madhyamaka school. This sense of svabhava can be understood in a similar way to the possession of intrinsic, essential properties. An entity has essence svabhava if it has properties that are intrinsic and essential parts of its nature. The presence of such properties would give the entity an essential identity that does not depend on any other entity. Without these properties forming a part of the entity's essential nature, the entity would not maintain its identity. An example might be that contained in the essence of being me is the property of being human. My humanity may be understood as an intrinsic property.[36] It may also be understood as essential, since I would not be the individual entity that I am, if I lacked the property of being human. This would mean that humanity is a part of my svabhava.[37] In contrast, if I was to lack a contingent property, say the property of having brown hair, then it could still be said that I would remain the same individual. Having brown hair is not part of my intrinsic essential nature, or my svabhava.

Given the Madhyamaka school reject the existence of svabhava, we can understand that they reject the idea that any entity has any intrinsic, essential properties. This implies that all properties that exist are either contingent or extrinsic. For all properties, they are either (a) not attached to any substance in any modally necessary way, or (b) dependent on another external entity, in some way. I leave these ideas loosely sketched and imprecise for now. It is useful to briefly introduce them here so that they can be kept in mind, especially when approaching chapter 3, where I discuss them in detail.

Westerhoff explains how distinguishing between the two senses of svabhava, essence svabhava and substance svabhava, can help resolve a worry that occurs for the Madhyamika. The Madhyamika rejects the existence of svabhava altogether. The worry, is that the absence of svabhava (which I will come to talk about more in chapter 4) is contradictory. Westerhoff puts the problem like this: "Taking into account that substance svabhava is argued not to exist, whilst [the lack of svabhava] does exist, this view faces an obvious difficulty: as the lack of svabhava seems to have exactly the properties of substance svabhava. The absence of svabhava should both exist (since svabhava does not) and not exist (since it has the same properties as the non-existing svabhava). Emptiness (that is, the absence of svabhava) appears to be a contradictory concept." (2007: 22)

A solution to this problem that Westerhoff suggests, is to equate the absence of substance svabhava with the essence svabhava of all entities: "In the same way as the property of heat

[36] 'Intrinsic properties' will be explained and challenged in chapter 3.

[37] Any other essential properties that I might possess are also parts of my svabhava.

constitutes the essence svabhava of fire, emptiness, i.e. the absence of substance svabhava constitutes the essence svabhava of all things." (2007: 26). In this way, we can understand the absence of substance svabhava as less like an absolute, objective truth about reality, and more like a dependent feature of reality. "Emptiness [or lack of substance-svabhava] is a property all objects could not lose without ceasing to be those very objects" (2007: 26).

4. Concluding Remarks

This chapter aims to have introduced the notions that are discussed and utilised throughout the rest of the thesis, and set out the backgrounds of the debates within both European and Buddhist philosophy that I engage with in what is to come. I conclude by carrying forward a characterisation of 'fundamental' in terms of 'ontological independence'. This characterisation captures folk intuitions, and encompasses ideas to do with being both mereologically (and more broadly, ontologically) minimal.[38] It also encompasses a characterisation of 'fundamental' as ultimate support for the rest of reality. I have shown that insight from comparison with substance svabhava suggests that fundamental and ontologically independent entities can be reflexively self-dependent. In all cases, what makes an entity non-fundamental is its dependence on some entity other than itself.

This chapter also aims to have justified the way that my investigation of fundamentality draws upon Buddhist philosophy as well as Western philosophy. While Western metaphysics can be said to be foundationalist in its majority (in particular, committing to a plurality of foundations, understood as distinct entities), Buddhist philosophy has consisted of a wider variation of popular positions. These include monist and pluralist foundationalism, as well as *emptiness*, which, as I will come to argue, is best understood as a position of anti-foundationalist interdependence.

[38] Mereological minimality implies a lack of dependence on proper parts, and ontological minimality implies a lack of dependence on any kind of component, or any kind of constitutive property.

Chapter 2: Rocking the Foundations

In the previous chapter I gave an introductory sketch of the issues surrounding the concept of fundamentality, suggestions of what characterises a fundamental entity, and how comparing fundamentality with the concept of svabhava can illuminate unresolved issues. This chapter turns towards an assessment of positions within the fundamentality debate. I begin §1 by introducing *foundationalism*, and the commitments made by its most standard form. This is the position that has dominated and often been assumed across the history of Western philosophy.[39] This position makes three key commitments: to the existence of independent foundations, to the hierarchical structure of reality, and to an orthodox set of structural properties of dependence relations.

I will then set about critiquing each of these three commitments. §2 will address counterexamples to the orthodox set of properties of dependence, and make a case for accepting the existence of symmetric dependence relations. §3 Will show how accepting symmetric dependence opens up possibilities of dependence structures beyond just traditional hierarchy, and will assess the reasons we have for accepting or rejecting the existence of independent foundations. I will defend the position that fundamentalia are problematic, because they should be considered as more of a hinderance than a help to metaphysical explanation. §4 concludes the chapter, by recommending that we should revise assumptions that reality has a hierarchical structure. Commitment to hierarchy means accepting that dependence chains must either close with fundamental entities, or remain open, descending infinitely. Both of these options are problematic when it comes to explanation. Therefore, we have good reason to explore the prospects provided by alternatives, including an interdependent network structure.

1. Breaking the Rules of Standard Foundationalism

This section introduces the most popular, pervasive and perhaps even 'default' position (Tahko 2023: §3) in regard to fundamentality, especially across Western metaphysics: foundationalism. I will introduce the broadest, general form of foundationalism, before outlining the three core pillars of foundationalism's more refined 'standard' form.

To be clear, I understand the term foundationalism (in its broadest sense) to refer to any kind of view that makes one key commitment: the commitment to the existence of one or more fundamental, foundational entity(ies). The previous chapter recommended an understanding of fundamentalia in term of ontological independence. By adopting this

[39] See Bliss and Priest (2018: 1-2).

understanding, the foundationalist can be characterised as committing to one or more ontologically independent entity:

Metaphysical foundationalism: $Ex \wedge \neg Dxy$ (Where D is a dependence relation)

In words: There exists some entity, x, such that x depends on no other entity, y, for its existence or nature.[40]

To be a foundationalist in the broad sense, one only needs to commit to the idea that there is something(s) which is fundamental (Bliss and Priest 2018: 3). Many variations of foundationalism fit under this broad umbrella.

A stricter 'standard' foundationalist view is one such variation, which has received the most attention and support across the fundamentality literature (Bliss and Priest 2018: 2-3). The standard foundationalist account takes on the definition of fundamentality in terms of (some form of) ontological dependence, introduced in the previous chapter (§1.3.4). If a fundamental entity is ontologically independent, it is commonly thought to naturally reside at the end of a chain of dependence. These dependence chains are what structure reality, linking entities through *asymmetric* dependence relations. This is a typical foundationalist understanding, according to which ontological dependence relations hold between entities at different levels of fundamentality, producing a hierarchical structure which is ultimately supported by independent foundations. This most standard and orthodox form of foundationalism involves three key characteristics; asymmetrical dependence, hierarchy, and well-foundedness.[41]

1.1 Asymmetric Dependence Relations

Regardless of which way one prefers to regard the relations that underpin fundamentality, (for example, grounding, building, or ontological dependence) these relations satisfy a set

[40] I will clarify what I mean by 'existence and nature' in chapter 3.

[41] Bliss and Priest (2018: 2) present the standard account of foundationalism as making two further commitments: contingency and consistency. The contingency commitment is about the modal status of fundamentalia. In order to preserve the contingency of some parts of the world, the contingency commitment holds that fundamentalia are contingent entities, as opposed to necessary entities. Since fundamentalia necessitate the existence of all other derivatives, it seems that fundamentalia themselves must be contingent, in order for derivatives to preserve their contingency. The consistency commitment holds that whatever properties dependence structures have (for example, irreflexivity, asymmetry, transitivity), they have them consistently. Every instance of a dependence relation must share the same set of properties.

of commonly agreed upon conditions (Bliss and Priest 2018: 7).[42] These include *irreflexivity*- the condition that such a dependence relation cannot hold between an entity and itself; and *transitivity*- the condition that when entity [a] depends on entity [b], and when entity [b] depends on entity [c], then there will also be dependence between entity [a] and entity [c].

Perhaps the most important condition to draw attention to, which I will directly challenge, is that dependence relations must be *asymmetric*. This is the condition that dependence can only hold in one single direction between two entities. For example, if entity [a] depends on entity [b], then entity [b] cannot depend upon entity [a].

Figure 4

Figure 4 illustrates asymmetric dependence, since the dependence arrow between [A] and [B] only goes in one direction. According to the standard view of foundationalism, which commits to orthodox properties of dependence, such a dependence arrow could never be double headed (in order to represent two-directional dependence between [A] and [B]).

The conjunction of irreflexivity, transitivity and asymmetry produce linear chains of dependence, that connect more fundamental entities to less fundamental entities. The three orthodox dependence properties produce strict partial ordering between entities. The direction of dependence that connects entities in these chains can only go one way. This picture captures common intuitions, for example, if some complex phenomenon depends on more simple phenomena that constitute it, then these simple phenomena do not depend back upon the complex phenomenon that they constitute.

1.2 Hierarchical Structure

The structure produced by the conjunction of the many chains of dependence that relate entities, is one of hierarchy. Less fundamental layers of phenomena depend upon layers made up of more fundamental phenomena. This kind of structure may be familiar and attractive to naturalists. For example, naturalists might consider complex social sciences like economics and psychology, as dependent upon biology, which in turn depends on the more fundamental science, chemistry, and down still until we reach the most fundamental-physics or microphysics. Phenomena that occur within each of these fields might be

[42] See also Schaffer (2010), Rosen (2010) and Cameron (2008) for further examples that employ this standard set of structural properties of dependence.

thought to fit into the vertical hierarchy or 'pyramid' of relative fundamentality, as illustrated by Figure 5. Reality that is structured as a hierarchy contains multiple layers or levels of relative fundamentality.

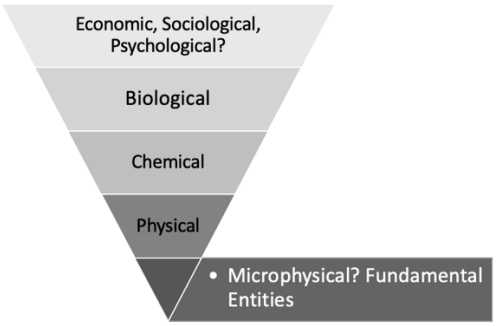


Figure 5: An illustration of what might lie at each layer of hierarchical reality.

1.3 Well-foundedness

The final central feature of standard foundationalism (and perhaps the most obvious) is the commitment to some final end to dependence chains.The proponent of standard foundationalism commits to some entity(ies) at the 'bottom' of the pyramid, which are the ultimate foundations that support the rest of the structure of reality. This can be considered the same as the single commitment that all kinds of foundationalism (in its broad sense) are required to make. A term commonly used to refer to this commitment, is that reality is *well-founded*. The foundations at end of dependence chains are regarded, under this understanding of fundamentality, as the only entities which are completely *independent.* They depend on no other step in the chain, or layer of reality for their existence and their nature. In this way, entities that are completely ontologically independent are regarded as the ultimate building blocks from which the rest of reality is constituted or derived.

The product of these three commitments put together is a picture within which some form of asymmetric dependence relations connect parts of reality, that together create a vertical hierarchy of layers that differ in their level of relative fundamentality. Each dependence chain terminates with an entity that is ontologically independent, which is one of the fundamental foundations that function to support the rest of the structure. Whatever plays this role at the fundamental level cannot be explained in terms of any other entity, or depend for its existence or nature on any other phenomenon. This standard view captures common intuitions about the existence of basic building blocks, upon which layers of more complex, more dependent things are structured. Linear chains of dependence are produced by orthodox properties of dependence (irreflexivity, asymmetry and transitivity). These linear chains of dependence together construct a hierarchy, with entities that are

more dependent higher up than those that are less, with fundamentalia residing at the bottom.

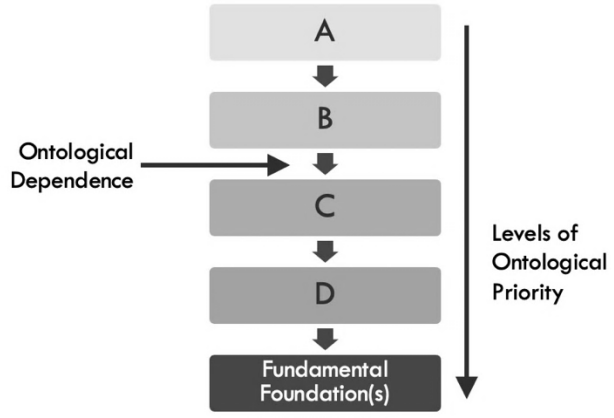


Figure 6.

The remainder of this chapter will address the reasons we have for rejecting the three commitments of standard foundationalism. §2 provides reasons for rejecting the asymmetry of all dependence relations. §3 provides reasons for rejecting hierarchical structure and for rejecting well-foundedness. Dispensing with all three of these commitments paves the way for the development of an anti-foundationalist account that features interdependence.

2. Rejecting Asymmetric Dependence Relations

2.1 Making Room for Alternatives to Orthodox Ontological Dependence

As already outlined, orthodox ontological dependence relations adhere to a set of rules that produce strict partial ordering. Traditional understanding of how dependence relations work is best illustrated with paradigm examples of dependence. Familiar examples include the physicalist claim: the mental depends on the physical; the mereological claim, the whole depends on its parts, or even the utilitarian claim, that facts about what is moral depend on facts about what maximises happiness. All such cases display three key structural properties; irreflexivity, asymmetry and transitivity. Take the physicalist claim to illustrate. The mental realm cannot depend upon itself, (it must depend on something else, i.e the physical realm). This relation is not reflexive. If the mental realm depends on the physical realm, then the physical realm cannot depend on the mental realm. This relation is not symmetric. If the social realm depends on the mental realm, and the mental realm depends

on the physical realm, then the social realm depends on the physical realm. This relation is transitive.

In this subsection, I show that there are no good arguments for the accepting the orthodox structural properties of dependence, that can be made prior to examining examples of dependence relations. I aim to show that these properties of dependence cannot be established as the result of intuition alone, or as the result of the connection between dependence and explanation, or the connection between dependence and priority.

Bliss and Priest (2018) are correct to highlight "that intuitions have been allowed to play the role they have in dependence/ fundamentality debates thus far is, in our view, why alternative views have been so poorly explored, and why actual arguments in defend of the view have been allowed to be so bad" (2018: 10). Aside from intuitions, there are two other convictions fuelling the dominance of the standard way of thinking about dependence. These are a) the commonly accepted connection between dependence and explanation,[43] and b) the commonly accepted connection between dependence and relative fundamentality or ontological priority.[44] An argument can be made that if dependence is intimately connected with these other notions, then they must share structural similarities.

An argument involving a) says that any explanation that violates the standard structural properties, for example, explanation that is reflexive or circular, is explanation that fails for being trivial. An explanation of an entity or fact that contains reference to itself cannot be considered a good explanation, because a good explanation must refer to something distinct or new to make any progress. A reflexive explanation is as unsatisfactory as responding to a question of 'why?' with the answer 'because it just is'. 'Given the tight connection between grounding and explanation, as it is a principle of explanation that nothing explains itself, it ought to also be a feature of dependence relations' (Bliss and Priest 2018: 11). Similarly, it is natural to think that explanatory relations must only hold in one direction between two distinct phenomena in order to be productive. If dependence is intimately connected with explanation, then dependence must also be irreflexive, asymmetric, and transitive.

Such an argument from shared properties between ontological dependence and explanation has multiple objections. First, it is not clear whether the connection between the two is close enough to warrant a justification for claiming that they must have identical structural properties.[45] There is still much disagreement over how to understand the link

[43] See for example, Rosen (2010), Audi (2012), Schaffer (2012), Thompson (2018), Trogdon (2018).

[44] See for example, Tallant (2013), Tahko and Lowe (2020), Tahko (2023).

[45] Note, also, that in the previous chapter I touched upon how this argument can be made in reverse. Whilst some argue for the orthodox structural properties of dependence from the connection between

between the two. For example, there is ongoing debate over whether metaphysical explanation should be considered an objective, unified and mind-independent notion (Brenner et al, 2021), and, given varying levels of explanation, whether it is most appropriate to be realist or anti-realist about metaphysical explanation (Thompson 2023).

Even if we do accept that there is a close connection between dependence and explanation, there have been recent arguments to the effect that explanation is doesn't always follow straightforward orthodox structure. For example, those such as Swiderski (2022) have highlighted that holistic explanation and understanding can only arise from relations that allow for loops and webs in their structure. I will draw upon these arguments in further detail later on.

Moving on to b), ontological dependence has been routinely tied to *ontological priority*, or the relation that produces differences in relative fundamentality, relating the fundamental and the derivative. Priority relations must adhere to the set of orthodox structural properties in order to produce a layered hierarchy of reality.[46] Therefore, as the argument goes, dependence must follow suit and work in the same way.

I take an argument from shared properties with priority to be hardly any justification for endorsing an understanding of dependence with orthodox properties. Such an argument simply assumes that reality is structured hierarchically.[47] If dependence is intimately linked to fundamentality structure, and dependence relations were to have different structural properties, then this might lead to a non-hierarchical picture. To assume hierarchy and the properties that produce it amounts to no justification for adopting orthodox dependence properties. This sentiment is echoed by Bliss and Priest (2018: 14): 'But exactly what the argument from relative fundamentality does not provide us with is a reason to suppose that the relation is anti-symmetric—it simply assumes it. One way to respond to the relative fundamentality argument, then, is to challenge the idea that we have reasons to suppose that reality is hierarchically structured in the first place'.

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dependence and explanation, others run the argument for there being a connection between dependence and explanation from them sharing structural properties. Both premise and conclusion are up for debate. I will discuss the connection between dependence and explanation in further detail later in this chapter, and again in chapter 7.

[46] This idea is challenged by Rabin (2018) who argues that the layered conception of reality can still be maintained, and perhaps even reached more easily, if we are to drop the commitment to one or more of the orthodox structural properties.

[47] Bliss and Priest (2018: 13) highlight that our strong intuitions in favour of hierarchy are hardly surprising, given it has been engrained in the sciences, art and theology up until the end of the nineteenth century, when scientific developments began pointing in a different direction.

Furthermore, Rabin (2018) discusses variation in ways that we might understand the link between dependence and fundamentality structure. He demonstrates that even with unorthodox dependence properties, hierarchical structure could still be maintained. Rabin offers the possibility that even if we possess a complete story of what depends on what, we must still do philosophical work to determine what is more fundamental that what.[48] We cannot simply 'read off' reality's layering from facts about dependence. He demonstrates this by recommending that a simple principle about the link between dependence and fundamentality be replaced with a slightly less simple principle:

"Simple principle: If x grounds [depends on] y, then x is at a lower level/ more fundamental than y."

[Should be replaced by:]

"Slightly less simple principle: If x grounds [depends on] y, and y does not ground [depend on] x, then x is more fundamental/ at a lower level than y". (2018: 42-43).

Rabin's slightly less simple principle addresses the possibility of cases of symmetric dependence, and the possibility of cases where entities exist at the same level of relative fundamentality. If such cases of symmetrical dependence are possible, then it is unclear where entities linked by symmetrical dependence fall in a hierarchical structure. By adding a caveat to the simple principle, Rabin concludes reality's structure is not *totally* ordered, but *partially* ordered. This means that not all entities must fall into different levels of relative fundamentality. Entities that fall on the 'pseudo same layer' of the structure, may be regarded as incommensurate, or on the same level, depending on whether they are linked by a symmetrical dependence relation (2018: 48). By accepting this qualification, the proponent of the layered conception that utilized ontological priority, may be able to accept changes to the orthodox structural properties of dependence. As Rabin puts it, 'having their (layered) cake and eating it too' (2018: 49). This further undermines the case for orthodox dependence properties. Justification for accepting the orthodox properties cannot come from the connection between ontological priority and ontological dependence.

In the absence of a good argument for why ontological dependence *must* follow the orthodox rules of irreflexivity, transitivity and asymmetry, what we are left with is the series of paradigm examples that are usually used to characterise dependence, which all adhere

[48] Rabin frames his discussion in terms of 'ground' rather than 'dependence', but his conclusions can be easily translated without any further complication into 'dependence' talk.

to the set of rules. I argue in the next section, that it is misleading to take this commonly accepted series of examples to represent *all* instances of ontological dependence.

2.2. The Possibility of Unorthodox Cases of Dependence

Recent metaphysical attention has turned to the question of whether all of the orthodox dependence properties must be present in *all* cases of dependence. As shown in the previous subsection, we lack a good argument for why dependence must always be constrained by the orthodox structural properties. The only justification we are left with for endorsing universal orthodoxy, is that all the paradigm examples we usually site in our characterisation of ontological dependence follow the orthodoxy. It is common to reason from these examples that the relation of dependence always obeys irreflexivity, asymmetry and transitivity. But, of course, this kind of justification can be easily undermined by the identification of counterexamples. Barnes (2018: 51) urges caution about using this kind of reasoning: "It is a mistake to reason as follows: Paradigm cases of F are f, therefore all cases of F are f".

Examples of cases that exhibit potential violations of irreflexivity, asymmetry and transitivity have been identified in recent work by Jenkins (2011); Barnes (2018), Thompson (2018) and Bliss (2014); and Schaffer (2012), respectively. Barnes notes that taken individually, such cases may not provide compelling reasoning for giving up on the orthodox attribute of dependence. However, "their dialectical force when taken together… is greater than the sum of their parts" (2018: 61). I follow Barnes' lead here, by claiming that if counterexamples are common across a range of areas of metaphysics, then this gives us reason for considering them seriously. If they are plausible, then the orthodox understanding of dependence shouldn't be assumed to be universal.

Of the three orthodox structural properties, there is one that has potential counterexamples that interest me in particular: asymmetry. There is a plethora of examples identified in recent literature, as well as some that I will add myself, that seem to be genuine instances of symmetrical dependence. It is these that I will focus on exploring in the next section.

2.3 In favour of Interdependence: Examples of Symmetric Dependence.

Before getting into the examples, I will briefly introduce some signs that have been thought to indicate that some case is a genuine case of symmetric ontological dependence. Barnes (2018: 56) identifies two characteristics that she takes to be indicators that ontological dependence is present: essence and explanation. She cites these characterisations of dependence in terms of essence and explanation by Fine (1995) and Schneider (2006) respectively:

"Essence: x depends on y just in case what it is to be x involves y (y is a constituent of some essential property of x)".

"Explanation: x depends on y just in case x exists, or is the way it is, *because* y is F".

Whilst staying neutral to which of these characterisations of dependence she adopts, Barnes suggests taking them as indications and motivate a potential account of symmetric dependence as a true account of symmetric dependence (2018: 57). A potential example of symmetrical dependence may also be supported if it can be shown to fit with a *hyperintensional* understanding of ontological dependence. A hyperintensional understanding allows us to distinguish between the claims that x cannot exist without the existence of some other y, and the claim that the x cannot exist *in the way that it does*, without y existing*, in the way that it exists in the actual world*. With these indicators in mind, I begin with some everyday examples of symmetrical dependence, familiar to anyone regardless of philosophical or scientific inclinations or background. I will then go onto explore cases from multiple areas of metaphysics, physics and philosophy from beyond the analytic tradition.

2.3.1 Everyday cases

I start with a case suggested by Bliss and Priest:

"Consider… the relationship between the north and south poles of a magnet: without the north pole, the south pole would not exist and without the south pole, the north pole would not exist" (2018: 14).

It is difficult to deny this straightforward example is a genuine case of ontological dependence, in the sense it is understood by all those endorse and employ the orthodox conception. It can be understood as hyperintensional: the north pole cannot exist *in the way that it does*, without the south pole*, in the way that it exists in the actual world*. Bliss and Priest's example also satisfies both of Barnes' criteria: it is true that both what it is to be a north pole involves a south pole (and vice versa), and that a north pole is the way that it is because the south pole has certain magnetic properties (and vice versa).

An equally straightforward, compelling case of symmetrical dependence comes from Thompson:

"Consider the propositions A = <B is true> and B = <A is true>. Assume that both propositions are true. In this case, the fact that A is true depends on the fact that B is true and vice versa" (Thompson 2018: 111).

This example differs in ontological category- it refers to dependence of facts rather than physical phenomena like magnetic poles. Both facts A and B exist in the way that they do (exist as true facts), in dependence on each other's existence and nature. The truth of both facts is dependent upon each other's context. Hence, this example also satisfies the criteria outlined above.

Barnes (2018: 60) introduces another everyday case useful for supporting symmetrical dependence, involving a third different ontological category. Her example involves *events*. Take the case of the event of WWII and the event of the evacuation of Dunkirk, that took place within WWII. Barnes suggests that it is plausible to think that WWII would not have been the same event it was if it were not for the evacuation of Dunkirk- the evacuation made the war the war that it was. Meanwhile, the context of the larger event of WWII is essential for the evacuation of Dunkirk. The event would not be what it was without its wider context. Barnes highlights that if the event ontologist wants to accept both the claims that the larger and smaller events were essential for each other's nature, then they must accept that this is a case of symmetric dependence. . "The two events- WWII and Dunkirk- each depend on each other to be what they are" (2018: 60). Again, with this example, it is clear to see how it satisfies both indicative criteria of essence and explanation

Other examples are available. Take perhaps, the French Revolution and the rise of Napoleon. Arguably, the revolution depended on Napoleon's part in it to be the event it was. Equally, Napoleon could not have risen to power in the way that he did were it not for the context of the revolution. Another more modern example might be taken from the 2020 pandemic. There is a case to be made that the social and political behaviour at the time, involving lockdowns and social distancing rules, was dependent on the rate of spread of the Covid-19 virus. Simultaneously, the rate of the spread of the virus was dependent on social and political behaviour. Each of these might be thought of as recognisable cases of ontological dependence, where each event involves or explains the other.

If the reader is, at this point, finding themselves searching for alternative explanations on a case by case basis, then I offer the reminder that the intention behind this section is to treat the large body of cases as evidence for symmetric dependence, *when taken together*. Having given these pre-theoretical cases, I now turn our attention to cases drawn from metaphysics, and a more post-theoretical posture.

2.3.2 Metaphysical cases

Barnes (2018) offers a number of examples, each attached to popular positions in metaphysics. They each rely on prior sympathies in favour of particular metaphysical positions, yet each position is independently plausible. The first is a straightforward case

of universals and their instances. The Aristotelian position holds that universals are intimately bound to their instances, so that it is impossible to have an uninstantiated universal. Part of what it is to be a universal is to have instances. It is also common to accept that universals are instantiated *essentially,* so that 'for any x that is a member of kind K, part of what it is to be x is to be a member of K' (Barnes 2018: 56). If both of these claims are true, then we have symmetric dependence. If 'being a fruit' is taken to be a universal, then that universal is dependent on there being apples, grapes and raspberries. Meanwhile, the apples grapes and raspberries are dependent on their membership to the kind 'fruits'.

Another example is taken from Armstrongian metaphysics involving states of affairs and their constituents. Armstrong (1996) faces the dilemma of which direction dependence goes between states of affairs and their constituents. For example, is the state of affairs that 'the apple is red' dependent on the apple and the universal of redness? Or is the apple and the redness dependent on the state of affairs of the apple being red? Armstrong's metaphysical project involves finding an ontology of facts in terms of states of affairs. So, for his own ambitions, he needs to deny asymmetric dependence in the first direction. If he were to accept the second direction of dependence, then he encounters a problem involving how to account for resemblances between states of affairs. For example, the state of affairs of today being sunny, and yesterday being sunny implies that today and yesterday have something in common. But if states of affairs are ontologically prior, then we cannot explain this commonality in terms of particulars (today and yesterday), and universals (like being sunny). Barnes (2018: 57) suggests that the most promising solution to Armstrong's dilemma is to embrace symmetrical dependence. This allows Armstrong to have his fact-based ontology whilst being able to respond to the resemblance problem.[49]

Continuing with the idea that symmetric dependence might provide a way out of dilemmas, I propose it may be able to help the theologian out of Plato's famous Euthyphro dilemma. As the modernised version of the dilemma goes, those who believe in an omnipotent God must choose between accepting either that a) goodness is dependent upon God's will, or b) God's will is dependent upon what is good.[50] As the dialogue goes, both horns are considered to be problematic. In case a) morality seems arbitrarily

[49] Note, that Armstrong himself treats states of affairs as prior to their constituents and uses this to account for truths and truthmaking. The suggestion of dependence holding in the opposite direction is a suggestion by Barnes (2018), that allows for a response to the resemblance objection.

[50] Correia and Shneider support an interpretation of the Euthyphro dilemma in terms of *grounding* (2012: 2-4). In Plato's dialogue, '[Socrates] wants to be told the aspect *by* which, or *in virtue of* which, a pious thing is pious. The Socratic question, hence, aims at the *ground* of piety.' They note that during the dialogue, Plato implicitly assumes that the notion 'because', or as they put it, 'grounding' behaves *asymmetrically*. It is this assumption that gives rise to the dilemma. Something cannot be both pious because it is loved by the Gods, and loved by the Gods because it is pious.

dependent upon whatever God wills, meaning it would be morally good to kill, if God willed it. In case b) it is a problem for theists that there is some standard of goodness 'above' God, that God must refer to. Perhaps the most appropriate way of addressing the worries attached to both of these horns, is to accept symmetric dependence between God and goodness. Whatever God wills is dependent upon a moral standard of goodness, meanwhile this standard of goodness is dependent back on God. Symmetrical dependence allows for the prevention of undermining God's power, whilst maintaining the idea of an objective moral standard.

The penultimate metaphysical example is another that stems from uncertainty about which direction traditional asymmetric dependence should take. Schaffer (2010) uses an example to motivate the reversal of the direction that dependence is usually understood between wholes and parts. We commonly think of wholes as 'mere heaps', dependent on their parts. Schaffer argues that in cases of 'integrated wholes', it is instead more intuitive to think of parts as dependent upon the whole. For example, in the case of an organism and its organs, it is more natural to think that the organism is prior to its organs, since 'the organs are defined by their functional integration within the organism' (Schaffer 2010: 47). Not all cases have such a straightforward answer, when it comes to the direction of priority between wholes and parts. Symmetric dependence may be used to resolve such cases where it seems genuinely unclear which direction an asymmetric dependence relation would hold between wholes and parts.

A borderline case where it is unclear if we are dealing with a 'mere heap' or 'integrated whole', is Schaffer's (2010: 1) case of a circle containing two semi-circles. Schaffer claims that intuition clearly tells us that the circle is 'prior' to the semi circles, implying that the semi-circles are dependent, because the semi-circles are arbitrary abstractions of the circle, and can be drawn at any angle. Equally, it could be claimed that the circle as a whole depends upon the composition and presence of both semi circles. To push this borderline case further, imagine that the circle is drawn on a blackboard, and a semi-circle within it is filled in with white chalk. The contrast in colour that makes the semi-circles more distinct may fuel the intuition that the circle is dependent on the two semi-circles. Again, the example can be adapted slightly, by imagining that the line between the white and black semi-circles is smudged on the blackboard. This may push intuitions back in the other direction, so that now the circle seems prior to the semi-circles. Symmetric dependence may be able to resolve cases where we have conflicting intuitions, or lack intuition altogether, as to whether a whole is integrated or a mere aggregate, and as to which direction asymmetric dependence should hold between wholes and parts. In cases that are unclear, such as the one described above, the solution may be to accept that dependence can hold in both directions.

Last of the examples that hangs on pre-held metaphysical positions, is one which might be most widely compelling. If we are inclined to accept any form of structuralism, then this is likely to involve acceptance of symmetric dependence, due to the holistic style of explanation that structuralism embraces. Barnes focuses on presenting mathematical structuralism as an example that exhibits symmetric dependence (2018: 66). This is broadly the idea that numbers are nodes or positions in a mathematical structure. The number 4 depends on its place within numerical structure, since it is dependent on 3, 5, 8, and every other node in the structure. Equally, the number 5 is dependent the number 4, making the relation between 4 and 5, as well as every other pair of numbers, symmetric. Similarly, ontic structural realists like Ladyman and Ross (2007) hold that all objects or entities are nodes in a structural network of physical dependence relations, that can be symmetric. The possibility of such structuralist metaphysical positions requires the possibility of symmetric dependence. Their popularity and plausibility, especially in the case of mathematical structuralism, gives us reason to take symmetric dependence seriously.

2.3.3. Cases from Physics

A case to illustrate that *partial* dependence may violate asymmetry is presented by Thompson (2018), who considers the interdependent dimensions of mass, density and volume of any given liquid. She justifies the understanding of the relationship between these three dimensions as one of dependence, as 'each of the parameters seems to have the value it does in virtue of the other two parameters' (Thompson 2018: 111). Each of the dimensions is a partially dependent on the other two as well as itself, given an understanding of dependence that is transitive. She argues that if we accept that these three parameters are interrelated through ontological dependence, then we must accept that partial dependence is not asymmetric.

Taking the example of interdependent dimensions further, Rowlands (2013) suggests that the best way of understanding the most basic physical parameters of the cosmos is through symmetric dependence. He argues that *space, time, mass and charge* are interdependently related, possessing symmetry as a group of four. It is possible to read off symmetric dependence between time and space from Einstein's (1905) discovery of the structure of spacetime. Einstein showed that we should reject the idea of 'absolute simultaneity', and accept that the simultaneity of any two events is relative to the spatial distance between the events occurring. This means there is no collection of events in the universe which exist 'now'[51], supporting an intimate connection between time and space. Space does not exist independently from time. Meanwhile, the relationship between space and time cannot be reduced to one of identity, because this would prevent the parameters from being

[51] Apart from, perhaps, events occurring at the same point in space.

analysable in terms of one another. Rowlands also highlights that it must be a mistake to treat space and time as identical, because of facts such as space is observable, whereas time is not. Rowlands suggests the best alternative to describing their relationship as neither independent nor identical, is to describe it as symmetrically dependent, or as a 'duality'.

Another key example from philosophy of physics, that I will say much more about in the next chapter, is the possibility that quantum entanglement demonstrates a physical case of symmetric ontological dependence. Such a suggestion is put forward by Calosi and Morganti (2018) who argue that quantum entangled systems are characterized by symmetric relations of ontological dependence among the component particles. The kind of quantum phenomena Morganti and Calosi focus on, is what Einstein described as 'spooky action at a distance'. This is when a particle on one side of the cosmos can be entangled with another on the other side, so that when it is observed and its properties get determined, its properties are correlated with properties of the particle it is entangled with. Such a connection involves instantaneous determination of both particles involved in the entangled state, ruling out the possibility that a causal signal travels from one to the other, responsible for producing the correlation. The connection between two entangled particles must be one of synchronic ontological dependence, as opposed to diachronic causal dependence. Such cases involve genuine entanglement of the kind that Calosi and Morganti focus on, where there are significant non-local correlations between particles, that violate some form of Bell inequality, and hence present a modal connection. A paradigm example of this kind of genuine entanglement is that of a simple singlet state, where '[when measuring] spin up for the first particle we will necessarily measure spin down for the second' (2018: 3). [52] Morganti and Calosi highlight that, in this case, a modal claim is made. According to Hume's dictum, there cannot be modal connections between distinct or independent entities. Hence, the relationship between particles in an entangled singlet state cannot be one of independence. Calosi and Morganti suggest that the best way of understanding the relationship between entangled particles is through ontological dependence. If entangled entities are related by symmetrical ontological dependence relations, then this means that when particles enter into genuine entanglement, they do not have independent complete sets of objective properties. Instead, they depend on one another with respect to their qualitative profiles. Calosi and Morganti go on to argue for why this interpretation of quantum entanglement in terms of symmetrical ontological dependence has benefits over alternative interpretations. They argue that it is preferable to explanations in terms of holism (where the components of an entangled state as parts depend on the entangled state as a whole), and in terms of structuralism (where the components of an entangled state are dependent on the physical structural relation that

[52] I introduce this kind of case briefly here, but I will say much more on the topic in chapter 5.

holds between them). It is worth briefly introducing these arguments here, as I will say much more about them later on- especially in chapter 5 and 6.

At this point, I have introduced numerous examples that display the features needed to be regarded as cases of symmetric dependence. As a reminder, the purpose of this investigation into the existence of cases of symmetric dependence is to raise doubt over one of the key commitments made by standard foundationalism. If even just one of the cases explored in these sections is a true case of symmetrical dependence, then this provides a counterexample to undermine the foundationalist's commitment to the asymmetry of all dependence relations. I have shown so far that there are multiple counterexamples to asymmetric dependence that can be identified from everyday occurrences, and phenomena studied by metaphysics and physics. Taken together, these provide us with substantial reasoning for revising the commitments made by those who endorse standard foundationalism.

In the previous chapter, I made the suggestion that standard foundationalism and commitment to fundamentalia may be more widely prevalent within Western philosophy, when compared with the history of Buddhist philosophy. The following section introduces examples of cases of symmetrical dependence found in Buddhist philosophical thought, as well as Daoist ideas that influenced Chinese forms of Buddhism. Discussion of these cases is intended to strengthen the doubt cast over foundationalist comments further, as well as set the scene for some comparative comments to be made between cases. I will argue that the differences between the kinds of cases of symmetrical dependence between traditions, can go some way to explaining the differences in popularity of foundationalism between traditions in §2.2.4.

2.3.4 Cases from Buddhist and Daoist philosophy

Before making reflective comments on the cases explored thus far, I will introduce a final set of possible cases of symmetrical dependence that have been highlighted within Buddhist literature. Modern Buddhist commentator, philosopher and monk Thích Nhất Hạnh provides multiple potential examples of symmetrical ontological dependence from biology and the natural world, as part of his commentary on the Heart Sutra (2012). To begin, take the example of a tree and its leaves. The leaf depends on the tree, and the tree is dependent on its leaves:

'The sap that the roots take up is only water and minerals, not good enough to nourish the tree, so the tree distributes that sap to the leaves. The leaves take the responsibility of transforming that rough sap into refined sap and, with the help of the sun and gas, sending it back in order to nourish the tree. Therefore, the leaves are also the mother to the tree.

And since the leaf is linked to the tree by a stem, the communication between them is easy to see.' (2012)[53]

In a similar way to a living organism like a tree depending on its parts like its leaves for its continued existence, and vice versa, we can observe this phenomenon in other living organisms like the human body, symmetrically depending on its internal organs. For example, as Thich Nhat Hanh observes, "the lungs take in air and enrich the blood, and, in turn, the blood nourishes the lungs. Without the blood, the lungs cannot be alive, and without the lungs, the blood cannot be cleansed" (2012).

Biological systems like trees and bodies are, in the words of Schaffer, more like 'integrated wholes' than 'mere heaps', where working functions are produced by a complex collection of interdependent parts that enable each other to produce and sustain life. Similar to Schaffer's 'semi-circle example' discussed above, I suggest that biological systems are examples of symmetric dependence between wholes and parts. The whole body could not exist and function in the way that it does without its parts, and the parts would not be able to exist and function in isolation from the whole body.[54] Thích Nhất Hạnh takes the example of human bodies further, to suggest that all five essential elements of humans (the five *skandhas*) are also interdependent. The five skandhas include both physical and mental phenomena (form, feelings, perceptions, mental formations and consciousness). Each of these cannot maintain existence, or continue being what they are, in the absence of the other four. This includes the mental and the physical. Mental phenomena depend on the physical (change the brain chemicals, you change the perceptions and mental formations), whilst also physical phenomena depend on the mental (physical wellbeing can depend on mental wellbeing, for instance).

The mental and physical might be one example of many interdependent dualities recognised widely across Chinese philosophical traditions. Daoist metaphysical ideas heavily influenced Buddhist thought upon Buddhism's arrival in China, complimenting each other when it comes to interdependence. The Daoist philosopher is already very familiar with the idea of harmonious dualities, that can be understood in terms of symmetrical dependence. The Chinese concept of yinyang captures all cases of 'opposing' dual forces that are interconnected, to produce and depend on one another. Classic examples include light and dark, hot and cold, expanding and contracting. The concept of yinyang has been described as "monistic-dualism" (Pratt, 2015: 3), as a way of capturing

[53] The commentary can be accessed at https://www.lionsroar.com/heart-sutra-fullness-emptiness/

[54] Here, the reader might worry about some body parts being more 'essential' than others. For example, arguably, the body as a whole would remain existing as a body an enduring nature, even if the body lost a limb. Of course, this is not the case if the body lost a vital organ. I will address the issue of being 'essentially dependent', and what it means for an entity's nature to endure over time, in detail in the following chapter.

the idea that any two things related by yinyang are neither completely distinct nor completely identical- they must be intimately connected through some form of metaphysical dependence. This dependence cannot be understood to be asymmetric, and neither side of the duality can be regarded as 'metaphysically prior'. There is no difference in priority between, say, light and dark. Both are essential for each other to exist in the way that they do, and for explanation in terms of one another. Being simultaneously unified and dualistic is considered a productive paradox by the Daoist tradition. The traditionally perceived inconsistency between being both unified and distinct might be resolved if we are to understand the relationship between such dualities as one of symmetric dependence.

In Daoist metaphysics, yin and yang are understood as dual forces or 'vital energies', which arise from a unified ultimate source- the Dao. The interplay between vital energies (*qi*) is what is responsible for the dynamic flow and change in conditions of the world (Wang 2011: 22). These can be thought of like the magnetic forces of attraction and repel, which push and pull parts of the world to produce change. Such phenomena have often been interpreted in terms of *the priority of wholes over parts.* Dynamic systems that are influenced by both forces of yinyang, can be regarded as integrated wholes which are greater than the sum of their respective parts. Such an interpretation implies parts asymmetrically depend upon wholes. However, Buddhist discourse emphasises that interdependent entities should not be considered as unified.[55] Instead of showing that parts asymmetrically depend on wholes, examples of interdependent phenomena might be interpreted as demonstrating that parts can symmetrically depend on other parts.

2.3.5 Comparative comments on the cases explored

Buddhist metaphysical discourse that emerged through interaction with Daoist ideas, emphasises the importance of cases of symmetrical dependence for being able to holistically explain the two-way connections between parts of the world. It could be argued that the cases covered in the previous section regard more common and pervasive phenomena as symmetrically dependence, in comparison with cases from Western philosophy, which might be regarded as more anomalous. Accordingly, the idea of symmetric dependence might be more familiar to those who have been trained in Daoist and Buddhist traditions, compared with those trained in the Western analytic tradition.

The broad survey of cases in this section is intended to have shown that a) there are a wide range of cases that cast doubt over the asymmetry of all ontological dependence relations; and that b) The intuition that leads us to favour asymmetric dependence is not as universal as it may seem. Acceptance of cases of symmetrical dependence may be more common if

[55] I will come to demonstrate this when discussing *emptiness* in chapter 4.

we look beyond Western philosophy. This suggestion is made in a similar way to the suggestion in Chapter 1, that the dominance of foundationalism should not be considered as universal as it may initially seem.

Those more familiar with Asian philosophy might be more inclined to accept putative examples of symmetric dependence that the analytic philosopher might not. The reason why is important for the development of my anti-foundationalist account, and has to do the dependence of what is *essential* to an entity. So far, the examples explored in this chapter have involved mutual dependence for properties that seem *essential to the identity* of each relata. The examples have been presented in such a way as to stress that the phenomena they involve are dependent on each other *for some essential part of their identity*. In this way, they are intended to be convincing to any reader, regardless of the tradition they were trained in. There are further potential examples from within Buddhist texts that may not strike the Western reader as examples in which two phenomena are essential for the maintenance of each other's identity.

I propose that this disparity might be the result of a difference in the pervading understanding of essential properties and identity. Properties that may not seem essential to the Western reader might be regarded as playing a more important role in Buddhist metaphysics. Highlighting this point about what is regarded as essential to the identity of an entity sets up the discussion of this topic at length in the following chapter. To illustrate this difference in intuitions about essential properties, consider the following example, that likely strikes the Western reader as outlandish:

"If the cosmos exists, then the smallest speck of dust exists.
If the smallest speck of dust doesn't exist,
then the whole cosmos doesn't exist." (Thích Nhất Hạnh, 2012)

The reaction that the Western reader is likely to have, that the cosmos as a whole does not depend on a small speck of dust, is from an intuition that the speck of dust is not essential for the cosmos to exist. The cosmos' identity can endure the loss of a small speck of dust.[56] However, the reader might be more inclined to agree that the cosmos' identity *does* depend on something *more essential*, like light or gravity. If this is the case, then the cosmos, (or anything else for that matter) depends on some things that are essential for identity, and does not depend on other things that are not essential. The issue of how to tackle the question of what is essential and what is non-essential to the existence and identity of any entity is the focus of the following chapter.

[56] There might be philosophers working in the Western tradition who accept a strict and literal sense of identity, who, for this reason, may naturally accept the dependence of the cosmos on the speck of dust. I will discuss this position in Chapter 3.

For now, I will highlight that the Buddhist philosopher might be most likely to respond to this issue, by saying that *all properties of any entity are essential properties*. If an entity were to lose or change any of its properties, regardless of how (in)significant they might seem, that entity ceases to be the same as it was prior. This thought is supported by the core Buddhist doctrines of universal impermanence and co-dependent arising which will both be properly explained in chapter 4. For now, it is enough to highlight that together, these doctrines suggest that there is nothing that is intrinsic to an entity's identity, and there is no part of any entity that has identity which endures through time. For this reason, the Buddhist might be more likely to accept a strict and literal sense of identity, and the idea that all properties of an entity are essential, and relevant to its dependence.[57] I defend this idea properly in the next chapter.

3. Rejecting Hierarchy and Foundations

1.1 The Possibility of Alternatives to Hierarchy

At this point in the chapter, I move on from my discussion of symmetric dependence which was aimed at challenging the first of the three commitments made by those who endorse standard foundationalism. Recall, three core commitments of standard foundationalism in the way I presented it in §2.1: Asymmetry of dependence relations, hierarchical structure, and well-foundedness.

§2 provided counterexamples to show that not all ontological dependence relations are asymmetric, holding only one way between two relata. Undermining this constrain on dependence relations means opening up new possibilities for the structures that dependence relations can create, beyond only a hierarchy. A hierarchical structure of reality is the product dependence chains that follow strict partial ordering. Dropping the commitment to the asymmetry of dependence relations means that they no longer must form a strict partial order, or produce chain-like structures. Instead, the possibility of symmetrical dependence opens room for the possibility of dependence loops, circular structures, or complex web-like structures. For an illustration of the difference made by accepting the possibility of symmetric dependence relations, compare the dependence structures represented by figures 7 and 8.

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[57] In previous parts of my project, I refer to an entity's *nature*. By 'nature', I mean a complete collection of properties that an entity possesses. The reason for opting for talking terms of 'nature' rather than 'identity' is to push the idea that all properties are 'essential' in some way, to make an entity *what it is*. If an entity were to change any of its essential properties, then it would change its identity; similarly, is an entity were to change *any* of its properties, then it would change its nature.

Figure 7: A simple structure containing only asymmetric dependence relations

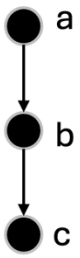
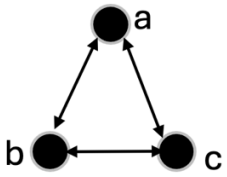


Figure 8: A simple structure containing only symmetric dependence relations.



Whilst the result of rejecting asymmetrical dependence includes the new possibility of dependence structures beyond just chains or hierarchy, at this point, we have no reasons for favouring one kind of structure over the other. Therefore, I proceed to tackling the third of the foundationalist's commitments, and perhaps the most important[58]- the commitment to the well-foundedness of reality's structure. The reasons I explore for preferring a non-well-founded structure over a well-founded structure motivate pursuing alternatives to hierarchical structure.

3.2. Fundamentalia and Complete Explanation

The commitment to well-foundedness can be broadly characterised as the commitment to the termination of chains of dependence. Therefore, well-foundedness can be understood as the commitment to the existence of one or more entities that do not depend on any other entity (Tahko 2023: §2).[59] According to the definition of fundamentality endorsed

[58] Recall, third commitment of standard foundationalism – commitment to some fundamental foundation- is one that is necessary and sufficient for all forms of foundationalism, in its general sense.

[59] Whilst I am using a heavily simplified notion of well foundedness here, Tahko (2023: §2) and Bliss and Priest (2018: 6) note many complications with the notion. For example:

- Tahko (2023: §2) points out that many authors (Schaffer 2010: 37; Bennett 2011: 30; Tahko 2014: 260) have characterised well-foundedness in terms of grounding. For instance, well-foundedness may be the requirement for grounding chains to 'bottom out' in something that is 'ungrounded', or may be understood as 'a ban on infinite chains and cycles of grounding'.
- There is some confusion over use of 'well-foundedness and the presence of a 'lower bound' within the literature. Here I am using 'well-foundedness' as if interchangeable with the presence of a

in chapter one, an entity that does not depend on any other entity is a fundamental entity. This part of the chapter will address the reasons we have for and against committing to ontologically independent fundamentalia or foundations.

Both Tahko (2023: §3) and Bliss and Priest (2018:17) highlight that despite a view of the structure of reality that possesses foundations being the default view, there are surprisingly few arguments in defence of well-foundedness in the literature. Both also highlight that most common defences of the commitment to foundations appeal to intuition. Since it seems that intuitions regarding foundationalism are culturally relative, further reasons are needed to justify endorsing well-foundedness. These further reasons are also needed to be able to respond to challenges from the anti-foundationalist.

Besides intuition, the foundationalist may defend their position using arguments concerning *explanatory necessity* and the *threat of vicious regress*. As noted earlier in the chapter, a connection is frequently drawn between fundamentality and metaphysical explanation. This is one reason why dependence relations are traditionally thought to follow strict partial ordering. Proponents of foundationalism have suggested that positing fundamentalia is the only way of achieving complete metaphysical explanation. Fundamental entities represent a point where chains of explanation must end, and a metaphysical picture is completed.

Rejecting the termination of chains of dependence, or rejecting the existence of ontologically independent entities, comes with concerns about vicious infinite regress, both of dependence, and of explanation. A simple justification for the foundationalist's position comes from the necessity for chains of dependence to terminate in something fundamental, or else derivatives would not be able to exist, and the reality we observe would not be able to be explained.

There are those who consider the relationship between dependence relations and explanation to be one where the latter *tracks* the former (Bliss and Priest 2018: 5, Tahko and Lowe 2020). There are also those who regard the relationship to be a stronger one of identity, so that metaphysical dependence relations *are* metaphysical explanatory relations (Thompson 2018). I will not offer an input to the debate about how close the connection

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'lower bound'. However, Bliss and Priest (2018: 6) offer a distinction between the two. Well-foundedness requires both the presence of a lower bound, and a 'finite number of steps between any member of a chain and the fundamentalium that it terminates in'. A chain that has a lower bound may ascend infinitely.

- Tahko (2023; §2) notes that there are some places in recent literature (Rabin & Rabern 2016; Dixon 2016) where set-theoretic well-foundedness and foundationalism have come apart.

is between dependence and explanation, but I will merely follow the crowd and accept that there *is some connection*, for the purposes of my project.

In order to illustrate the natural link between fundamentality, dependence, and metaphysical explanation, consider a series of explanatory questions, following the pattern 'what is x, *really*?'. Any answer is thought to indicate what underlies or explains x at a more fundamental level. The requirement for dependence chains to terminate, reflects the requirement for chains of explanation to terminate. An example of a pursuit of such a sequence of questions is illustrated by Barker:[62]

"Question 1: What IS this chair, really?
Answer: It's a material object used for sitting.
Question 2: Yes, but what IS sitting? And what IS a material object?
Answer: Well, a material object IS a bundle of properties. And so on.
Question 3: Yes, but what IS a property? And what IS bundling?
Answer: A property IS a universal: an abstract entity wholly present in everything having it. And bundling is a form of non-mereological composition.
Question 4: What IS a universal, such that it is wholly present in distinct bundles?
Answer: A universal a primitive kind of entity. It's a basic category of being."

As the final answer in this string of questions and answers indicates, it is common to accept that metaphysical enquiry must reach an endpoint, no matter what one's metaphysical preferences, or route the enquiry might take. When this endpoint is reached, (in the case above, when the universal is reached), then we cannot continue with metaphysical explanation, since the final phenomenon reached is resistant to being explained. Differences in theoretical preference might mean that the chain ends in the chair 'ultimately' being a conceptual abstraction from a unified whole, a collection of spacetime points, a mental construction, etc. No matter which analysis we take, Barker argues that pursing such metaphysical analysis will always lead us to encountering something that is basic, unexplainable and primitive. Barker argues that a typical route through metaphysical analysis will follow a foundationalist pattern. Whatever is reached at the endpoint of enquiry, and accepted as resistant to explanation, is identified as fundamentalia. To accept this as standard metaphysical practise, we must be able to justify positing entities which are fundamental, independent and resistant to explanation, which will eventually be encountered.

[62] '*What is emptiness?*' (manuscript).

3.2.1 An End to Chains of Explanation?

An argument in favour of well-foundedness can be put as follows: the absence of a point where dependence chains terminate, implies that we can never reach a complete, ultimate metaphysical explanation. On pain of infinite regress of ontological dependence, and in effect vicious infinite regress of metaphysical explanation, the foundationalist can justify their commitment to some fundamentalia.

Bliss (2013) responds to such an argument, by objecting that an infinite regress of metaphysical explanation need not be vicious. She makes this objection by drawing an analogy between metaphysical explanation and causal explanation. She highlights that in cases of diachronic, causal explanation, a satisfactory explanation of a phenomena can be given by merely referencing whatever is immediately doing the explanatory work at the next step in a chain of explanation. To illustrate, Bliss uses the case of a smashed window caused by a tree. An adequate explanation can be given by referencing a storm that caused the tree to smash the glass, and other relevant details like the brittleness of the glass window. Such an explanation need not go beyond the immediate steps in the causal chain. For instance, the explanation would not be deemed unsatisfactory if it did not trace back to the beginning of the universe, and whatever may have been the 'ultimate' first cause, such as the big bang or God. It is possible, that if only an immediate explanation is needed in the causal case, and causal and metaphysical explanation are similar in the relevant ways, then only an immediate explanation is need in the case of metaphysical explanation.

Tallant (2017: 113-115) responds to this example, by defending the position that the analogy cannot be used to show that chains of metaphysical explanation need not be well-founded. He argues that when considering *metaphysical explanation*, the explanations at the immediate stage of the chain, and at the ultimate stage of the chain, are both essential for a satisfactory explanation in different ways. The immediate stage 'gives us an explanation of why some particular derivative entity exists' whereas the ultimate stage 'gives us an explanation of why there's anything derivative at all' (2017: 113). Both components of an explanation are required when it comes to telling the full story of dependence relations in order to acquire a full and adequate metaphysical explanation.

Tallant argues that a relevant difference between the causal case and the metaphysical case, is that when asking questions of causal explanation, we are often asking questions of (folk and practical) *partial* explanation rather than *full* explanation. A full and proper explanation of the window smashing would have to trace back to the big bang, God, or whatever was at the start of the universe. Similarly, metaphysical explanations can be partial or full. We don't commonly ask for explanation concerning fundamentality

structure in everyday conversation, so typically, asking for a metaphysical explanation will mean asking for a full explanation.

'Full explanations are more complex, and perhaps we never really need make recourse to them in the causal case (unless we are debating the ramifications of our best physical theories). Nonetheless, they are there, and as soon as we ask for them, they must be given – otherwise, really, we have no full and proper explanation of how to explain the smashing of the glass…. When we discuss metaphysical grounding, and metaphysical explanation, mere partial explanations will not do. We are after a description of the deep structure of reality; an account that gives us only partial explanations simply will not do.' (Tallant 2017: 114).

Tallant's response to Bliss convincingly shows that complete metaphysical explanations are necessary. However, I suggest that dependence chains, and explanatory chains, need not always be well-founded, in order for metaphysical explanations to be complete. Positing foundations that close dependence chains could be one way of providing full, ultimate explanations, but I argue that it is not the only way. Committing to foundations to close explanatory chains may be necessary to achieve complete explanation for those who endorse the orthodox properties of dependence and explanatory relations. Constraining dependence to its orthodox properties (introduced in §2.1 of this chapter) results in restricting the structure of reality to a hierarchy made up of linear chains of dependence, that either 'bottom out' in some fundamental entity, or continue descending forever. These two options can be characterised as typical species of either *foundationalism* or *infinitism*. Chains must either be well-founded (producing a foundationalist structure), or non-wellfounded (producing an infinitist structure).[63] See figure 9 for an illustration. Infinitism provides an account of reality's structure on which chains of dependence hold between entities at different degrees of relative fundamentality, and fail to terminate in some ultimate 'bottom' level. Foundations are never reached, because chains never end.[64] The lack of completion of chains implies a complete metaphysical account could never be reached. Infinitism is subject to objections from vicious infinite regress, because it can be criticised on the grounds of incomplete and inadequate explanation.

[63] Foundationalist chains may not *always* have to be well-founded, in the set theoretic sense. See footnote 58.

[64] This is a generalised characterisation of infinitist accounts, and it is worth noting that there are variations of infinitism. 'Boring' infinite descent is defended in some form by Tahko (2014), Cameron (2008) and Bohn (2018). A potentially promising account, emergentist infinitism, was recently developed and defended by Morganti (2014), who argues that existence is not endangered by infinite descent, but instead existence and being comes about *in virtue of* there being an infinite chain of dependence. Being is not wholly transmitted from fundamental to derivative entities in the way that Schaffer (2010) claims it must. Instead, *being* gradually arises from an infinite chain of derivate entities.

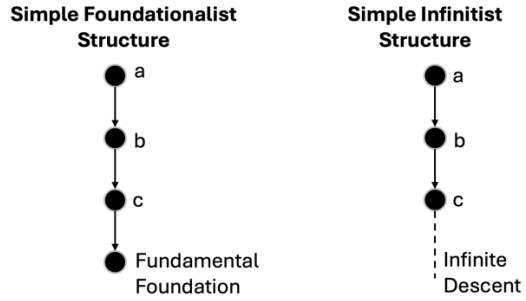

Figure 9

What I want to emphasise at this point, is that the restriction of the fundamentality debate to two possible options- foundationalism and infinitism- is based upon a commitment to the orthodox properties of dependence. This is a commitment that I rejected in the earlier half of the chapter. There are counterexamples that imply that we should not assume the orthodox properties of dependence, that create a false dichotomy. The debate need not be restricted to foundationalism verses infinitism.

Tallant's response to Bliss assumes linear chains of dependence and explanation. I recommend dropping the assumption that dependence must work in this way. If we opt for alternative structures of dependence and explanation that allow for symmetrical dependence, such as a web-like structure, like the one illustrated by *Figure 8*, then Tallant's argument for the necessity of chains to be well-founded (in order to complete metaphysical explanations), loses its bite. In chapter 7 I will come to discuss how web-like structures that contain symmetrical dependence might be able to provide complete metaphysical explanation.

3.3 In favour of Anti-foundationalism: The Problematic Nature of Fundamentalia

The previous section addressed the justification for positing fundamentalia from requirement for complete metaphysical explanation. As I have suggested, and will elaborate in chapter 7, there may be other ways to provide complete metaphysical explanation besides positing fundamentalia. In this section I move on to addressing the question of whether anti-foundationalism fairs any better when it comes to metaphysical explanation. In doing so, I will show that there are independent reasons for rejecting the existence of fundamentalia. I argue that the nature of fundamentalia that means that their existence poses a problem (especially for those who concerned with metaphysical explanation).

As has been already outlined, I understand what is (or would be) fundamental to be whatever lies at the end of a dependence chain. If we accept the common claim that there is at least some link, as strong as supervenience, between dependence and explanation, then

this also means that fundamentalia lie at the endpoint in a series of metaphysical explanations. To be fundamental is to be ontologically independent, and resist explanation (Bliss and Priest 2018: 6).

The resistance to explanation is what I consider to be the key problem with positing fundamentalia. To resist explanation, is to be a metaphysical primitive- an entity which can only be pointed towards, since it cannot be described or explained in any further terms. The moment we encounter a metaphysical primitive, we are often also met with some dissatisfaction or discomfort. This discomfort is reflected by Schaffer's (2015) parsimony principle, which recommends that we do not commit to fundamentalia without necessity, because positing anything fundamental incurs a cost to our metaphysical theory. We can understand the metaphysical cost of positing fundamentalia as positing primitives that have some level of explanatory failure attached.

The objection to positing fundamentalia from inadequate explanation can be put another way. I follow Correia and Schneider (2012), Bliss and Priest (2018) and Aitken (2024), in observing an inconsistency between positing fundamentalia, and the principle of sufficient reason (PSR). This is the principle that all things and all facts must have some explanation or reason for their existence. The PSR is the driver of the continuation of a string of 'what is it really?' or 'why?' questions, and the demand for an answer to all such questions. Aitken (2024: 19) notes that the PSR can be understood as saying that everything has a ground, cause or explanation.

In cases of non-well-founded chains, and cases of complex webs of symmetrical dependence, each part of the chain is adequately accounted for, and there is nothing that lacks an explanation. Therefore, both options can be consistent with the PSR. On the other hand, the PSR, far from backing foundationalism's explanatory ability, can be thought to backfire against the foundationalist's position, since the existence of fundamental entities violate it. Fundamental entities, by the definition set out in the previous chapter, do not depend upon anything else, and therefore cannot be explained by anything else. Fundamental entities end up either being self-explanatory, or having no metaphysical explanation, neither of which is satisfactory to those who endorse PSR."…the PSR in effect denies that there are fundamental facts, i.e. facts that are not grounded by anything else" (Correia and Schneider 2012: 5).

Partington et al (2023) conducted empirical research which shows that people presuppose a PSR-like principle in ordinary judgement, and conclude that a metaphysical assumption

in favour of the PSR plays an important role in our explanatory inquiry.[65] Given such widespread intuitions in favour of the PSR, and an apparent inconsistency between the PSR and foundationalism, something needs to give.[66] I suggest that it is this tension that lurks behind our discomfort with positing primitives or fundamentalia that resist explanation. Thus, I recommend dropping the commitment to foundations, and going in search of an alternative metaphysical picture that avoids commitment to problematic fundamentalia.

"Canonical defenders of the PSR, such as Leibniz and Spinoza, are metaphysical foundationalists of one stripe or another. This is curious since, on its face, the PSR precludes fundamental entities and facts" (Aitken 2024: 2).

Foundationalist metaphysicians might justify their commitment to fundamentalia through noting their necessity to close chains of dependence, and hence offer ultimate explanation. However, what is often swept under the carpet by those who make this move, is that fundamentalia themselves are problematic due to their resistance to explanation. This echoes Thompson (2018: 117), who highlights that 'foundationalists seem to both be committed to the PSR and routinely avoid it'. I argue that fundamentalia , or 'unexplained explainers' (Bliss 2013: 415) are not a good explanation of the end of dependence chains- they are no explanation at all.

The issue is put nicely my Bliss and Priest (2018:20): 'There is what we believe to be a considerable concern with the use of cosmological questions to motivate metaphysical foundationalism: they appear to rely on an application of the principle of sufficient reason (PSR). Although there may be a suitably constrained version of the principle in the vicinity, the employment of the full-blown principle—according to which *every thing* has an explanation for its existence—to motivate foundationalism would be a disaster for the view: exactly what the foundationalist believes is that not everything has an explanation. Metaphysical foundationalism, so motivated, runs the risk of pulling the rug out from beneath itself.'

The way that fundamentalia can be understood to violate the PSR comes with three related worries for the foundationalist. First, the discomfort that may come alongside positing

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[65] Partington et al found, from four studies, that 'participants reliably judged that facts must have an explanation people' leading them to conclude that people 'consistently presuppose a PSR-like principle in their judgment' (2023: 2964).

[66] Given such a choice, there will be those who are far more prepared to give up commitment to the PSR than give up commitment to foundationalism. If the reader is still inclined to prefer commitment to foundationalism than commitment to the PSR, then they may get off board with this section. Regardless, they may still find other motivations for anti-foundationalism convincing, such as considerations from Buddhism and/or current physics.

something with no metaphysical explanation, may be due to positing a first step in a dependence chain that can be paralleled with a first cause in a causal chain. Just as we might feel uncomfortable with the unanswerability of the question of 'what temporally preceded the first cause of the universe', we might feel equally uncomfortable with the unanswerability of the question of 'what grounds the ultimate ground of reality?'. Accepting that all of reality depends on some phenomena which itself comes from nowhere might be admitting defeat in the project of metaphysics.

This line of thinking is closely tied to my second worry: the arbitrariness of the end of a dependence chain. Even if one is willing to accept that a chain of dependence and/or explanation must end at a certain point, why must it be at *that* point? It seems odd at best, that the great chain of being should stop at a particular point, without there being something especially special about that point. We may never be sure that the end of the chain, or the ultimate foundations we have identified, are the true ends or foundations of reality's structure.

Finally, a commonly endorsed form of standard foundationalism, *atomism*, commits to the view that fundamentalia are mereologically *and ontologically* simple. They possess no proper parts, nor qualitative properties. This popular form of foundationalism comes with the worry regarding how the complexity, and qualitative properties that we observe in the everyday world, emerge out of absolutely simple foundational primitives. If we accept that there is an intelligible way of understanding that absolutely simple things might exist, then there remains a challenge about how any number of simple things might compose to give rise to phenomena with complexity. Put differently, if the world is ultimately reducible to phenomena that lack qualitative properties, then how do qualitative properties become part of the picture?

These related concerns lead me to the conclusion that ontologically independent entities, no matter what form they come in, have problematic nature. Their independence makes then unanalysable and unexplainable in terms of anything else, which makes them problematic for those who endorse some form of the PSR.

3.3.1 The Principle of Sufficient Reason, and the Principle of Dependent Origination

In a recent paper by Aitken (2024), foundationalism, infinitism, and interdependence are assessed, for their compatibility with the acceptance of the PSR.

> "Proponents of metaphysical grounding versions of the PSR will owe some response to the so-called Agrippan Trilemma concerning the structure of grounding relations, which says that one must accept at least one of the following three alternatives, each of

which seems to undermine the PSR when the relation of metaphysical explanation is understood as irreflexive, asymmetric, and transitive:

(i) A fundamental fact/entity, which might be (a) ungrounded or (b) self-grounding
(ii) An infinite regress of grounding
(iii) Mutually grounding facts/entities"
(Aitken 2024: 2)

Aitken suggests that option (i), the foundationalist option, is a direct violation of the PSR. Option (ii), the infinitist option, involves an infinite regress of explanation, which Aitken claims is 'amount to no explanation *at all*'. Finally, the problem with option (iii) is that it violates the asymmetry of metaphysical explanation. Of course, it is option (iii) that I aim to pursue, and demonstrate to be the least problematic.

Atiken discusses the three options in relation to the positions of key Buddhist figures. She characterises Nāgārjuna's position as anti-foundationalist, and as accepting versions of (ii) and (iii). She contrasts this with Vasubandu, who she characterises as foundationalist, and who accepts a version of (i) (2024: 2-3).

Aitken argues that Buddhist philosophers across all Buddhist schools should be concerned with meeting some form of the Principle of Sufficient Reason, since the PSR has strong resemblance with the principle of dependent origination (PDO, *pratityasamuptpada*)[67]. She highlights the PDO is 'a commitment unifying the diversity of Buddhist schools of thought… according to which all conditioned (saṃskṛta) things are dependently originated, meaning that they come into being in dependence on causes and conditions; in other words, there is a cause, ground, or explanation for the existence of every conditioned thing' (2024: 5). In this way, the PDO can be described as a 'proto-PSR' (restricted to causal explanation).

She goes on to argue that Vasubandu's Abhidarhma metaphysics (which Aitken characterises as foundationalist, as I also did in chapter 1 §3.1) commits to a *qualified* version of the PSR. The qualified version of the PSR that Vasubandu commits to, distinguishes the ways in which 'ultimately real' things and 'conventionally real' things must be explained. 'Ultimately real' (or fundamental) things must be explained by reference to their intrinsic nature. 'Conventionally real' (or non-fundamental) things must be explained by reference to 'ultimately real (or fundamental) things (2024: 19-20). Hence, Vasubandu's foundationalist metaphysics offers a way that both fundamental and non-fundamental things are subject to explanation, by essentially claiming that fundamental

[67] I introduced this in chapter 1 §3.1 and will return to discussing this further in chapter 4.

things are self-explaining. In this way, Vasubandu can be understood as commiting to a qualified version of the PSR.

She contrasts this with Nāgārjuna's Madhyamaka metaphysics (which Aitken characterises as anti-foundationalist, as I also did in chapter 1 §3.1). She shows that Nāgārjuna commits to an '*unrestricted and exceptionless*' version of the PSR. An unqualified version of the PSR can be found directly in Nāgārjuna's work: "There is nothing whatsoever for which there is no cause/reason (*hetu*)." (MMK 4.2:2). By committing to no fundamental entities with or entities with intrinsic nature, Nāgārjuna is able to avoid self-explaining entities, and maintain that all entities arise out of dependence. Aitken concludes that Nāgārjuna is 'in fact the more faithful friend of this principle [PSR]' (2024: 3). By extension, we can infer that she takes the anti-foundationalist position as more faithful to the PSR than the foundationalist position. For this further reason, I conclude that fundamentalia are more problematic than helpful when it comes to providing metaphysical explanation.

4. Concluding Remarks

The three commitments of standard foundationalism (asymmetrical dependence, hierarchy and well-foundedness) have all been shown to encounter problems, and should all be subject to revision. This chapter aims to have demonstrated the problems with each:

1. An understanding of all dependence relations as asymmetric is problematic, due to the plausibility of many counterexamples.

2. An understanding of reality as well-founded is problematic, as ontologically independent fundamentalia come at a cost to metaphysical explanation, and violate the PSR.

3. An understanding of reality as structured hierarchically is problematic, since it introduces a false dichotomy of foundationalist and infinitist structures, both of which are problematic when it comes to explanation. Revising commitment to the asymmetry of dependence shows other structures besides foundationalism and infinitism are possible.

In conclusion, I recommend revising each of these three commitments. By rejecting the orthodox properties of dependence, we can enquire into the explanatory abilities of a structure that contains cases mutual dependence. I hold that such an alternative structure, which commits to no fundamental entities, is the most promising option when it comes to ensuring a sufficient explanation of all things and vindicating the PSR.

Chapter 3: Relational Properties and Relational Identity

This chapter works towards establishing three unconventional claims concerning properties, and the role they play in contributing to the identity of any entity. The three claims are as follows: (1) all properties are extrinsic (relational); (2) the identity of any entity cannot endure a change in any of its properties, and (3) we should collapse the common distinction between essential and contingent properties. I argue towards (1) by critiquing characterisations of intrinsicality, as well as paradigm examples of intrinsic properties. I argue towards (2) by drawing upon the indiscernibility of identicals, and critiquing accounts of persistence over time. I then reach (3) though the conclusions of the arguments already made. By showing that any entity is dependent for its identity on all of its relational properties, the picture on which all entities are connected by a web of symmetrical dependence relations becomes more compelling.

1. All Properties are Relational, No Properties are Intrinsic

A distinction between intrinsic and extrinsic properties is commonly drawn and utilised by metaphysicians. The best place to locate a sketch of a typical understanding of the distinction is in Lewis (1983). Lewis characterises intrinsic properties as properties of something that are the way they are purely in virtue of the thing itself. In contrast, extrinsic properties are properties something possesses in relation to something else. Extrinsic properties may also be properties something possesses in relation to the larger whole which it is a part of. Intrinsic and extrinsic properties may be characterised in terms of *dependence* and in terms of *duplication*:

The intrinsic properties of something depend only on that thing, whereas the extrinsic properties of something may depend, wholly or partly, on something else. (Lewis 1983: 197).

*If something has an intrinsic property, then so does any perfect duplicate of that thing; whereas duplicates situated in different surroundings will differ in their extrinsic properties. (*Lewis *1983: 197)*.

The distinction is simple enough to grasp, and can be made more intuitive by introducing examples. Orangeness and roundedness may be regarded as intrinsic properties of a satsuma. However, being peeled or squashed, or being within a certain distance of the tree on which it was grown, are regarded as extrinsic or relational properties of the satsuma. They are only properties of the satsuma in virtue of other things external to the satsuma itself. Taken at surface value, this may be a useful distinction to employ. For example, it has been made use of by ethicists, who draw a distinction between things that have the property of moral goodness intrinsically- in virtue of only the thing itself, and things that

have the property of moral goodness merely in virtue of its connection to external things, like producing good outcomes.

I contend that the notion of intrinsicality of properties encounters serious problems. §1.1 will address the concerns that can be raised in response to popular characterisations of intrinsic properties, as perfectly natural properties, or as interior properties. It then addresses concerns with the paradigm examples of intrinsic properties (§1.2). I conclude the first section with the claim that there are no genuine examples of intrinsic properties (§1.3). All properties are at least partly extrinsic or relational. If all properties are at least partly extrinsic, then this introduces more dependence relations between properties than we might naturally take to exist.

1.1 Problems with Perfect Naturalness and Interiority

Lewis' (1986) most influential analysis of intrinsicality is in terms of 'perfect naturalness'. Lewis' notion of perfect naturalness has direct connections with the notions of dependence and fundamentality. A 'perfectly natural' property, according to Lewis, depends only on itself, nothing else.[97] They are properties with maximal ontological priority, that can be thought of as residing at the end of dependence chains. For example, the extrinsic property of being an uncle fails to be an intrinsic property because it can be analysed in terms of other properties, like 'being a sibling' of and 'being a child of'. In contrast, an intrinsic property cannot be analysed in any other terms. An example might be 'having a mass of two grams'. There are no further properties that 'having a mass of two grams' could be analysed in terms of. It follows, according to Lewis, that intrinsic properties supervene on *fundamental properties*. Intrinsic properties are 'perfectly natural' because they 'carve nature at its joints'. Together, perfectly natural properties and relations are sufficient for complete characterisation of the world (Marshall and Weatherson, 2023: §3.2).

Being a 'perfectly natural property' encounters problems related to resistance to explanation, similar to those discussed in the previous chapter. There is no possible further metaphysical description of a perfectly natural property. Positing intrinsic properties and characterising intrinsicality in terms of perfect naturalness is problematic, as it means positing some form of primitive that resists all metaphysical explanation in terms of anything other. Chapter 2, §3.3 explored reasons for resisting exactly this kind of metaphysical commitment. If we can resist resorting to employing primitivity, then I contend that alternatives should always be pursued.

[97] When talking about intrinsicality, Lewis commonly uses the language of 'in virtue of'. Intrinsic properties are properties that things have 'in virtue of the way they themselves are', whereas extrinsic properties are properties that things have 'in virtue of their relations or lack of relations to other things' (1986: 61). 'In virtue of' talk implies dependence.

Moreover, Sider (1995) and Schaffer (2004) have raised issues about whether perfectly natural properties and relations can be sufficient for a complete characterisation of a world. They highlight the possibility of an infinite descent of increasingly natural properties, without ever finding a set of completely, perfectly natural properties to provide a basis for definition of all other things. 'Both claim that it is metaphysically possible for there to be endless sequences of more and more natural properties, without any set of perfectly natural properties out of which all the other properties can be defined' (Marshall and Weatherson 2023: §3.2). With Lewis' connection between naturalness and fundamentality in mind, Sider and Schaffer's suggestions amount to suggestions of metaphysical infinitism (see §2.4).

Closely related to the characterisation of intrinsicality in terms of perfect naturalness is the characterisation of intrinsic properties 'interior'. An interior property is a property associated with an entity's internal nature (Marshall, 2016).[100] Marshall and Weatherson (2023: §2.3) note that whilst philosophers often cash out intrinsicality in terms of interiority, this is to some degree circular. An interiority account of intrinsicality can be characterised thus: 'Being F is intrinsic iff, necessarily, for any x, if x is F then x is F in virtue of how x is intrinsically' (2023: §2.3).

This demonstrates further how any property that resists reductive analysis in terms of anything apart from itself is problematic. A property that something has only in virtue of that thing itself is problematic because it is primitive. The danger with positing primitives can also be understood as a danger of circularity. Resisting reductive analysis or metaphysical explanation in terms of something other, means that we are left with two options: (i) there is no possible explanation, or (ii) an explanation of an entity can only be given in self-referential terms. Opting for (i) means running into PSR related problems as discussed in the previous chapter. Opting for (ii) means accepting that an explanation of a phenomenon can be given using only terms of the phenomenon itself, which is commonly deemed unsatisfactory due to circularity. Characterising intrinsicality in terms of perfect naturalness or interiority involves the ontological independence of intrinsic properties. This makes these characterisations subject to charges of circularity or problematic self-dependence.

[100] Being an *interior* property does not coincide with being a local property. For example, 'being identical with x' is plausibly both a non-local property, and an interior property. If y is identical with x, then this relates y to something non-local, which is x. However, the property of 'being identical with x' can be understood as an interior property, because the state of affairs of y being identical to x is plausibly about how y and its parts are, and how they are related to each other, as opposed to how they are related to other things and how other things are.

1.2 Questioning Paradigm Cases of Intrinsic Properties: Shape and Mass

An alternative account of an intrinsic property which does not resort to self-dependence or primitivity, is an account which identifies intrinsic properties with those properties that are always preserved in cases of perfect duplication (Langton and Lewis 1998: 337). For example, 'F is intrinsic iff F never differs between duplicates'. Consider the example of duplicating a round ball that has a mass of 50g. On a duplication preservation account of intrinsicality, if both the properties of roundness and a mass of 50g would be possessed by the duplicate of the ball, no matter the surrounding conditions of the world it is duplicated in, then shape and mass should be considered intrinsic properties.[102]

Since shape and mass are often considered as paradigm cases of intrinsic properties, they should be duplicated regardless of external surroundings, in order to render the right result. I argue that certain changes in external environment would produce changes in shape and mass properties of a duplicate, hence, they cannot be considered as intrinsic on this characterisation. I argue further, that if we take duplication preservation as the indicator of intrinsicality, then there is reason to think that no properties can meet this standard, hence, it is plausible to understand all properties as relational or extrinsic. I argue that paradigm cases of intrinsic properties like mass and shape, cannot in fact be understood as intrinsic. If these paradigm cases can't hit the mark of being considered as intrinsic properties then surely, no properties can.

1.2.1. Shape as extrinsic

I begin with looking at the property of shape. According to a duplication preservation account, the ball's roundness must be preserved across duplicates in any kind of world, in order for its shape to be intrinsic. It seems straightforward to argue that the round shape of a tennis ball is dependent on external conditions. Imagine the ball is duplicated in a possible world in which there is a heavy object that exists directly on top of it. Arguably, the ball requires the lack of such an object in order for its shape to be preserved across duplication. The physical condition of the ball, including how it is shaped, can be affected

[102] There are independent problems for a duplication preservation characterisation for intrinsic properties. For example, any two properties that are indiscriminately necessary would be duplication preserving, and therefore intrinsic. If one was to assume numbers necessarily exist, then the necessary property of being 'such that there is a number' is preserved across duplicates, and is therefore intrinsic. This seems like an intuitively incorrect result, as 'being such that there is a number' is not something local or interior- it relates to the outside world. This might show how duplicate preservation does not always coincide with the intuitive sketch of an intrinsic property.

by other external forces. A change in pressure exerted on the ball between the original and the duplicate may affect whether the round shape is preserved.[103]

There is room for objection to this kind of case. It may be suggested that such a case relies on overlooking a distinction that should be made between physical dependence and metaphysical dependence. Skow (2007) suggests that it is fine for an intrinsic property to physically depend on the existence (or non-existence) of external things (like the heavy object that squashes the ball). Intrinsic properties must not *metaphysically* depend on the existence (or non-existence) of any external thing. Skow suggests another example case that might parallel with the squashed ball case:

"The [pile of] sand's shape [in my hands] physically depends on the existence of my hands: it is the physical forces my hands exert on the sand (and the sand grains on each other) that gives the sand its shape … The sand's shape is metaphysically independent, it seems: we can conceive of a world (a world with different laws of nature, to be sure) where the sand has the shape it actually does even though my hands do not hold it in the shape" (2007: 6).

Multiple responses can be made. First, one could argue that the shape of the ball or the pile of sand *does* metaphysically depend on external conditions including the existence or non-existence of things like the heavy object or the hands. This kind of response raises the question of the difference between physical and metaphysical dependence, if there is one at all. It seems that whilst the sand is physically dependent on the hands, it is also metaphysically dependent- the shape of the sand depends synchronically on the existence and placement of the hands. A second way of responding is to suggest that intrinsic properties cannot be physically dependent *nor* metaphysically dependent. This is to say that shape can only be an intrinsic property if it does not depend *in any way* on external conditions. I consider this as a convincing response. It is unclear why Skow considers the distinction between physical and metaphysical dependence relevant to the issue of intrinsic properties.[104]

Another issue for the preservation of the property of shape across duplicates is whether we are concerned about ontic vagueness in the form of fuzzy boundaries of material objects. If one is convinced by a view on which there are some objects which lack a sharp boundary dividing the matter that composes it from the matter outside it, then they might be inclined

[103] One might be tempted to respond to this case by claiming that the ball hasn't undergone perfect duplication. My reply emphasises that perfect duplication must only apply to the entity in question, and not to its surrounding conditions. The distortion of the shape of the ball is the result of the difference in surrounding conditions, without which, the ball's duplication would've been perfect.

[104] See Skow (2007: 6)

towards accepting ontic vagueness, in the form of vague spatial boundaries.[105] If the spatial boundaries of some objects are vague (prime examples in the literature include clouds, mountains and islands)[106], then their property of shape is also vague. In cases like this, the lack of a precise metaphysical truth about the shape of an object or entity would imply that the property of shape is merely conceptual, or a practical mental construction. This immediately suggests shape to be an intuitively extrinsic property. Further, a duplication preservation account of intrinsicality would produce this outcome. Duplicates of an object with vague boundaries might be interpreted (conceptualised, or mentally constructed) as two different shapes depending on the conditions of the world they are duplicated in. Hence, if we are correct to accept ontic vagueness in regard to the shape of some objects, then the shape of those objects is not a property that involves only the object itself, and is not a property that must always be preserved if the object were to be perfectly duplicated.

A final important objection to understanding shape as an intrinsic property comes from Bricker (1993), McDaniel (2007), and Skow (2007). They have all argued that the shape of a material object depends on the curvature of the space in which it is located. This implies that if it were duplicated in a world that did not possess the same curvature of space, then a perfect duplicate of the material object would not possess the same shape. 'The fact that a material object has a shape is constituted by the fact that it bears a relation to a region of space that has that shape' (McDaniel 2007: 135).

I have provided three reasons against understanding shape as an intrinsic property, despite its status as one of the most commonly cited paradigm examples of intrinsic properties (Skow 2007: 1; Lewis 1986: 203; Ramsey 2000: 117). I proceed by tackling mass, a second popular example of an intrinsic properties. By showing that there are reasons to consider both of these kinds of properties as extrinsic, I am to demonstrate that there are reasons to reconsider the position that intrinsic properties exist.

1.2.2 Mass as extrinsic

Mass is a property that seems more stable in its preservation between duplicates. Take the case of the tennis ball, with its perfect duplication in a world where it is subject to external forces which distort its shape. Even in this case, the duplicated ball (or flattened pancake of a ball) still preserves its mass. However, there are at least four reasons from physics to doubt that mass must always be preserved across duplicates.

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[105] Vagueness is only ontic if it does not result from linguistic vagueness (lack of precise terminology) or epistemic vagueness (lack of precise knowledge) (Chibeni 2004: 2).

[106] For example, see Tye (2000: 195).

I. Instantaneous action at a distance suggests mass distribution is a *holistic* property

Esfield (2014) discusses whether mass is most appropriately considered as an intrinsic property. Attributing intrinsicality to mass is deemed appropriate by classical physics and Newtonian mechanics. This is because according to Newtonian mechanics, first order properties of particles such as mass, can be primitive and do not require explanation. Their inertial motion (constant motion in a straight line) also need not be accounted for. Second order properties of particles such as changes in their state of motion (acceleration due to changes in velocity) must be accounted for. These can be accounted for in terms of particles' mass. For example, mutual attraction of the particles can be explained in terms of gravitational mass, and resistance to acceleration can be explained in terms of inertial mass (2014: 2).

'Action at a distance' can be explained in terms of mass by Newtonian mechanics: the presence of a mass in space at a given time t changes the state of motion of other things- it transmits a force of gravitational attraction (2014: 4). However, there is also the phenomenon of '*instantaneous* action at a distance', which is taken as an anomaly by Newtonian mechanics. Instantaneous action at a distance- later theorised in terms of quantum entanglement- is when the action cannot be explained in terms of the transmission of something. Instead of mass (as an intrinsic property of a particle) transmitting a gravitational force that accounts for the action, cases of instantaneous action are more accurately accounted for by suggesting that the property of mass, and its manifestation, are present in all objects of the universe at any given time t (2014: 4).

'These considerations suggest taking mass to be a relation among the objects in space rather than an intrinsic property of each object. That is to say, there is one instantiation of a holistic property of mass distribution at any t that relates all the objects in the universe and that fixes how each of them changes its state of motion at t' (Esfield 2014: 5).

II. Particles acquire mass from the Higgs field

Developments in particle physics in recent decades have suggested that Newtonian mechanics' acceptance that first order properties of particles (including mass) require no explanation, is misguided. In 1964, Peter Higgs first theorised about an explanation of why particles have mass.

"Why do particles have mass? Such a simple question—but very profound—that many don't even think to ask it." (Schirber, 2013: 111).

The explanation involved the existence of a field. A field that came into existence shortly after the big bang can explain why elementary particles which had no mass immediately

after the big bang, soon came to acquire mass. In order to observe the existence of such a field, the field must either be manipulated by particles interacting with it, or the quantum particle associated with the field must be produced.[107] The Higgs field cannot be manipulated. So, to infer its existence, its quantum particle- the Higgs Boson- must be produced. In July 2012, it was announced that a new particle that matched the features needed[108] to be a Higgs Boson was observed through colliding particles at high energies using the Large Hadron Collider at CERN. In March 2013 the discovery of the Higgs boson was confirmed. Since its discovery, it has also been confirmed that the stronger a particle interacts with the Higgs field, the more mass it comes to have.

Before the discovery and confirmation of the Higgs field and its effect on mass of elementary particles, Bauer (2011) proposed an argument to the effect that the dependence of the mass of a particle on the Higgs field undermines the understanding of mass as an intrinsic property. Bauer's argument contains an empirical premise about the acquisition of mass from the Higgs field, and a metaphysical premise about this relation between the field and mass having an implication for the extrinsicality of the property of mass. It can be summarised thus:

(1) The disposition mass of any fundamental particle, a, is generated by a's immersion in the Higgs field.

(2) The nature of the relation between a fundamental particle, a, and the Higgs field meets the conditions of extrinsic grounding [in the environment].

(C) Thus, the mass of fundamental particles is extrinsically grounded [in the environment]. (Bauer 2011: 9-12)

The argument, published in 2011, had its empirical premise backed by CERN's discovery of the Higgs boson in 2012. The interesting premise for my purposes, is the second premise about the discovery's metaphysical consequences. To support this premise, Bauer makes an analogy between the property mass and the property of weight, which is commonly recognised as an extrinsic property:

"X existing in a certain gravitational field activates x's disposition to gain a specific weight. I suggest that if weight counts as extrinsically grounded… due to the necessity of an object being situated in a gravitational field in order to have a specific weight, then this enhances the plausibility that mass is extrinsically grounded… due to the necessity of a particle being

[107] For example, the photon is the quantum particle associated with the electromagnetic field.
[108] These features include 'decay' in the right way (immediate transformation into the right kind of lighter particles), as well as being the only particle to have no spin direction.

situated in the Higgs field. If weight counts [as an extrinsic property], then mass counts." (Bauer 2011: 11).

Bauer also argues that the dependence of a particle's mass on its interaction with the Higgs field means that mass no longer meets Lewis' duplication preservation condition of intrinsic properties (2011: 122). He illustrates a metaphysically possible example, where x is located in an environment with the Higgs field, its duplicate, x1 is located in an environment without a Higgs field. In this case, x will have some mass, whereas x1 will have no mass. This means that mass is an extrinsic property, dependent on x's environment.

III. Bohmian mechanics - the holistic wave function

I turn to interpretations of quantum mechanics for the third and fourth reasons to doubt mass as an intrinsic property. As noted, Newtonian mechanics took instantaneous action at a distance to be an anomaly, and explained it away using theories of local fields, which preserves mass as an intrinsic property, rather than a holistic property instantiated by all particles in the universe at any given time. The development of quantum mechanics departed from classical mechanics by taking instantaneous action at a distance seriously. Quantum mechanics accounts for this phenomenon in terms of two entangled quantum subsystems which exist in superposition state, until one subsystem is observed (and the *wave function* collapses), determining the properties of both subsystems instantaneously. Bohmian mechanics (an interpretation of quantum theory founded by Bohm in 1952) takes the changes in the motion of particles (or their temporal development), as first order, and posits the wave function as a universal property which accounts for it. Bohm's realist and universal interpretation of the wave function regards it as a dispositional property that determines the temporal development of all particles.

'The property that fixes the velocity of any particle at a time t given its position at t is not an intrinsic property of that particle, but there is only one instantiation of a holistic property of all the particles at t, represented by the universal wave-function at t, that determines the velocity of each particle at t, given the position of all the particles at t' (Esfield 2014: 8). As he goes on,

'Hence, as far as what is specific to quantum mechanics is concerned, there is no room for intrinsic properties instantiated by the objects in space; instead, there is only one holistic property of all these objects taken together that determines their temporal development' (Esfield 2014: 9).

Esfield notes that the holism exhibited by Bohmian mechanics in terms of the wave function as a universal property is more radical than the holism that can be interpreted from Newtonian mechanic in terms of the holistic property of mass distribution. This is because the universal wave function does not represent the distribution of a property of

objects (such as mass), but instead the wave function represents only one instantiation of a holistic property of all the particles taken together.

IV. Relational Quantum Mechanics- all properties are determined upon interaction

Not all interpretations of quantum mechanics regard the wave function in a realist way. Those who endorse anti-realism about the wave function[109] are likely to be unconvinced by the third argument presented. Thus, I will offer another, fourth argument for regarding mass as an extrinsic property, which draws upon an interpretation of quantum mechanics that rejects realism about the wave function. Rovelli explicates and defends a *relational* understanding of quantum theory (1996, 2018, 2022), which is built upon the very idea that all properties of quantum systems must be relational and hence, non-intrinsic. Relational quantum mechanics (RQM) rejects a realist interpretation of the wave function, and so parts ways with Bohmian mechanics which regards the wave function as a holistic dispositional property. The wave function is instead treated by Rovelli as a theoretical tool used for calculating probabilities of future events. The key characteristic of Rovelli's RQM is that any and all physical systems can play the roles of both observer and observed in an interaction which determines the properties of each system.[110]

In textbook quantum mechanics, prior to measurement, the superposition of a physical system means that its properties are undetermined. The measurement or observation of that system is the moment when properties become determined. When subsystems are entangled, the observation of one subsystem produces instantaneous anti-correlated determination of properties in both subsystems (instantaneous action at a distance). The distinguishing element of RQM is that it suggests that when such observation and determination occurs, this amounts to an interaction between the observer and observed, in which the properties of *both* systems get determined (Rovelli 2022: 47, 67-69). The observer is not an uninfluenced, impartial player in that makes a measurement (as textbook QM) suggests. Instead, any measurement is an interaction in which both systems involved become determined relative to one another. The involvement of the observer in an interaction means that we can *consider all properties of physical systems to be relational*. Rovelli suggests that there are no absolute values of variables that are independent from interactions. RQM therefore implies that there are no parts of the world that are completely self-constituted, ontologically independent, and immune to external influences.

[109] This is the view that the wave function is merely a mathematical tool for calculation, and so we shouldn't regard as an existing entity.

[110] I will explain this in much more detail in chapter 6.

"All variable aspects of an object exist only in relation to other objects. It is only in interactions that nature draws the world" (Rovelli, 2018: 115).

If RQM is true, then there is reason to doubt that properties such as mass are intrinsic properties, and that mass would always be preserved by perfect duplication. Returning back to the example of the tennis ball and its properties: the duplication of the physical systems the ball involves have their properties determined depending on the other physical systems they interact with. The values of their variable properties such as mass are therefore relative to interactions with surrounding systems. Interactions with different systems will produce different values relative to those systems. As Rovelli emphasises, 'Different observers can give different accounts of the same set of events' (1996: 1643).

1.3 No Intrinsic Properties, Only Relational Properties

This section has shown that there are: a) problems with the notion of intrinsic properties when characterised as perfectly natural, interior, or ontologically independent properties, and; b) both physical and metaphysical challenges to the paradigm cases of intrinsic properties, including shape and mass. Taken together, the lack of a good characterisation of intrinsic properties, as well as the lack of any uncontroversial cases of intrinsic properties, is enough to justify the rejection of the notion of intrinsic properties. To my knowledge, there are no immediate problems with a metaphysical view on which all properties are extrinsic or relational. This is the direction I will take, on the grounds of the arguments presented. All properties of all entities have at least some partial dependence on external conditions or other entities, hence all properties can be understood as relational. There is no property or part of any entity that is completely intrinsic, and immune to all external change. This means the identity of all entities are more fragile than we might initially think.

2. No problem of temporary intrinsics; No identity over time

I have shown that there is good reason to consider all properties as extrinsic properties. In this section I focus on defending the view that the identity of any object, x, depends on all of its properties, such that if x changes any of its properties, then it is no longer the same entity. Hence, the identity of an object does not persist though changes in properties over time. To show this I will use Leibniz's law to motivate the idea that the *problem of temporary extrinsics* still occurs, even if we deny intrinsic properties. I will then show that attempts to solve the problem of temporary extrinsics fail, leaving us with the result that the identity of an entity depends on all of its (extrinsic) properties, and cannot persist through change to any of those (extrinsic) properties.

A common, intuitive assumption is that an object or entity can maintain its identity from one moment to the next. This means that it is true to say that object x at time t1 is the same object as object x at t2, even if x has undergone a change in its properties between t1 and t2. However, there is a problem regarding how we can give an explanation for x's persistence (or the continuation of x's identity over time), given that the versions of x at t1 and t2 have differing properties.[111]

Lewis labels this problem the 'problem of temporary intrinsics' (1986: 202–205), since he regards it as a problem focused on how persisting entities can change their *intrinsic* properties. With the example of the property of shape in mind (as an intrinsic property, in the way that it is traditionally viewed), the problem can be illustrated: an entity, [a] , changes its shape over time, from cubical at t1, to spherical at t2. How are we to explain the persistence of the identity of entity [a], with *a* having undergone a change in its intrinsic property of shape? How can we explain the intuition that [a] at t1 is the same entity as [a] at t2, given that [a] at t1 is cubical, and [a] at t2 is spherical, and that shape is an intrinsic property?

I object to the setup of this problem, because I have shown that there are reasons to reject the existence of any intrinsic properties. There can be no problem of temporary intrinsics if there are no intrinsic properties. However, I will argue that the problem of persistence through change in properties still occurs, even if all properties are extrinsic.

A case of change in extrinsic properties over time can be illustrated as follows: imagine that a new building is being added to the New York skyline. The building [b], has the extrinsic property of being 'shorter than the Empire State Building' whilst it is being built at t1. However, at t2, when [b] has finished being built, it has the extrinsic property of being 'taller than the Empire State Building'. Between t1 and t2, [b] has undergone a change in its extrinsic property of 'height relative to the Empire State Building'.

The most natural reaction to this kind of case might be to accept that there is no change in the identity of the building over time- [b] continues to be [b] even after the change in its height. Therefore, there is no problem of persistence through change in extrinsic properties. This intuition of maintenance of identity can be fuelled further, by changing the case slightly: imagine our building, [b], has been fully constructed, and its height remains the same over the following fifty years. During these fifty years, the Empire State building gets demolished. [b]'s property of height relative to the Empire State building

[111] It is generally taken to be the case that an entity's identity is intimately tied up with the entity's properties. Being identical and being qualitatively indiscernible (having the same set of qualitative properties) are two ways of expressing sameness. It is commonly accepted that there is some resemblance between the notions. How the notions come apart is the problem to be solved.

changes. Despite this change in [b]'s extrinsic properties, it seems intuitive to regard it as exactly the same building as it was prior to the demolition of its neighbour. Hence, change in extrinsic properties do not have any effect on an entity's identity over time.

I argue that this intuition is misguiding, and we should be concerned about change in extrinsic properties over time. I will show, in the following subsections why an entity cannot maintain its identity throughout changes to its extrinsic properties. In the case illustrated above, we should *not* regard [b] as the same building before and after changes to its property of height relative to the Empire State, no matter how these changes come about. I argue that there is no good explanation of how an entity can have inconsistent extrinsic properties at different times (like the properties of being both shorter and taller than the Empire State Building), whilst maintaining its identity.

2.1 Motivating the Problem of Temporary *Extrinsics*

Even when accepting that there are no intrinsic properties, the challenge of how an entity persists through changes in its properties remains. In this section I will argue that an entity cannot maintain its identity through a change in its properties. There can be no change in (extrinsic) properties without a change in identity (and vice versa). I begin motivating this position by introducing Leibniz's law.

Leibniz's law suggests that any change in properties (regardless of whether they're relational or non-relational), creates a change in the identity of the object that possesses those properties (or a change in w*hat there is)*. Leibniz's law can be understood as a biconditional between identity and qualitative indiscernibility. Any two things that have the same set of properties (or are qualitatively indiscernible) must be identical, and any two things that are identical must have the same set of properties (or be qualitatively indiscernible).

$x=y \leftrightarrow \ \forall F(Fx \leftrightarrow Fy)$

This biconditional suggests that we should draw no distinction between numerical identity and qualitative identity. The relevant notion of identity that should be focused on is identity which cannot persist through any change in properties.[112] In a case where an object has changed its temperature from cooler to hotter, it is no longer the same object as it was before it had undergone the change. To support this claim, the conditional 'if an entity changes its properties, then it changes its identity' needs defending. In what follows, I will

[112] Various formulations of Leibniz's law that distinguish which properties are relevant have been offered in more recent literature. Forrest (2020) suggests that the 'strong' version of the principle considers only intrinsic properties as relevant properties, whereas the 'weak' version of the principle considers both intrinsic and extrinsic properties.

defend both conditionals that make up the biconditional in turn. I begin with the direction of the conditional that is most relevant for my purposes:

Indiscernibility of identicals: $x{=}y \rightarrow \forall F(Fx \leftrightarrow Fy)$

This is usually taken as the least controversial of the two principles that make up Leibniz's law. It states that if two entities are identical with each other then they have the same properties. In the words of Ladyman and Bigaj (2010: 18), it can also be summarised by saying that the 'individuality of objects can be grounded in their attributes'.

If this principle were false, then we are faced with problems regarding how else the individuality of an entity might be grounded. A rejection of this principle raises the concern: in virtue of what other things do entities have individuality? There seems no other answer aside from an answer involving the entity's properties, or qualitative discernability. If there is no available alternative, denying that the individuality of entities is grounded in their properties, implies that the individuality of entities is ungrounded, or self-grounded. As I have already shown, there are reasons to consider ungroundedness or self-grounding as problematic, and explanatorily unsatisfactory. Being ungrounded amounts to being ontologically independent, and problematically fundamental. Individuality being self-grounded means that things must be reflexively dependent, giving us an unsatisfactory account of individuation. In order to avoid encountering both the problems associated with independence and self-dependence, we should accept that an entity's individuality is dependent upon its properties.

The principle that identity and individuality are dependent on an entity's properties reflects common intuition and lacks plausible alternatives. If we are to accept that individuality and identity are dependent upon attributes, as well as the conclusion made in §1.3, that there are no intrinsic, non-relational properties, then it follows that individuality and identity are dependent upon relational properties only. *Identity is relationally constituted*. An entity is dependent for its identity on its properties, and every property it has is extrinsic. Therefore, an entity's identity, formed from its properties, is dependent on all other entities which are involved in its set of relational properties. This is an idea that will become centrally important later on.

If the indiscernibility of identicals is true, then this means that object's identity cannot persist over time, since with time comes change in properties. An object changes its identity from moment to moment. Any change in moment means a change in the temporal (and possibly also spatial) location of the object. Change of the property of spatiotemporal location means change of identity.

The inability for the identity of an object to persist through any change of property may strike most as counterintuitive. Commonly we would want to accept that the keyboard that I am currently using to type this sentence is the same keyboard as that which I used to type the previous sentence. Despite such common intuition, I argue that we should accept that the keyboard has not maintained its identity. The keyboard possesses a relational property between itself and a time, and this relational property changes between t1 and t2. This change in property means that it cannot be identical to the keyboard that existed previously.

Identity of indiscernibles: $\forall F(Fx \leftrightarrow Fy) \rightarrow x{=}y$

The reverse of the indiscernibility of identicals, that together makes up the biconditional of Leibniz law, is the identity of indiscernables. The identity of indiscernables states that if x and y have an identical set of properties, then x and y are numerically identical. In other words, there cannot be non-identical entities with the same set of properties. It is equivalent to the principle that McTaggart calls the 'Dissimilarity of the Diverse' (1927: §94), which states that if x and y are distinct, then x has at least one property that y does not, or vice versa. This principle is more controversial than the previous principle, since on the surface it seems possible to be able to have two entities that are exactly alike in their properties, and that remain distinct. Moreover, it has come under criticism by Black (1952), who proposed an influential counterexample to the principle.

The indiscernibility of identicals does not need to be defended in order to achieve the purpose of this section, which is to show that an entity cannot persist through a change in its extrinsic properties. However, I will show how it follows from the positions I have already defended earlier in the chapter. It is also useful to discuss the ways that proponents of the principle can respond to Black's challenge, because this discussion will highlight the relevance of spatiotemporal location and substantivalism. I will come to show how those who accept substantivalism must commit to an extrinsic property of every entity, that involves the entity in relation to its spatiotemporal location.

First, I will show how the identity of indiscernibles is supported by arguments already defended. If we accept that all properties are relational, then no entity can be exactly duplicated with all of its properties remaining intact.[114] This is the upshot of Relational

[114] Perhaps the only way this could be possible, is if an exact duplication were to exist at exactly the same spatiotemporal location as the original. In this case, it seems that we must accept that either this 'duplication' is numerically identical to the original, or that a duplication in the same exact location is not metaphysically possible.

Quantum Mechanics, introduced in §1.2 of this chapter. The rejection of intrinsic properties implies that there are no properties that can be exactly preserved over duplication. All properties are (at least in some small way) dependent on some other feature of the entity's environment.[115] It follows from the rejection of intrinsic properties that there can be no distinct, qualitatively indiscernible entities. There are no properties which an entity can possess that do not rely in some way on that entity's position in relation to other things. Therefore, any duplication or distinct entity will have different properties, relative to its own different position in relation to other things.

The principle can be defended from challenges put to it. Max Black's (1952) proposed counterexample to the identity of indiscernibles involves the possibility of a completely symmetrical universe. This universe would contain nothing but two spheres that resemble each other exactly:

"Isn't it logically possible that the universe should have contained nothing but two exactly similar spheres? We might suppose that each was made of chemically pure iron, had a diameter of one mile, that they had the same temperature, colour, and so on, and that nothing else existed. Then every quality and relational characteristic of the one would also be a property of the other. Now, if what I am describing is logically possible, it is not impossible for two things to have all their properties in common. This seems to me to refute the principle." (1952: 156)

This example is useful to be able to demonstrate the importance of spatiotemporal location, as a property which is relevant to the identity of things. My reaction to this example is to emphasise the different spatial locations of the two spheres. If the spheres are located in different places, then they have at least one differing property- the property of location. This makes them discernible, and therefore able to be distinct. Black shares the thought that the locations of the spheres must be addressed. In Black's dialogue between *characters* A and B, B offers the example of the spheres, and *his opponent,* A, responds thus:

"A: ... Each of the spheres will surely differ from the other in being at some distance from that other one, but at no distance from itself- that is to say, it will bear at least one relation to itself- being at no distance from, or being in the same place as- that it does not bear to the other. And this will serve to distinguish it from the other.

B: Not at all. Each will have the relational characteristic being at a distance of two miles, from the centre of a sphere one mile in diameter, etc. And each will have the relational characteristic (if you want to call it that) of being in the same place as itself. The two are alike in this respect as in all others.

[115] This way may not be directly observable or perceived as significant.

A: But look here. Each sphere occupies a different place; and this at least will distinguish them from one another." (Black 1952: 157).

At this point in the dialogue, B responds by suggesting that being at 'different places' is no different from having some distance between the spheres, because there is no 'independent existence' of places for the spheres to be located at. Since there is no difference between the 'distance properties' of the two spheres, this means that 'location properties' are not an issue. Making this move commits B to a non-substantivalist metaphysical position. The disagreement between A and B that proceeds in the dialogue is a disagreement about whether we should be substantivalist (accepting that objects and spacetime are distinct, so that object must be related to regions of spacetime by occupying them) or supersubstantivalist (accepting that objects are not distinct from spacetime, so that no relation is needed). It seems that if we are substantivalist, then we must accept that the spheres are discernible, as they have different relational properties to different regions of space. Therefore, the principle of the identity of indiscernibles stays intact. If we are supersubstantivalist, rejecting the independent existence of spacetime, or if we reject spacetime altogether, then the example remains difficult for the proponent of the principle.

The debate between substantivalism and supersubstantivalism is relevant to my defence of the lack of persistence of an entity over time. The substantivalist who accepts that extrinsic properties are relevant to identity of an entity must accept that an entity's identity changes from moment to moment, because its extrinsic property of its spatiotemporal location changes from moment to moment. The supersubstantivalist, on the other hand, does not need to commit to entities having the extrinsic property of spatiotemporal location, because they reject that an entity is distinct from spacetime.

Perhaps one way that the supersubstantivalist proponent of the principle can respond to the example, is to highlight that even in the case of the spheres, the spheres have parts such as hemispheres (divided by a diameter at any given angle). These hemispheres can exist at different distances from the hemispheres in the opposite sphere. For example, the left hemisphere of the left sphere and the right hemisphere of the right sphere will exist at a different distances from the left hemisphere of the right sphere and the right hemisphere of the left sphere. This is represented in the figure 10 below:

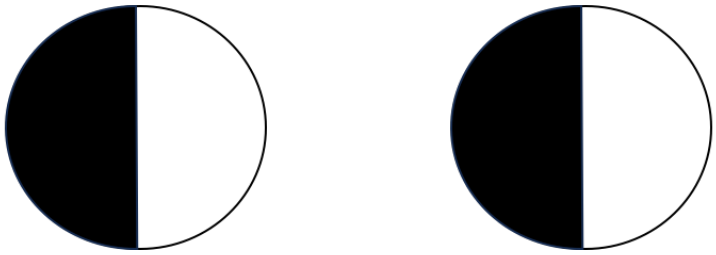

Figure 10

In this case, the white portion of the sphere on the left-hand side and the black portion of the sphere on the right-hand side have a different distance when compared with the white portion of the sphere on the left-hand side and the black portion of the sphere on the right-hand side. If it is correct to claim that this amounts to differing properties between the two symmetrical spheres, then the principle of the identity of indiscernibles can be preserved even by the supersubstantivalist, and does not necessarily commit us to substantivalism.

With both of the principles that make up Leibniz's biconditional defended, I have shown that it is reasonable to claim that an entity's identity is dependent on all of its relational properties. With some relational properties changing from moment to moment, such as an entity's relation to time and space (for the substantivalist), or spatiotemporal position in relation to other entities (for the supersubstantivalist), it is reasonable to think that an entity's identity cannot be preserved from moment to moment.

In what follows, I will address potential solutions to the problem of temporary extrinsics, that I have motivated here. I will respond to suggestions of ways to preserve identity over time and argue that they cannot defend the strict and literal notion of identity from changing over time. The metaphysical notion of identity that we should stay focussed on cannot survive a change in any properties, even when they are purely extrinsic.

2.2 Responding to Ways of Preserving Identity Over Time

I. Three Place Properties

One strategy to preserve the identity of an entity over time, is to turn two-place relational properties, that hold between the entity and something external, into three place properties, that hold between the entity, something external, and a time. For example, the property of being 'shorter than' can hold between building [b] and building [c], and this

property can also be related to time, t1. 'Taller than' can hold between [b] and [c], related to time t2, making the extrinsic properties compatible at different times.[116]

Whilst this provides a response to the question of how an object can possess incompatible properties at different times, I argue that this does little to preserve the identity of that object over time (or at least, the strict sense of identity we should be focused on). Relativising properties to times (or, relativising their instantiations, or the truth values of propositions about them) might demonstrate how it is consistent for an object to possess the property of being 'taller than' at t1 and 'shorter than' at t2. However, it cannot be used in response to arguments from Leibniz's law considered in the previous section. This is because it does nothing positive in favour of demonstrating why we should consider the object that has undergone such a change in properties as the same object between t1 and t2.

II. Four Dimensionalism

A different suggestion inspired by Lewis' preferred way of responding to his problem of temporary intrinsics, is to suggest that entities are extended temporally as well as spatially, giving them four dimensions. This potential solution does not turn on the intrinsic/extrinsic property distinction, so it can be applied to tackle the problem of temporary extrinsics. The suggestion is that entities have temporal parts in addition to spatial parts. Each temporal part of the entity exists at each different time. When an entity is whole, this entirety must include all of its parts that span over its entire timeline of existence, from creation to cessation. When we perceive an entity at any one moment in time, we are perceiving only one temporal part or 'slice' of it- the slice that exists at that moment. To illustrate, imagine a building that was constructed in 2010 and demolished in 2020. The building is extended spatially (covering a certain number of square metres), as well as extended temporally (covering ten years). At any given moment, we cannot perceive the *whole* building, as the building as a whole has temporal parts that exist at every moment within its ten-year timeline. In this way, we can understand the identity of the building, as a whole, to be consistent over time. Lewis calls this kind of persistence over time 'perdurance' as opposed to 'endurance'. To perdure through time is to 'have different temporal parts, or stages, at different times, though no one part of it is wholly present at

[116] This strategy is reminiscent of a response to the problem of temporary *intrinsics* discussed by Lewis (1986, 202–205). Lewis considers the option of making one place properties (holding only between the entity and the property, into two place properties (holding between the entity, a property and a time). For example, an entity could be round at t1 and square at t2. Lewis' problem with this option is that it transforms (what he considers to be) intrinsic properties into extrinsic properties. Of course, this is of no concern to me, as I consider all properties to be extrinsic.

more than one time' (Lewis 1986: 202), whereas to endure through time is to 'persist by being wholly present at more than one time' (1986: 202).

By suggesting that entities can perdure through different temporal parts existing at different times, Lewis provides a solution to the problem of temporary intrinsics. As highlighted, it could also be used in response to the problem of temporary extrinsics, that occurs when we drop the commitment to intrinsic properties. Different temporal parts can have different properties; therefore, it is possible for an entity as a whole to have inconsistent properties at different times. Just as it is consistent for one spatial part of an object to have different properties to another spatial part (for example, my hand has a different shape to my foot), it is also consistent for one temporal part of an entity to have different properties to another (for example, right now I have short hair, whereas in the past I have had long hair). My temporal part with long hair only exists at t1, and my temporal part with short hair only exists at t2. According to Lewis, this means that there is no problem posed by either temporal part changing its properties.

'We perdure; we are made up of temporal parts, and our temporary intrinsics are properties of these parts, wherein they differ one from another. There is no problem at all about how different things can differ in their intrinsic properties' (Lewis 1986: 204).

Now that I've presented this solution, I will argue for why it cannot succeed in preserving identity over time and change in properties. Perdurantists like Lewis face the problem of how temporal parts compose to form a whole with a persisting identity. How should we understand why a certain collection of temporal parts are related in such a way that their complete set constitutes a whole 'worm' through time? How can we explain why this collection of temporal parts constitutes a whole, as opposed to some other collection?

For a moment, let's shift this talk of composition to more familiar mereological cases. When it comes to debates about mereological composition, those who endorse restricted composition are committed to giving some account of why composition occurs in some cases and not others (why do some parts compose to form a whole and others don't?). Van Inwagen (1990: 21) famously calls this the *special composition question*. This question has a parallel with the perdurantism case. Similarly, those who endorse perdurantism are committed to giving some account of difference between collections of temporal parts which have a sum, and collections which do not (Hawley, 2023: §8). In effect, they must answer a form of the special composition question that involves composition *over time*.

Such accounts of restricted composition come with problems. For example, they struggle to deal with borderline cases, where there is no clear answer as to which collections of temporal parts compose a whole, and which do not. Cases like this occur when there is no clear answer to when an entity came into existence, and when it goes out of existence.

Accounts that permit ontological vagueness in these cases may be considered as problematic. For reasons such as this, four-dimensionalists often commit to unrestricted composition. Lewis himself takes this route. Any two temporal parts (no matter their location in space or time) can compose some whole. "Any combination of temporal parts of any objects from any times, no matter how scattered and disparate, compose an object" (Hawley, 2023: §8). This commits the four-dimensionalist to an enormous number of objects. For reasons such as the extreme cost to parsimony, I suggest it is worth looking for an alternative that does not come at such ontological costs.

Unrestricted four-dimensionalism implies that we pick out certain entities, as entities which are considered 'wholes' that perdure over time, according to our own interests. However, these entities with a temporally extended identity are mere convenient designations, and we cannot say that they have an identity in the strict sense. If this is the case, then why not reject unrestricted composition, and accept that different temporal parts are entities with different identities? This suggestion amounts to rejecting composition over time, and in effect, rejecting persistence of identity through time. Temporal parts never compose to form a whole with a perduring identity, instead, each temporal part should be thought of as its own entity with its own properties. In this way, we remain focussed on the strict sense of identity that we should be most metaphysically interested in (identity which cannot endure a change in properties), and we avoid the huge cost to parsimony. For these reasons, I recommend rejecting four-dimensionalism as a solution to the problem of temporary extrinsics.

I have shown that two potential solutions to the problem of temporary extrinsics come with their own with problems. Therefore, in the absence of a successful solution, we should accept that an entity cannot preserve its identity through change to its extrinsic properties. Entities change their extrinsic properties from moment to moment.[120] If the reader accepts my arguments, then this means that entities change their identity from moment to moment. There is no identity over time.

[120] This is true for both substantivalists and supersubstantivalists. Substantivalists will take it to be true, since they must regard spatiotemporal location as an extrinsic property, and entities must change their spatiotemporal location from moment to moment. Supersubstantivalists may not regard spatiotemporal location as a relevant extrinsic property, but other extrinsic properties, such as distances from other entities are extrinsic properties that change from moment to moment.

3. Conclusion: No Distinction Between Essential and Contingent Properties

I have argued (in §1 of this chapter) that all properties of any given entity are relational. All properties depend on something other than the entity they are instantiated by. They would no longer be the same property if some certain external conditions were to be changed. I have also argued (in §2 of this chapter) that the identity of an entity should be thought of in the strict and literal sense of identity, meaning that an entity's identity cannot survive any change to any of its properties.

Since all properties are dependent on external conditions, and all entities are dependent on all of their properties, then by the transitivity of dependence, this means that all entities are dependent for their identity on external conditions. All identities are constituted by a certain set of relational properties.

This view has some radical consequences. Since an entity's relations to the external world are ever changing, that entity's identity is ever changing. Every time I move, I become something different. If I were sat on the other side of the room instead of where I am sat now, I would be a different entity. Relational properties of spatiotemporal location are just as crucial to my identity as any other relational property.[121]

No intrinsic properties, and no persistence of identity over time, means that the distinction typically made between essential and contingent properties breaks down, because all properties are essential properties. Essential properties are typically considered as properties that an entity must maintain in order for its identity to be maintained. This modal understanding of essential properties is endorsed by Correia (2007), for example. Contingent properties, on the other hand, are properties that can change whilst the identity of the entity stays the same. If we take the strict understanding of identity that I have endorsed, then an entity cannot endure a change in any of its properties, meaning that all properties are essential in some sense. Meanwhile, all properties are non-intrinsic, implying that relations to other entities are in some sense essential to an entity's identity. Entities have no essence of their own, their identity is entirely dependent on external things. In this way, the narrative of the interdependence (for both existence *and identity*) of entities re-emerges.

To illustrate, lets return to the example introduced in §2.3 of chapter 2, involving the dependence of a spec of dust on the cosmos, and the dependence of the cosmos on the spec

[121] This is assuming substantivalism.

of dust. The dependence can be understood to hold in both directions here, because all properties of both the cosmos and the spec of dust are essential. Therefore, every relation they hold to every other entity (that their properties depend on) is essential to their identity. In this way, we can understand the cosmos and the spec of dust as symmetrically dependent for their existence and their identity.

These arguments are relevant to fundamentality. If an entity were to be fundamental, it must depend on nothing else for its existence nor its identity. If the identity of an entity essentially involves all of its properties, then no property can be dependent on any other entity, in order for that entity to be fundamental. However, I have argued in this chapter that all properties are relational, therefore all properties hold with dependence on some other entity. Put together, these arguments reach the conclusion that nothing is fundamental, since nothing has its existence and its identity completely independently.

These arguments are also relevant to *svabhava*. Recall, in chapter 1 §3.2 I discussed Westerhoff's explication of essence svabhava, in which 'having svabhava' can be understood as 'having intrinsic, essential properties'. This chapter has argued that no properties are intrinsic. Therefore, no entity has svabhava, when understood in the sense of essence svabhava. The next chapter discusses the topic of the absence svabhava, understood by Madhyamaka Buddhists as 'emptiness', directly.

This chapter has argued that all properties are relational properties, and has argued that an entity's identity is dependent on all of its properties. Together, these produce the outcome that an entity's identity is dependent on other entities (that contribute to its relational properties). Any entity with any properties must be a dependent entity. Being dependent on something else means being non-fundamental. Hence, (assuming that all entities have some properties), taking this stance on properties means accepting anti-foundationalism.

I will end the chapter by summarising this argument, whilst illustrating with an example. Let's take our example of an entity to be the New York building, [b]. I have argued that all of the properties of the building are relational or extrinsic properties (including its shape and its mass). All the building's properties depend (at least partially) on some other entity or external conditions. There are no properties of the building that would always be duplicated perfectly into any possible world. The building is dependent for its identity (using a strict and literal notion of identity) on all of its properties. It would not be the same building if one of its properties were to be changed. This means that building [b] becomes building [c], whenever its relations to its external conditions change. If all of the above statements about the building are true, then it is true that the building ontologically depends on all things that contribute to its set of extrinsic properties. Given [b] is ontologically dependent on something other than itself, [b] is non-fundamental. This

applies to all entities that possess properties. Given my reservations about entities that are ontologically simple, and possess no properties, this implies that all entities are non-fundamental; hence, interdependent anti-foundationalism.

Chapter 4: Buddhist Metaphysical Emptiness

This chapter provides further motivation for pursuing an anti-foundationalist and interdependent account of reality's structure. I turn to concepts and arguments from the Buddhist tradition that can provide support for such an account, as well as give insight into the direction in which it should be developed in the following chapters. After setting up some background in §1, I introduce the key pillars of Nāgārjuna's philosophy in §2, including Catuskoti methodology, dependent origination, and the 'middle way' of emptiness. Then, I will spend §3 discussing Nāgārjuna's arguments used to reach his metaphysical conclusions, in order to see how they can support my own.

1. Madhyamaka Buddhism

The views and arguments I've presented so far have interesting connections to ideas from the Buddhist tradition, specifically, Madhyamaka Buddhist ideas first explored and recorded by Nāgārjuna. The reader might recall from Chapter 1 that I introduced the school of the *Middle Way*, known in Sanskrit as *Madhyamaka*. This chapter focuses on expounding Buddhist thought about the Middle Way, and exploring its relevance to the debate about dependence and fundamentality. The first part of the chapter will consider the Madhyamika's rich concept of emptiness, and how it can be understood as the middle way between 'ontological extremes'. It also introduces a connection between a relational interpretation of emptiness, and an anti-foundationalist metaphysical picture. The second part will consider arguments central to the Madhyamaka tradition that together support their conclusion of the middle way of emptiness. When I develop my own account of anti-foundationalism, I do so in such a way that it can receive support from arguments aimed at defending emptiness.

Drawing upon the ideas and arguments of richly developed and sophisticated philosophical traditions from outside of the Western philosophical canon serves to make an account more powerful, especially in cases such as fundamentality. As illustrated in Chapter 1, the history of Western philosophy has seen the fundamentality debate be so dominated by intuitions that favour hierarchy and foundations, that other possibilities have been neglected. By considering the development of the debate within traditions where the same pre-theoretical intuitions are not shared to the same extent, these other possibilities can be properly evaluated. The Buddhist tradition offers a wide range of positions in the fundamentality debate, some of which were covered in the overview given in Chapter 1. It offers positions familiar to the Western reader, such as the Abhidarma's

position that resembles atomic foundationalism, or the Yogacara's position that resembles idealist foundationalism. In addition, it offers positions that present new, unfamiliar territory within the fundamentality debate, unlike any present in Western philosophy. The Madhyamaka's position presents such an example.[123] Whilst offering novel contributions to the debate, the Madhyamaka position also shows resemblances to interdependent anti-foundationalism. After exploring interpretations of the Madhyamaka position in this chapter, as well as Nāgārjuna's arguments in support it, it should become clear why the discussion of fundamentality from a Buddhist perspective is integral for the development of my anti-foundationalist account.

1.1 Historical Context

Before delving into the detail of Nāgārjuna's ideas, some context is useful in order to situate them with the historical development of Buddhism, and to be able to understand the metaphysical ideas at play. To quickly recap: Madhyamaka is a Mahayana Buddhist school - part of a version of Buddhism that emerged out of criticism of the older Abidharma tradition. This emergence was considered as the second of three 'turnings of the Wheel of Dharma' (Oliver 2019: 103), referring to the second of three great moments in the history of Buddhism, each building upon the last and revealing new teachings. Mahayana schools, including Madhyamaka, spread from India, where this second major Buddhist movement was founded by Nāgārjuna around 200CE, across Central Asia and East Asia. Upon entering China, Mahayana Buddhism met with distinctly Chinese philosophy, such as that of the Confucian and the Daoist, to produce unmistakably Chinese forms of Mahayana Buddhism (Priest 2018: 127), to which I will return.

The distinctive ideas of the Madhyamaka school reflect its position at the intersection of older and more traditional Indian Buddhist thought, and the existing metaphysics of Chinese traditions that it came into contact with. Recall, the older Abidharma tradition, founded on the earliest Indian Buddhist texts, argued that since something cannot be constructed out of nothing, hence there must be something fundamental- *dharmas*- from which everything is constructed. This places them into the broad 'atomistic foundationalist' camp, holding that all things depend on some independent, distinct, and simple physical entities. In stark contrast, the Chinese ideas that Madhyamaka Buddhism came into contact with, often held the position that all things are ultimately unified rather than ultimately distinct. For instance, Daoism is most often interpreted in terms of some form of Monism, with all things arising from the One- produced and sustained by the

[123] For support for this claim, and a wonderful illustration of the value of considering the philosophy of non- Western traditions, see the introduction of Priest's chapter in Emmanuel (2013).

impersonal and all-pervading force, known as the Dao, or the 'Way'.[124] Due to such pervading ideas, it can be understood that Chinese metaphysics represents 'the opposite of philosophies based on dualisms or ontologically independent substances' (Perkins 2023: §3.1).

We can say that European metaphysics has tended to focus on problems of reconciliation (how ontologically distinct things can interact), while Chinese metaphysics has been more concerned with problems of distinction (what grounds individuation). (Perkins 2023, §3.1).

If we can broadly understand the philosophy that Madhyamaka came from as philosophy based on distinctness, and the philosophy that Madhyamaka was influenced by a philosophy based on unity, then we can understand how Madhyamaka philosophy might fall somewhere in-between. I hold that this is one of the key ways of understanding what is meant by being the school of the *Middle Way*. This historical background is useful to keep in mind when approaching and understanding ideas about the Middle Way, that I introduce in the next section.

1.2 The Middle Way

The Middle Way is the central idea that Nāgārjuna's Madhyamaka philosophy is based upon, and represents a theme of undermining dualisms and dichotomies that are endorsed by other traditions. Above we can see the dichotomy that has been endorsed by the Indian Abhidarma tradition, the Chinese Daoist tradition, and by European traditions alike: that what is fundamental must be either multiple or one. These traditions might be thought to have a stake in a simple debate between two positions: priority monism, or priority pluralism[125]. I understand Nāgārjuna, and the Madhyamaka Buddhist, to endorse neither of these options, and undermine the thought that these are the only two available options in the debate.

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[124] Perhaps the most common place to locate the authoritative statement of Daoist metaphysics is in Chapter Forty-Two of the Daodejing, where is reads:
The Way produces the One.
The One produces the two.
Two produces three.
Three produces the myriad creatures.
The myriad creatures shoulder yin and embrace yang, and by blending these qi, "vital energies" they attain harmony. (Trans. Ivanhoe, 2001: 183)

[125] Recall, priority monism can be broadly characterised as the view that takes the cosmos as a whole as fundamental, and priority pluralism can be broadly characterised as the view that takes some set of parts of the universe as fundamental.

My understanding of Nāgārjuna's philosophy is that it is largely based upon adopting a midpoint between two key dualities, or 'ontological extremes'. The dualities can be stated in terms of a pair of disjunctions. Thus, we may think of entities as:

(a) Being identical or being distinct.
(b) Being existent or being non-existent.

These two dualities can be applied to both individual entities, and all things universally. When applied universally, these become:

(c) All things are ultimately unified, or all things are ultimately distinct.
(d) Realism (some things do exist) or nihilism (nothing exists).

Nāgārjuna argues for the Middle Way between each of these disjunctions. I interpret the Middle Way that he endorses, in each of these cases, as interdependence. Throughout the course of the chapter, I will explain how interdependence can be understood as the midpoint between the 'ontological extremes' above. For now, I will give some brief indications of how this might work, in order to help with understanding the ideas going on in the remainder of the chapter.

(a) Two entities can be neither completely identical nor completely distinct, by being interdependent.
(b) An entity can be neither completely (independently) existent, nor completely non-existent, by existing through dependence on something else.
(c) All things can be neither ultimately unified, nor ultimately distinct by all things being interdependent.
(d) It could be the case that we can neither endorse 'full-blown realism', since there are no entities that exist independently, nor that we can endorse 'full-blown nihilism', because entities exist, yet they exist whilst being dependent for their existence on some other entity.

I will expand and explain each of these claims in more detail shortly. First, it is necessary to introduce the Mūlamadhyamakakārikā, Nāgārjuna's foundational text of the Madhyamaka tradition, where these ideas are found.

2. The Mūlamadhyamakakārikā

I can't help but find irony in the most common way of translating the title of Nāgārjuna's most important work on establishing ideas about the Middle Way and *emptiness*, the Mūlamadhyamakakārikā (or MMK). Of those who have published English translations, the

majority, including Jay Garfield, who's 1995 translation I will focus on, have interpreted the title as *The Fundamental Wisdom of the Middle Way.* As will become clear, I understand Nāgārjuna's text as a discourse aimed at rejecting the existence of the fundamental, hence the irony.[126]

Differences between interpretations of the MMK have been the underpinning of differences between major Buddhist philosophical schools.[127] The text produced a huge amount of commentarial literature, as a result of the interpretative challenges it poses, and the wide variation of perspectives that commentators choose to illuminate. The translation and commentary by Garfield that I have chosen to focus on most centrally is translated from Tibetan[128], and reflects the Prāsangika-Madhyamika interpretation, that became highly influential in China and Japan. This is my preferred translation to work from, since it reflects the Buddhist tradition in which influential Madhyamika commentators including Candrakīrti and Buddhapālita can be found. Candrakīrti's commentaries are particularly helpful for understanding the more elusive aspects of emptiness. Previous translations into English have been influenced by alternative perspectives and interests of the tradition of the translator, including Zen, Theravāda, and Kantian.[129] Focussing solely on understanding the thought of the Madhyamika is my aim. A translation that most faithfully represents the arguments of the Madhyamaka tradition is the best starting point for understanding the tradition on its own terms.

One way to get to the heart of such a complex text is to give sketch of the conclusion that it reaches, and of the methodology through which it gets there. It is also useful to give an outline of the range of technical terms that the text makes use of in order to refer to concepts uniquely located in the Buddhist tradition. Therefore, before analysing Nāgārjuna's arguments for the Middle Way of Emptiness in the MMK, I will first approach the text by clarifying its methodology, terminology and conclusion.

2.1 Nāgārjuna's Conclusion: *Śūnyatā*

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[126] Others including the Dharmachakra translation committee (2011) and the Padmakara translation group (2008) have preferred the 'Root stanzas/ verses of the Middle Way' as opposed to using the term 'fundamental'. This indicates that 'fundamental' and 'root' are more likely to be used in the sense of 'important', perhaps with the further implication of 'basic' or 'core'. Alternatively, 'fundamental' might be used in its epistemic sense, implying, 'most important for developing understanding'. Therefore, the use of the term 'fundamental' in the title in not inconsistent with the way in which I interpret the content of the text.

[127] See, for example, Hayes (2023).

[128] Garfield retranslates from Tibetan into English, from a prior translation from its original Sanskrit into Tibetan.

[129] Garfield (1995: viii).

Back in Chapter 1, I outlined a number of ways of understanding the central Buddhist concept of *svabhava*, and argued for an interpretation of svabhava that can be directly compared to the Western notion of fundamentality, in terms of ontological independence. Despite the vast array of ways in which Nāgārjuna's conclusion- *śūnyatā*- has been understood, there is one point that all Madhyamikas and commentators agree upon: that *śūnyatā is the universal absence of svabhava*.[130] By understanding svabhava as akin to ontological independence, the existence of which indicates some form of foundationalism, we can read off an understanding of śūnyatā. Śūnyatā can be understood as the universal lack of any existing entity with ontological independence and hence, we can understand śūnyatā as an indicator of anti-foundationalism.

Evidence for the interpretation of svabhava in terms of ontological independence comes from Westerhoff's analysis of substance svabhava (see §1.5).[131] It also comes from Garfield's translation. Garfield (1995: 89) offers an insight from the Tibetan understanding of lacking svabhava. If an entity does not have svabhava, it does not exist "from its own side" (Garfield, 1995: 89). This implies that entities that have svabhava exist independently.

Garfield joins the majority of other work on Nāgārjuna in the English language in translating śūnyatā as *emptiness*- 'the Buddhist technical term for the lack of independent existence, inherent existence, or essence in things' (1995: 88). Nāgārjuna argues for the emptiness of all phenomena including causation, objects, and people. Using the term 'empty' to characterise these phenomena invites the question 'what are they empty of?'. The answer, as I understand it, is to be empty of self-grounded essence, or any independent nature that is nonrelational.[132] Hence, for any phenomenon to have a nature, it must be a purely relational nature. I understand universal emptiness as equivalent to universal interdependence. Through being caught up in a vast and complex web of mutual dependence relations, it can be the case that the nature of every entity is purely relational, and there exists no entity that is ontologically independent or ultimately fundamental.

Priest (2018b) illustrates this relational understanding of emptiness with an example about the self. What it means to be a certain person is not that there is some intrinsically self-defining identity. Instead, what it means to be a certain person is to stand in a certain set of relations to other things, including a date and place of birth, interpersonal relationships with parents, partners and friends, particular events, careers, social groups etc. Anything that satisfies the conditions of standing in that very particular and complex set of relations,

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[130] Westerhoff (2024: §2), Hamilton (2001: 94-95), Garfield (1995: 89), Priest (2018: 129).

[131] According to Westerhoff (2009: 12, 25), Candrakīrti defines svabhava as something that does "not depend on anything else".

[132] Priest answers this question, saying that śūnyatā is the emptiness of 'intrinsic nature' and 'self-being' (2018b).

can be considered as the person in question. There is no mysterious, additional, intrinsic self or soul that exists 'behind' the set of relations. According to Nāgārjuna and the Madhyamaka tradition, this is the case for all things. Everything that exists is what it is only by relating to other things (Priest, 2018b). This understanding of emptiness is backed up by the popular Mahayana Sutra, the *Prajñāpāramitāhṛdaya (The Heart of the Perfection of Wisdom),* in which the Bodhisattva[133] *Avalokiteśvara* famously states, 'Form is Emptiness (śūnyatā). Emptiness is Form'. In Thich Nhat Hanh's (2012) commentary on the sutra, he explains how Avalokiteśvara claims that all things are empty. Thich Nhat Hanh then answers the question, 'empty of what?', by saying 'empty of a separate self'. Nothing can exist by itself alone, it must co-exist and 'inter-be' with all other things. The phrase that Nhat Hanh uses in his commentary, which I consider to perfectly summarise this understanding of emptiness, is that 'being empty of a separate self means being full of everything else' (2012). In other words, emptiness of an ontologically independent nature, means being full of the nature of other things- all things have a completely relational, and interdependent nature.[134] This can be understood to support the conclusions made in the previous chapter, to the effect that all essential properties are relational, and no properties are intrinsic.

Before moving on to explore the method through which Nāgārjuna defends this view, there is one more important idea about emptiness to introduce: the Net of Indra. The Net of Indra is a metaphor used to illustrate how a network of interdependence can give rise to emptiness. The metaphor was developed by Mahayana schools, and can be found in the Buddhāvataṃsaka Sūtra, which illuminates Madhyamaka ideas about śūnyatā. Both the Sutra and the metaphor it contains, however, are most commonly associated with the Chinese Huayan school of Buddhism, which took the Sutra as its foundation. As I will discuss in chapter 6, the Huayan school have a distinctive and extreme understanding of emptiness, which departs from the view that I will be defending. Therefore, I will introduce the metaphor in Madhyamaka terms for now.

The Net of Indra paints a picture of a magnificent web-like net, hung across the entire universe by a deity, Indra. The net stretches out infinitely in all directions. At every

[133] Bodhisattvas are Buddhist figures who help lead others towards enlightenment through their profound compassion.

[134] Emptiness has been interpreted other ways, for example, as a form of non-existence or nihilism (see Wood, 1994). This is due to an understanding of emptiness as a denial of existence, as opposed to a denial of *inherent* existence. However, there are many who reject this understanding of emptiness, for example, according to Garfield, 'to say that the table is empty is hence simply to say that it lacks essence and importantly *not* to say that it is completely non-existent' (1995: 89).

intersection of the latticework, Indra has placed a shining jewel, polished and cut in such a way that it reflects every other jewel in the net - an infinite number of jewels. Any single jewel reflects every other jewel, all of which reflect every other jewel, and so on, so that the process of reflection is also infinite. The metaphor depicts all existing entities as the jewels in the net, and the reflections between them depict how they are interrelated. By all jewels depending on all other jewels for their nature and reflections, it can be seen that there is no jewel, or part of the world that has a completely independent nature, or could exist with svabhava. Through universal reflection or interdependence, we get universal emptiness (Cook 1977). This idea is useful to introduce here to illustrate how emptiness can come from a network of interdependence, and I will return to discuss it further in chapter 6.

2.2 Nāgārjuna's methodology: *Catuṣkoṭi*

Nāgārjuna has a distinctive way of arguing for śūnyatā in the MMK. The method used and repeated throughout the MMK involves systematically eliminating all possible ways in which a certain phenomenon could have svabhava. The system used to reject all svabhavic possibilities, which features frequently throughout Buddhist literature beyond Nāgārjuna, is called the *catuṣkoṭi*. Any Buddhist argument structured as a *catuṣkoṭi* consists of a list of four possibilities: a thesis, its negation, the conjunction of the thesis and its negation, and the disjunction of the thesis and its negation. In the majority of cases, when Nāgārjuna uses a *catuṣkoṭi*, he proceeds by rejecting each of the four possibilities, in order to undermine a presumption that all four of the possibilities rest upon (the presumption of the existence of svabhava). However, in some cases, the *catuṣkoṭi* is used in order to affirm one of the options and reject the rest, or even, in rarer cases, to affirm all four of the options.[136]

Since Nāgārjuna's methodology relies heavily on the use of negation to reject engrained presuppositions such as svabhava, it is worth clarifying the ways in which this negation works. In order to avoid contradiction, Nāgārjuna employs two different types of negation. Negation that preserves the presuppositions of the proposition negated, and negation that cancels the presuppositions of the proposition negated.[137] Westerhoff (2006: 371-373) offers an illustration of these two types, with an example in which there are just two (as opposed to four) alternatives. Consider the case of a proposition 'the number 7 is yellow', and its negation, 'the number 7 is not yellow'. Clearly, neither of these propositions are true, as they both make a category mistake based upon presupposing that numbers are the kinds of things that can be coloured. To express this, we can state:

'For all numbers x, *not* (yellow[x] or not yellow[x]).' (2006: 372)

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[136] An example of an affirmation of the four alternatives is in MMK 18:8.

[137] *Paryudāsa* negation preserves presuppositions, and *Prasajya* negation cancels presuppositions.

This statement can avoid the contradictory implication that all numbers are both yellow or not yellow, by utilising the two different kinds of negation. The first 'not' outside of the brackets, is presumption-cancelling negation[138], and the 'not' inside of the brackets is presupposition-preserving negation.[139] Preserving the presupposition that number can be coloured, and denying that numbers are yellow, implies that numbers are some other colour.

In order to argue for the non-existence of svabhava, Nāgārjuna often uses presupposition cancelling negation to deny both a concept (which presupposes svabhava), and its presupposition preserving negation (which also presupposes svabhava). Another example from Westerhoff to illustrate this is from the MMK 18:10:

'Whatever comes into being dependent on some object is not identical with that object, nor is it different from that object' (trans. Garfield 1995: 49)

In this case, the concept 'identical with a' and its presupposition-preserving negation, 'different from a' are both denied by Nāgārjuna, using presupposition-cancelling negation, because both options involve svabhava-presupposing concepts.

'…In the same way that we can spot a deficiency in calling the number seven yellow, (because the presupposition that numbers are things that could possibly have a colour is not fulfilled), Nāgārjuna regards common-sense concepts like causation to be deficient because they presuppose the existence of svabhava, the independent existence of objects, which, Nāgārjuna argues, is a presupposition that is not fulfilled.' (Westerhoff 2009: 72).

The negation of both identity and distinction between two dependent objects is a theme I will return to, since I consider it central to understanding the Middle way and emptiness. For now, I return back to the classic structure of the *catuṣkoṭi*, and how to understand the four alternatives that it lists:

i) A (the concept)
ii) ¬A (its presupposition-preserving negation)
iii) A ∧ ¬A (the conjunction of the concept and its presupposition-preserving negation)
iv) ¬ (A ∨ ¬A) (denying the disjunction of the concept and its presupposition-preserving negation)

[138] Westerhoff calls this 'exclusion negation' (2009: 72).
[139] Westerhoff calls this 'choice negation'. (2009: 72)

Having explained how Nāgārjuna will typically use presupposition cancelling negation to deny both (i) and (ii), I move on to discussing his rejection of alternatives (iii) and (iv). Option (iii) is often swiftly rejected by Nāgārjuna, on the grounds of either internal contradiction, or on the grounds of inheriting both of the problems faced by (i) and (ii).[140] In the cases where Nāgārjuna does not reject (iii) on the grounds of contradiction, the contradiction is avoided by relativising A and ¬A to different mereological parts, or different perspectives of the concept under investigation. For example, in Candrakīrti's discussion of Nāgārjuna's investigation of causation, he does not claim that it is contradictory for something to be partly caused by itself, and partly caused by something else.[141] The problem Nāgārjuna identifies for this kind of case is that it faces the same difficulties of both analyses of causation, which Nāgārjuna argues should be rejected when discussing (i) and (ii).

There is more to be said about the fourth option of the *catuṣkoṭi*, (iv). In the way it is presented above, options (iii) and (iv) are logically equivalent. ¬ (A ∨ ¬A) can be rewritten as (¬A ∧¬¬A), which according to double negation elimination, is equivalent to A ∧ ¬A. If this straightforward understanding were what Nāgārjuna intended, then he would be dealing with three options as opposed to four, and the rejection of this option would be understood as A ∨ ¬A. This is not how we should understand Nāgārjuna's arguments.

The way that Westerhoff suggests that we should understand this situation, is by accepting that presumption-cancelling negation does not obey double negation elimination (2009: 75-76). When Nāgārjuna rejects the fourth option, ¬¬ (A ∨ ¬A), we cannot move from this to A ∨ ¬A, because the kind of negation that Nagarjuna uses does work in this way. In cases of presumption cancelling negation, we do not want to imply that a proposition being true or false are the only possible options, instead we want to undermine both options. Westerhoff suggests that it is more accurate and intuitive to read option (iv) as 'I do not assert that (A ∨ ¬A)', so that the rejection of option (iv) becomes 'I do not assert that I do not assert that (A ∨ ¬A)', in which case, double use of negation does not cancel out (2009: 78-79).

To illustrate, consider the example of Candrakīrti's investigation of a chariot (See Westerhoff 2024: 142 for commentary). Using the structure of the *catuṣkoṭi*, Candrakīrti argues for rejecting (i) that the chariot is ultimately x, (ii) that the chariot is not ultimately x, (iii) that the chariot is ultimately both x and not x, and that (iv) the chariot does not exist. The outcome of this kind of argument is that we cannot define what a chariot

[140] An example of Nagarjuna rejecting option (iii) on the grounds of contradiction is located by Westerhoff: MMK, 25:14 contains a rejection of both the existence and non-existence of Nirvana, by drawing an analogy with light and darkness being unable to exist in the same place.
[141] Westerhoff (2009: 83).

ultimately is, or deny that it exists. Therefore, we must reject the presumption that these options are based on. We must reject the presumption of svabhava. The chariot does not exist with an ultimate independent identity, and equally, we cannot deny that the chariot exists. Therefore, we must accept that the chariot exists without svabhava. The chariot is empty. The formula that this example uses can be applied universally, to universally undermine the presupposition of svabhava, through rejecting the use of the qualifier 'ultimately'. Many of Nāgārjuna's uses of the *catuṣkoṭi*[142] follow the formula of rejecting all four of the following possibilities:

i) [Ultimately] A
ii) [Ultimately] ¬A
iii) [Ultimately] A ∧ ¬A
iv) [Ultimately] ¬ (A ∨ ¬A)

A rejection of all four of these alternatives is a rejection of the presupposition 'ultimately'. Denying all of the ways that [A] can 'ultimately' be, implies denying all ways of [A] having svabhava.[143]

2.3 Clarifying Nāgārjuna's Terminology

2.3.1 Existence

The MMK uses certain terms in a technical sense, that can depart from a typical Western understanding. It is worth clarifying some of these, before moving on to explore some of the MMK's classic arguments in favour of emptiness that use *catuṣkoṭi* methodology. First, is Nāgārjuna's use of 'existence' and 'non-existence'. Often, when Nāgārjuna refers to existence, he is referring to 'full-blown' existence, in the sense of existing with svabhava—in a state of ontological independence. Nāgārjuna's understanding of existence is intimately related to dependence, so that if an entity is dependent, it may exist, but not in the strict sense of 'full blown existence'. According to Nāgārjuna, only things that exist completely independently hit the high marker of real or 'ultimate' existence.

'Nāgārjuna relentlessly analyses phenomena or processes that appear to exist independently and argues that they cannot so exist, and yet, though lacking the inherent existence imputed to them either by naïve common sense or by sophisticated realistic philosophical theory, these phenomena are non-existent- they are, he argues, conventionally real.' (Garfield, 1995: 88)

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[142] An important example of which will be discussed in more detail in §3.
[143] Applying this formula to all things also implies a rejection of any 'ultimate reality'- a concept introduced in the next section.

We might imagine existence on a scale, with independent existence at one end, and complete non-existence at the other. Intermediate points on the scale are determined by the degree to which a phenomenon depends on others. A phenomenon cannot exist fully, in Nāgārjuna's sense of existence, if its existence is qualified by, or reliant on, something else. This is the typical way in which Nāgārjuna refers to existence in the MMK. Exceptions, where 'dependent existence' is employed, will be explicitly noted.

'From the standpoint of Mādhyamika philosophy, when we ask of a phenomenon, Does it exist?, we must always pay careful attention to the sense of the word "exist" that is at work. We might mean exist inherently that is, in virtue of being a substance independent of its attributes, in virtue of having an essence, and so forth, or we might mean exist conventionally, that is to exist dependently, to be the conventional referent of a term, but not to have any independent existence'. (Garfield, 1995: 90)

2.3.2 Dependent Origination

Closely related to the notion of existence, is the Buddhist notion of *Pratītyasamutpāda*, or dependent origination. According to Nāgārjuna, anything that originates, is produced, or arises through dependence on other things, must be empty of inherent existence (Hopkins 1996: 162). Dependence implies emptiness. If all things come about and go out of existence through dependent origination, then all things must be empty. The opening verse of the MMK praises the Buddha for teaching that dependent origination/ arising is how all things come about, and tread the middle path of emptiness, between the extremes of full-blown independent existence, and full-blown non-existence:

'I bow down to the perfect Buddha,

The best of propounders, who taught

That what dependently arises

Has no cessation, no production,

No annihilation, no permanence, no coming,

No going, no difference, no sameness,

Is free of the elaborations of

inherent existence and is at peace'

(Hopkins 1996: 162)

Hopkins (1996: 164-167) gives an insight into the etymology of the Buddhist term *pratītyasamutpāda* . Not only does the term refer to the process of coming into existence

dependent on other things, the phenomena themselves that come into existence are also 'dependent-arisings'. Hopkins gives the examples, that pots, consciousness, and emptiness are all 'dependent-arisings'. This perhaps implies a collapse in the common distinction between static entities and dynamic processes. Nāgārjuna himself etymologizes the term in his Sixty Stanzas of Reasoning:

'*[Pratītyasamutpāda is] that which is produced having met this and that [collection of causes and conditions] and is not inherently produced*' (Hopkins 1996: 165)

Nāgārjuna suggests that *prati* be taken as 'this and that' (*tat tat*), which implies that all things rely on a multitude of diverse other things, rather than just one other thing. *Prati* itself means 'reliance', so we can understand the term together as 'reliance on this and that', or 'arising through meeting' (1996: 166). Hopkins also clarifies Candrakīrti's comments that 'causes and conditions' should not be understood simply as things that proceed an effect, but also as any kind of thing that a phenomenon can rely on (not only through causation but also ontological dependence), such as its mereological parts, or even cognition that might designate the phenomenon as a certain concept. 'Arising' should not only be understood as 'production', but also as 'establishing existence' (1996: 168).

The sketch of *pratītyasamutpāda* just given, is compatible with a picture where all phenomena depend on some other *asymmetrically.* The arising of all things in dependence on some external conditions could be captured by an infinitist structure of reality, where all things depend on another through asymmetric relations, forming an infinite chain. Indeed, in his 2018 chapter, Priest characterises the Madhyamika's endorsement of emptiness through dependent arising, as a form of non-well founded infinitism. There are, however, reasons to understand *pratītyasamutpāda* through symmetric dependence. These include Garfield's influential translation of *pratītyasamutpāda* as 'dependent co-arising' (1995: 91). This translation is present in perhaps the most famous verse of the MMK (24: 18):

'Whatever is dependently co-arisen

that is explained to be emptiness.

That, being a dependent designation,

Is itself the middle way.'

(Garfield 1995: 69)

The prefix 'co' implies that the dependent origination of all empty things is *two-way* dependence. Understanding *pratītyasamutpāda* as *co-dependent arising*, suggests revising reading the Madhymika as endorsing an infinitist structure, and instead preferring an

understanding in terms of symmetric dependence relations, in line with those represented by the Net of Indra. Further reason for understanding *pratītyasamutpāda* in terms of interdependence comes from an example found in MMK (8:12):

'A doer arises dependent on a doing,

And a doing arises dependent on a doer.'

(Hopkins 1996: 168)

It is clear to see that this example is not intended to be understood in the sense of diachronic causation, between the doer and the doing.[145] It should instead be understood as synchronic mutual ontological dependence. A picture which allows for such examples implies the lack of difference in relative fundamentality between mutually dependent entities, and permits the possibility that all phenomena are dependent on some other, without encountering any infinite descent of relative fundamentality levels.

2.3.3 Ultimate and Conventional Reality

Another idea intimately linked with existence and dependent origination is Nāgārjuna's position on the *doctrine of two truths*. This is a doctrine with a complex history throughout the Buddhist tradition, and one that has had a multitude of interpretations. A key part of its complexity is that the Sanskrit word *satya* can be translated into English as both 'reality' and 'truth', depending on context. In some contexts, the term can mean both (Priest, 2010: 214). Priest focuses on talking about two kinds of *reality*, and introduces two models that can be used to explain the distinction between the two. I will also introduce a third, that I consider important for understanding the *emptiness of emptiness*- the idea that emptiness itself cannot be considered as fundamental. In what follows, I will introduce Priest's two models of the distinction between ultimate and conventional reality, which draw upon ideas from other Buddhist schools beyond the Madhyamaka. These serve as useful context for introducing the third model- the model which I consider crucial for understanding Nāgārjuna's ideas about emptiness as anti-foundationalist.

Priest introduces the first, most straightforward way of understanding the difference between ultimate and conventional reality, which is most similar to the understanding used by earlier Buddhist schools, as well as by the Yogācāra school. This is to understand ultimate and conventional reality as referring to the illusory appearance of reality, and

[145] If it was intended that the example be understood in terms of causation, then this would imply the possibility of 'reverse' causation between the doer (which temporally precedes the doing), and the doing (which occurs at a later time). Hopkins suggests that this is not what Nāgārjuna intends to claim: 'It is clear that Nāgārjuna does not mean that these two cause each other, with each one arising after the other one; such would be impossible' (1996: 168).

actual true reality. They are two perspectives on the same phenomena. To understand and interact with conventional reality is to live within a world of illusion, that according to the Buddhist, leads to clinging and suffering. Upon enlightenment, one can come to understand and interact with ultimate reality, through which one can escape the cycles of suffering (Priest 2010: 216).

The second way of understanding ultimate reality and conventional reality suggested by Priest, is that they do not merely differ as a matter of perspective. Conventional reality can be understood as a *manifestation* of ultimate reality- the two referring to objectively different things. This understanding has heavy Chinese influence from Daoist metaphysics. In Daoism, the 'myriad things' which make up the world we interact with, are manifestations of the underlying Dao.[146] When Buddhism met with Daoism upon its arrival in China, The Dao often became associated with Buddhist emptiness, with both of these being regarded as 'ultimate reality'. In the same way as the myriad things- or conventional reality- becomes manifested from the Dao, Chinese Buddhist ideas involved the manifestation of conventional reality from underlying emptiness. This 'manifestation' can be understood as analogous to a person's actions being a manifestation of their personality (Priest 2010: 217). In the same way as actions and personality are interdependent, so could the interdependence of conventional and ultimate reality be understood. This understanding of ultimate and conventional reality comes with a puzzle about how to understand the difference in ontological status or priority between the two kinds of reality. This is a puzzle that divides Buddhist schools, and still gets debated amongst Buddhist scholars.[147] Priest notes that another problem with this second way of understanding, is that comparing the Buddhist concept of emptiness with the Daoist concept of the Dao is misleading (2010: 217). The central reason for the disanalogy between the two, according to my understanding, is that the Dao is best understood by Daoists as the one fundamental. In contrast, emptiness should not be understood by Madhyamaka Buddhists as fundamental, since emptiness means that nothing has independent, inherent existence, including the phenomena of emptiness itself- emptiness should be considered as empty as everything else.

The third way of understanding ultimate and conventional reality is useful for illuminating the idea of the emptiness of emptiness. On this understanding, ultimate reality is understood as akin to existence at the fundamental level, or having inherent or intrinsic existence. When understood in this way, there is *no* ultimate reality. Thakchoe (2024) offers this third understanding as the way that Candrakīrti develops Nāgārjuna's thought, in the

[146] The Dao, or 'The Way' is the concept at the centre of Daoism. It can be understood as an impersonal, immanent, cosmic force, which creates and sustains the 'myriad things' which we interact with in the world (Wang 2011: 9).

[147] See, for instance, Thakchoe (2024).

Prāsaṅgika Madhyamaka tradition: 'ultimate reality is ultimately unreal (or put it differently, emptiness is ultimately empty)' (2024: §4.2.2).

As Priest puts it, Nāgārjuna was *serious* about the idea that *all* things are empty (2010: 214). This includes emptiness itself. Therefore, it is misleading to identify ultimate reality with emptiness. If ultimate reality implies independent existence or independently objective truth, then emptiness along with all other things, cannot be 'ultimate reality'.
Understood in this way, conventional reality can be taken to mean the reality that comes about through dependent arising, made up of empty phenomena. In contrast, ultimate reality can be taken to mean reality that has svabhava, that would exist independently. Of course, Nāgārjuna's project is to deny this kind of reality. An example of Nāgārjuna using the conventional/ ultimate distinction in this way, is in an uncharacteristic use of the *catuṣkoṭi*, that affirms rather than denies all four options (MMK 18:8):

(i) *Everything is conventionally real*

(ii) *Nothing is ultimately real*

(iii) *Everything is both conventionally real, and ultimately unreal.*

(iv) *Nothing is either conventionally unreal, or ultimately real.*

(Garfield 1995: 250)

Garfield (1995: 250) understands the upshot of this verse to be that nothing is ultimately real, or completely non-existent. The two kinds of reality are required to be able to articulate this. Garfield also suggests that the same sentiment can be asserted by the following:

'Nothing is real (ultimately). Nothing is not-real (everything has a kind of reality, [or exists conventionally]). Nothing is both real and not-real (in the same sense- that would be contradictory). Nothing is neither real nor not-real (the law of excluded middle).' (Garfield 1995: 251)

Understanding the doctrine of two truths (or two realities) in this way can be helpful for understanding what is required by the 'emptiness of emptiness'. Emptiness should not be understood as the ultimate truth, or ultimate nature of reality. This would imply that something *does have* an ultimate, inherent nature: reality would have the inherent nature of emptiness. In other words, emptiness would be fundamental. This cannot be the case. According to Nāgārjuna emptiness itself must be empty.

2.4 Returning to the Middle Way

Nāgārjuna's Middle Way has already been introduced, but having an understanding of śūnyatā (emptiness), *pratītyasamutpāda* (dependent origination), and conventional/ultimate reality will shed light on the remarks made about the Middle Way about the beginning of the chapter. Here I give a short recap.

Earlier I suggested understanding emptiness as the middle way between:

(a) Being identical or being distinct.
(b) Being existent or being non-existent.
(c) All things being unified, or all things being distinct.
(d) Realism (things do exist) or nihilism (things don't exist).

Using the tools and terminology introduced thus far, I can now say some more about each of (a)-(d).

(a) If [a] and [b] are interdependent phenomena, then neither have their own inherent nature, or nature 'from its own side'. Their existence and nature influence are dependent upon each other. In this way, we can understand how they occupy a middle position between being completely identical, and completely distinct. Interdependence is the middle way between identity and distinction. Recall, MMK 18:10, which when translated by Garfield, seems to support this understanding:

'Whatever comes into being dependent on some object is not identical with that object, nor is it different from that object.'

(b) §2.3.1 clarified that often, when Nāgārjuna talks of existence, he refers to independent existence. From this, we can understand how coming into existence through dependent arising is the middle way between independent existence (existence with svabhava) and complete nonexistence. In other words, conventional existence is the middle way between ultimate existence, and non-existence (in both the ultimate and conventional sense). This is supported by MMK 18:8:

'Everything is both conventionally real, and ultimately unreal. Nothing is either conventionally unreal, or ultimately real.'

(c) Svabhava cannot be found at either the level of the cosmos as an entire whole, or at the level of the smallest indivisible atom. It is a mistake to interpret emptiness in terms of priority monism or priority pluralism, since either of these would result in emptiness as a form of ultimate reality. Through interdependence, and

pratītyasamutpāda, all phenomena can exist at the same level of relative fundamentality, neither prioritising the whole nor the parts. This is supported by the MMK's dedicatory verses:

'What dependently arises has… no difference, no sameness… and is free from inherent existence'

(d) The middle way between independent existence and complete non-existence can be applied universally, so that we cannot understand emptiness as a form of realism (since this would imply the independent existence of some certain phenomena, such as physical objects). Equally, emptiness cannot be understood as a form of nihilism, since entities do exist in the conventional sense- they are not completely non-existent. The interdependence of all things is the way in which all things exist conventionally. Hence interdependence can be understood as the middle way between realism and nihilism. This is supported by MMK 24: 18:

'Whatever is dependently co-arisen that is explained to be emptiness. That, being a dependent designation, is itself the middle way.'

I will make one final point before moving on to look at Nāgārjuna's most influential arguments for emptiness including his arguments from causation, properties and change. This final point is about the Madhyamika's recognition of more dependence relations at play in the world, than those that we commonly perceive and accept. To illustrate this point, I draw upon Priest's (2013) paper, which offers a neat and contained example of how one case of interdependence creates the middle way. Recall, that Abhidharma Buddhism can be characterised broadly as realist (since it commits to elements of the physical world-dharmas, which have svabhava). Yogācāra Buddhism (the other main Mahayana school), can be broadly characterised as idealist (since it commits to the view that all things are conceptually dependent, yet there is some aspect of the mind that is not conditioned). Priest highlights that realism and idealism both hold asymmetric relations of dependence between the material world and concepts. They disagree on which is more fundamental than the other. This reflects the debate between Abhidharma and Yogācāra. For Nāgārjuna and the Madhyamika, there is a symmetrical dependence relation between the material world and concepts. Some concepts are dependent on other concepts, some concepts are dependent on material phenomena, some material phenomena are dependent on concepts (Priest 2013: 219). This symmetrical dependence relation creates the middle way between mind independent realism and idealism. As Priest puts it, 'each of these other schools was right in seeing some of the dependence relations. Each was wrong in seeing only some of them.' This is a sentiment that I intend for my account of the structure of reality to reflect. Each form of foundationalism is correct in identifying some chain of dependence, whether that lead to realism, idealism, monism, atomism, etc. However, what each form of foundationalism fails to do, is to appreciate *all* of the dependence relations at work. Once

these are appreciated, then it becomes misleading to identify any phenomena as ultimately fundamental, since nothing is ontologically independent, or has svabhava.

3. In Favour of Emptiness

The remainder of the chapter explores three arguments from the MMK that provide reasons for accepting emptiness, and the anti-foundationalist implications of emptiness that I have discussed so far. Westerhoff (2009: 31) highlights that most classifications from the Indian and Tibetan Madhyamaka literature classify either four or five kinds of argument to refute substance svabhava, although classifications and distinctions made between each argument may vary. Three of these arguments I discuss below: the argument from causation, argument from properties, and argument from change.[150]

When discussing the three arguments below, I will offer limited defences of their premises. These defences are not intended to be watertight, but are merely intended to show that these arguments are relevant, and that there are some good reasons for taking their conclusions seriously. For this reason, I will not go into detail about objections that could be raised to each argument, and ways that one might respond. Instead, I will sketch cases in favour of each argument, with the intention of letting the reader decide the extent to which they can contribute to motivating emptiness, and its anti-foundationalist interpretation presented above. The argument I begin with, the argument from causation, is often called the Diamond Silvers argument due to its position as Nāgārjuna's primary argument against svabhava. It seems a fitting place to start.

3.1 The Diamond Silvers: Argument from Causation

The Diamond Silvers argument can be found at the very start of the MMK, with its crux set out in 1:1. The upshot of Nāgārjuna's Diamond Silvers argument is that causes and effects are interdependent, so both must be empty. Since all physical things are caught up in causation, this means all physical things must be empty.[151] The argument is structured as an argument from elimination, where four (exhaustive) options regarding the nature of causation are each rejected. Nāgārjuna uses the *catuṣkoṭi* system to list four options of ways that causation might work:

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[150] In regard to the other two potential kinds of argument, one concerns the relationship between emptiness and dependent origination, which I have already touched upon. The final kind of argument concerns numerical relations between cause and effect. I will not discuss it here, since I regard it as adding little to the argument from causation that I do discuss, and because it does not appear amongst Nāgārjuna's work. For details of this argument, see Hopkins (1983: 155-160).

[151] The obvious exception to this is abstract entities, which I will address later.

(i) Cause and effect are identical. Something is caused by itself.
(ii) Cause and effect are distinct. Something is caused by something else.
(iii) Something is caused by both itself and something else.
(iv) Something is caused by nothing at all.

Nāgārjuna works through each of these possibilities, rejecting each by reductio ad absurdum. As might be expected, the majority of the argumentation is focused on rejecting option (ii), since this is the most common and intuitive way of understanding causation, which implies it requires the most work in order to reject.

It is important to note that Nāgārjuna's aim is not to undermine the concept of causation itself. The target of the argument is to reject *causation that presumes svabhava*. The four options that Nāgārjuna rejects are all ways that causation might work under the prior assumption that svabhava exists. It is this prior assumption that Nāgārjuna targets, using the kind of presumption-cancelling negation discussed in §2.3.2.

In order for a cause or effect to have svabhava, it must have an independent or inherent existence and nature. It is simple to see why an effect can never be considered as something that could have svabhava, since it is within its definition that it will always be dependent for its existence and nature on something else- a cause. Causation is a type of dependence relation,[154] and an effect will always be dependent on a cause. It is less straightforward to see why a cause cannot be something that could have svabhava, since there is nothing in the definition of a cause that implies it must depend on something else. Nāgārjuna's argument attempts to show that just as an effect always requires a cause, a cause also requires an effect. The argument's outcome is that a cause and an effect must depend upon each other, therefore neither is ontologically independent, and both should be understood as empty.

Rejecting options (i) and (iv)

Arguments against (i) and (iv) are most straightforward, so I begin with them. Let's start with (i). Option (i) implies it is possible for something to be self-causing (given an understanding of cause and effect as identical). Nāgārjuna argues that the notion of something causing itself is problematic. This is because there is no conceivable way for an effect to be contained within a cause. It's easy to see why. A necessary feature of causation is change. As Westerhoff puts it, 'if the causal relation has any essential properties, its role as a transmitter of change is surely one of them' (2009: 101). Nāgārjuna argues, then, that

[154] Albeit, a diachronic one, as opposed to the synchronic ones I have predominantly been focussing on.

a self-caused entity is immune to real change and therefore that self-causation isn't possible. Being self-causing implies being unchanging and eternal:

'If a is self-originating then it exists and perpetuates itself independently of anything else. For a is self-originating just in case a necessary and sufficient cause of its existence at time t is its existence at time t - δ, and so on backwards in time. It follows that there is no point in time at which a comes into existence, for its existence at one instant is necessary for its existence at the next. It also follows that there is no point in time at which it goes out of existence, for its existence at one time is sufficient for its existence at the next. So, calling something 'self-causing' is just a rather misleading way of saying that it is eternal.' (Ganeri 2001: 52).

Even by having a complete description of a causal field, or acquaintance with all elements of a causal field, we will not encounter the effect amongst it. The example Westerhoff gives to show this, is that even we are acquainted with all causes and conditions, including a spark, fuel, and the presence of oxygen, we will not find amongst these causes the effect- an explosion. Even if the effect can be directly inferred from the complete set of causes and conditions, it is not literally present amongst it, which is the reason Nāgārjuna gives for rejecting option (i).

Moving on to option (iv), related worries arise from the lack of distinct relata in an understanding of a causation where something can be caused by nothing at all. Option (iv) implies that it is possible for something we understand to be an effect to come about independently of a cause. Two problems with the idea of the absence of causation can be identified in the Buddhist literature (Westerhoff 2009: 112). The first is that a key source of our knowledge about the world is through following causal patterns. If we were to deny that things that we perceive are connected through causal patterns, then this would prove hugely problematic for our epistemic access to the world. Second, is that a world without causation would be significantly phenomenologically different from the world we experience. The world we experience contains causal patterns, such that certain effects follow from certain causes- a window smashing follows from a ball being thrown at it, it doesn't follow from a ball being thrown in the opposite direction. In the words of Westerhoff, 'it is sufficient to note that [a world without causation] is not the world we experience, and therefore the fourth alternative is no satisfactory explication of our concept of causality' (2009: 112).

Rejecting option (ii)

This is the option that Nāgārjuna spends the most time refuting, since it is naturally how we are likely to conceive of causal relations. We usually understand causes and effects to be distinct things- two relata that are connected by a causal relation. Take the classic example

of a ball causing a window to smash. The cause, the ball and its momentum in a trajectory towards the window, is usually thought to be distinct from the effect- the smashed window.

I identify three kinds of argument attributed to Nāgārjuna amongst commentarial literature,[156] for why this understanding of causation is problematic. The first reason for doubting the distinction between cause and effect, is a common aversion to an infinite causal chain. Given Nāgārjuna has already rejected the possibility of self-causation, the cause of a certain phenomenon [x], must be something other than itself. If [x] is caused by something distinct, [y], then [y] cannot be caused by [x], since this would lead to problems with the temporal ordering of causation, as well as self-causation through causal loops. Even if [x] isn't directly the reflexive cause of itself, an indirect causal loop through [x] and [y] means that [x] is still a part of its own cause. This means there must be a third thing that causes [y], and so on, to produce an infinitely descending chain of causes. An infinite chain of causes implies an infinite number of entities, as well as an infinite receding timeline, which come with problems that are familiar to Western and Buddhist philosophers alike (Westerhoff 2009: 105).

Nāgārjuna's second argument against option (ii), the option that cause and effect are distinct, is aimed at showing why we cannot conceive of causes and effects as completely independent of one another. In the case of the ball smashing the window, the ball, with its complete set of properties, including its causal properties, cannot be understood independently of its effect, the smashed window. The window, and its complete set of properties, including being smashed, cannot be understood independently of the cause- the ball. For this reason, we must reject that causes and effects are *completely* distinct, in the sense of being independent from one another. They are not wholly distinct in a way in which either could have svabhava, because of their dependence upon each other. It is important to keep in mind that Nāgārjuna's argument is directed towards refuting that causes or effects possibly have svabhava, by showing that every way of conceiving of causation (i)-(iv) implies that causes and effects must be dependent, as opposed to independent. 'When the Mādhyamika speaks of causation by distinct objects, it is this kind of distinctness he has in mind: cause and effect are supposed to exist independently, it is not sufficient to assume that they merely differ by having some different properties.' (Westerhoff 2009: 107).

It remains to be demonstrated why a cause must depend on an effect, and an effect must depend on a cause. The latter direction of dependence is easier to defend.
The effect could not exist (as an effect, with all of its particular properties) if it were not for *that particular* cause. An effect is existentially dependent on its cause. Of course, the effect

[156] See Westerhoff (2009: 107-109) and Garfield (1995: 112-116)

may have been brought about by some different cause. However, in such a counterfactual case, the effect would have had *some* different properties. The effect is therefore *rigidly* existentially dependent upon its cause.[158]

In the other direction, the dependence of a cause on its effect can be understood as *notional dependence*. Without the effect, the cause would not have a causal nature- it could not be described as a cause. Being able to be described as a cause is a part of its nature. Furthermore, being *the cause of that effect, in particular, is part of its nature.* Westerhoff calls this *notional dependence* (2009: 107), which is just as relevant to Nāgārjuna as existential dependence. If the ball is the cause of the window smashing, then it is part of *that* balls nature to be not just a cause, but *the* cause of *that particular* window smashing.

Related to the second argument is the third: cause and effect cannot be distinct, in the sense of being ontologically independent from one another, because if they were, then they would be indistinguishable from non-causally related entities. Nāgārjuna argues (MMK 20: 4) that in a case where a cause and its effect were ontologically independent from each other, they could not be distinguished from entities or phenomena that are not causally related. If there were a collection of entities that were all ontologically independent, possessing svabhava, then there would be no way of justifying the claim that some of the entities are causes, and some of the entities are effects. Garfield (1995: 259) explains this point, by saying that if an effect were distinct from a cause, and had svabhava, then there would be no difference between the cause of that effect, and an arbitrary collection of phenomena with no relation to it at all. Put another way, Westerhoff (2009: 109) expresses this idea: 'a set of independently existent objects does not give us any indication of how the causal relations between them should be established. Since the existence of any object does not influence the existence of any other object, it appears to be completely arbitrary which way around we consider the causal relations between the objects to hold'.

In summary, these three arguments aim to show that a causal connection requires interdependence between causes and effects. An effect could not exist without its cause, and a cause could not be called a cause without its effect. 'The point is rather that independently existent objects… could not be the relata of a causal relation' (Westerhoff 2009: 108). Option (ii), when understood as the claim that cause and effect are completely distinct and ontologically independent, should be rejected.

[158] I will explain and discuss rigid existential dependence further in chapter 6.

Rejecting option (iii)

The final option that Nāgārjuna considers is that a phenomenon is caused both by itself and by others. As already mentioned, this third conjunctive alternative of the Catuskoti is usually dismissed very briefly. In this case, this is because self-causation and causation by other objects have already been refuted individually, there is no need to refute both of them together. Their problems as a conjunction are inherited from their problems individually.

Westerhoff highlights that this kind of reasoning will not always be sufficient to refute all ways in which option (iii) might be understood. For example, Garfield proposes that a 'happy compromise' between options (i) and (ii) may be the most accurate way of understanding causation: an effect is brought about by both itself as a potentiality present in the cause, as well as the presence of other external conditions.

'The happy compromise doctrine that emerges is the doctrine of causation-by-both: Effects are the result of the joint operation of the effect itself in potentio and the external conditions necessary to raise the effect's mode of existence from potentiality to actuality.' (Garfield 1995: 107).

The proponent of Nāgārjuna's argument can respond to this kind of 'happy compromise' case by emphasising that it cannot preserve the svabhava of cause and effect. In this case, the phenomena involved in causation are not independent. The conditions internal and external to the cause, needed to bring the effect about, are interdependent. Cause and effect would still turn out to be interdependent, and lack svabhava. The point that Nāgārjuna makes by rejecting (iii) is that whilst interdependence is the middle way between the identity and independence of cause and effect, it is *not* the c*ombination* of identity and independence.

Conclusion

Nāgārjuna's argument aims to have refuted all the possible ways in which relata involved in causation relations could have svabhava. Therefore, we should reject the basic assumption of the presence of svabhava that is common amongst our typical understandings of causation. Anything that is involved in causation cannot be a distinct, ontologically independent object, that exists 'from its own side' (See Westerhoff 2009: 113). Since causation is pervasive across the world that we perceive and experience, there cannot be entities with svabhava within this world.[159]

[159] Since it could be argued that abstract objects are not involved in causal relations, it should be noted that this argument may not prevent the existence of svabhava with amongst abstract things.

We can interpret Nāgārjuna's conclusion in terms of advocating for the middle way between the complete identity and the complete difference of cause and effect. This is the middle way between the disjunction (a) discussed in §2.4. Cause and effect are neither completely identical, nor completely distinct. Instead, cause and effect are best understood as ontologically *interdependent*- a conclusion that renders them both empty of svabhava.
Given the connections between svabhava and fundamentality already defended, the conclusion of this argument suggests that any entity that is part of a causal relation cannot be a candidate for fundamentalia.[160] In what follows, I explore two more arguments made by Nāgārjuna in favour of the emptiness of phenomena, which can in turn be used in support of interdependent anti-foundationalism.

3.2 Argument from Properties

Nāgārjuna's argument from properties, and the following argument from change, compliment the arguments I made about the lack of intrinsic properties, and the lack of identity over time in the previous chapter. The conclusion that each of these arguments leads to, once again, is that there is nothing that exists with its own completely independent and inherent nature, or with svabhava. From this we can infer that there exist no fundamentalia, when fundamentalia are identified with ontological independence.

The upshot of the argument from properties (presented in MMK 5: 2-5) is that there is no way of understanding properties, and the particular substances that they could attach to, whilst maintaining that either could have svabhava. Entities and their properties cannot be fully identical nor fully distinct. All entities depend on their properties, and all properties depend on the entities that instantiate them. There can be no ontologically independent bare particulars or uninstantiated properties. The four options of the *catuṣkoṭi* can be listed as:

(i) Particulars and properties are identical.
(ii) Particulars and properties are distinct.
(iii) Particulars and properties are both identical and distinct.
(iv) Particulars do not possess properties.

Similar to the case of cause and effect, when the *catuṣkoṭi* is applied to particulars and properties, the most attention is given to the rejection of option (ii), that particulars and properties could possibly be distinct, independently existing phenomena. Option (ii)

[160] Anti-foundationalism cannot be directly read off this, as it is possible that other phenomena that are not involved in causation could be fundamental. In order to turn this in to an argument for anti-foundationalism, another premise must be added- that all existing phenomena are involved in some causal relation. This premise is harder to defend.

would imply the possibility of entities without properties (bare particulars), and properties without entities that instantiate them.

Both bare particulars and independent properties can be rejected. As noted in chapter 1, it is common to conceive of an ontologically independent thing as something with no properties, since anything that possesses properties could be said to depend in some way on those properties. The existence of a completely simple bare particular that completely lacks properties is difficult to conceive. Nāgārjuna reasons further, that the independent existence of something with no properties is self-contradictory. An independent entity would have the characterising property of inherent or independent existence.

'A thing without a characteristic has never existed' (MMK 5.2)

Westerhoff explains that if a bare particular were to have svabhava and independent existence, then it would have its nature (bare-particular-ness) intrinsically and essentially. This would be a problem, because something cannot have two svabhavas, and therefore this bare particular could not have any other intrinsic characteristics. Any other characteristic of a 'primary existent' must be relational, and therefore introduce dependence. The possibility of bare-particulars characterised only by their bare-particular-ness can be criticised by claiming that such an entity must depend on mental construction.

'A bare particular from which all characteristics have been abstracted away bears the mark of the mind's handiwork. Bare particulars are nothing we are immediately (or even mediately) acquainted with- they are conceptual fictions, theoretical entities introduced in the course of constructing an ontological theory, but hardly anything we could suppose exists "from its own side", independent of conscious minds.' (Westerhoff 2009: 34).

Option (ii) also rejects the existence of completely independent properties with their own svabhava, since a property must always be attached to some entity. Drawing upon Siderits (2003: 122-123), it is suggested that this possibility is rejected because properties as primary existents cannot be individuated. We may only be able to tell them apart by organising them into clusters, which would again, introduce dependence.

'If the characterised object is not posited, there will be no characteristic either' (MMK 5.4)

Rejecting the existence of independent particulars and independent properties serves to address option (ii) of the *catuṣkoṭi*, that particulars and properties could be completely distinct. It also, in effect, addresses options (i) and (iii), that both suggest that they could be identical (particulars can be identified as properties, or properties can be identified as particulars).

Option (iv) can be disregarded for the same reason as is it was in the case of causation- that a world without particulars with properties would be vastly different from the world that we experience.

'If we treat the primary existents and their properties as distinct and independent entities (as we do in the case of ordinary objects), we realize that the two cannot be independent at all, since we cannot conceive of a primary existent without its characteristic property. If, on the other hand, we subsume primary existents under one side of the individual-property divide, that is, if we assume that they are either bare particulars (individuals without properties) or tropes (properties without individuals), it becomes evident that neither of these can play the desired role of mind-independent foundational objects existence from their own side' (Westerhoff 2009: 35).

Nāgārjuna's conclusion, once again, is that we should reject the assumption that individuals or their properties could have svabhava, and instead accept that they must be empty, because they are always mutually dependent on one another. As Westerhoff puts it, the 'only satisfactory way of understanding the relation between primary existents and their properties has to deny that there are primary existents in the first place' (2009: 36). Particulars and their properties are another case of interdependence.[161]

3.3 Argument from Change

Nāgārjuna 's argument from change makes an inference from the change that we perceive in the world, to the lack of svabhava in the world that we perceive. The presence of svabhava would imply the presence of a part of the world with permanence, however, Buddhist metaphysics across all schools regularly emphasises the impermanence of all things.[162] Just as Nāgārjuna rejects the possibility of a self-caused entity for being eternal, he rejects the possibility of anything with svabhava for being eternal.

'If there were [svabhava], the whole world

Will be unarising, unceasing,

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[161] Nāgārjuna's 'neither one nor many' argument (Westerhoff 2009: 31), can be understood as another argument about properties, focussed on the property of possessing or lacking mereological parts. This argument involves the idea that all things are either simple or complex, and fundamentals can be neither simple nor complex. x is simple iff x has no proper parts, and x is complex iff is possesses proper parts. Both of these exhaustive possibilities imply dependence. If something is complex, then it cannot be independent, because it depends on its parts (or its properties). If something is simple, then it cannot be independent, because an entity with no parts (or qualitative nature) cannot exist in a mind independent way. Both of these premises could be met with many counterarguments (for example, parts may asymmetrically depend on wholes). For such reasons, I will leave this argument aside.

[162] Impermanence is one of the *Three Marks of Existence* set out in *Dhammapada* (277-9), for example.

And static. The entire phenomenal world

Would be immutable.' (MMK 24:38)

The argument runs by rejecting two exhaustive ways in which change could come about in a world which contains elements with svabhava. (1) An entity with svabhava changes within itself- its internal elements rearrange so that the entity goes from one state to another. (2) Entities with svabhava arise and cease, going in and out of existence to produce what we perceive as change. Nāgārjuna argues that neither of these possibilities is compatible with svabhava:

'A thing itself does not change.

Something different does not change.' (MMK 13:6)

Let's begin with possibility (1). The first possibility is that an entity can undergo a change in properties, and remain the same entity, whilst also retaining its svabhava. This kind of possibility was addressed and rejected in the previous chapter, where I argued that an entity depends for its identity on all of its properties, so no entity can maintain its identity throughout a change in its properties.

Nāgārjuna addresses and rejects possibility (1) through which entities can have svabhava whilst also undergoing change. Possibility (1) suggests that entities can exist eternally, whilst change comes about due to changes in the arrangement of their eternally existing parts. The possibility of such change implies the complexity of these entities. Complexity is required so that parts can be rearranged, or properties can be changed. As soon as complexity comes into the picture, it is possible to claim that entities are dependent on their parts or properties. Hence, they cannot have svabhava. Alternatively, another way to understand how change could arise from eternally existing entities, is to attribute change to the rearrangement of the eternal entities themselves, as opposed to rearrangement of their parts. Whilst this alternative does not introduce dependence due to complexity, it introduces dependence of eternal entities on other eternal entities, and their position in relation to each other.

Moving on to possibility (2), Nāgārjuna addresses the option that change comes about due to entities with svabhava going out of existence, and being replaced with new ones, so that nothing with svabhava has to persist through a change in properties. What we perceive as an ongoing process of change macroscopically, is in fact things going in and out of existence at the microscopic level. The problems with this possibility are twofold. First, if svabhava implies eternity, then it is unclear how an entity that momentarily arises and ceases could have svabhava. Second, is that something must be responsible for the production and cessation of these entities. Whatever is responsible is what these entities

existentially depend upon. If such entities depend on causes and conditions for their transition in and out of existence, then they cannot have svabhava.

By rejecting both possibilities (1) and (2), the argument concludes that in order for change to occur, entities cannot be understood as having svabhava. Nāgārjuna's reasoning from change compliments my discussion of identity over time in the previous chapter. The arguments I offer in chapter 3 suggest that change comes about through the arising and ceasing of different entities, that can be understood to lack svabhava, due to their dependence on others. I argued that an entity cannot persist and maintain its identity through a change in its properties. I also argued that since all properties are relational, and the identity of an entity depends on all of its relational properties, then all entities can be understood as dependent on their relations to external things. In such a world, there is no possibility that anything can have svabhava. The change that we perceive can be attributed to change in relations between entities, and change in their identities. Both of these processes involve dependence, and nothing with svabhava can be dependent. Hence, we must accept that the world lacks svabhava.

4. Concluding Remarks

A world without svabhava means a world without fundamentalia. A world that is faithful to the doctrine of co-dependent origination is a world that contains interdependence. Therefore, if the reader finds Nāgārjuna's arguments for emptiness and co-dependent origination compelling, then they have reason to find an account of anti-foundationalist interdependence compelling. When I come to develop such an account in chapter 6, I will do so in a way that ensures the account is compatible with Buddhist ideas about emptiness explored in this chapter. This is important so that the account can receive support from Nāgārjuna's arguments, and avoid the problems that Nāgārjuna identifies with positing things that have svabhava. As already mentioned, if a metaphysical account of fundamentality can be supported by philosophy from beyond the Western canon, as well as by analytic arguments, then this serves to strengthen it. The following chapter will continue to explore support that anti-foundationalist interdependence might receive from places beside analytic metaphysics. Next, I will look at how interpretations of quantum physics can be shown to indicate that all entities depend on some other, and that there are no ontologically independent, fundamental entities.

Chapter 5: Interdependence and Relational Quantum Mechanics

This chapter explores how an anti-foundationalist and interdependent account of reality's structure can be shown to be consistent with our current best physics. I begin by introducing quantum mechanics, as one of the most successful physical theories to date, and I will motivate why quantum mechanics should be considered as relevant to the fundamentality debate (§1). I will outline Rovelli's *relational* interpretation of QM, and how its philosophical upshots are consistent with my metaphysical position (§2). In the second half of the chapter, I construct an argument to show that anti-foundationalist interdependence provides the best ontology for capturing the commitments of RQM, by showing that a consequence of Rovelli's interpretation is that all entities are ontologically dependent on some other, and hence, non-fundamental. This chapter does not aim to argue that Rovelli's interpretation of QM is the best interpretation, as this aim would be too ambitious for the scope of my thesis. However, I will provide some suggestions as to why the union of RQM and metaphysical anti-foundationalist interdependence might be the best way to go when tackling the puzzles that QM presents, and is worthy of further research and investigation.

1. Introducing Quantum Mechanics

The topic of quantum physics has cropped us numerous times thus far. In chapter 1, QM appears to complicate the foundationalist picture that classical physics supports, challenging the position of foundationalism as the most popular picture. In chapter 2, the discussion of examples of symmetrical dependence relations included quantum entanglement as a potential example, in which two quantum physical systems exhibit dependence in both directions. In chapter 3, I made reference to RQM, an interpretation of quantum mechanics that can be used to support the idea that there are no intrinsic properties, and that all properties are relational. In this chapter I flesh out the support that phenomena from the quantum world can provide for the account of anti-foundationalist interdependence that I defend.

The previous chapter suggested that ideas from beyond the Western cannon provide a fresh and helpful philosophical perspective on the issue of fundamentality. Similarly, this chapter suggests that physics from beyond the classical domain, can provide reason for thinking beyond our typical metaphysical assumptions, and for taking alternatives to foundationalism seriously.

Justifying an investigation into quantum mechanics, and the insight it can give to the fundamentality debate, is relatively simple. It is beneficial to any metaphysical account to

be consistent with, or better supported by our best scientific theories. Developments in the field of QM are still offering a significant challenge for physicists to understand and interpret, as we will see. Despite the live debates ongoing within the field, developments in QM are widely considered as valuable and accurate contributions to our understanding of entities at the smallest scale. Hence, it is desirable for a metaphysical account of fundamentality to complement our ever-developing 'most fundamental' physical theories, including quantum mechanics, and quantum gravity.[164]

Before exploring particular interpretations of QM, and the ontological conclusions we might draw from them, it is worth giving the reader who is not familiar with issues in QM a crash course in its most important findings, and the current problems they pose. Differences between ways of responding to these problems underpin the differences between the major interpretations of QM. Below I introduce QM in its general form, by discussing four important ideas: observations, probability, superpositions and entanglement. As a part of this introduction, it is also worth highlighting the impact and success that QM has had since it was first discovered and developed in the mid 1920's by Bohr, Heisenburg, Pauli, Born and Jordan, amongst others.

'The astonishing run of quantum theory's successes has been uninterrupted for a century, and it continues today… It is the only fundamental theory about the world that until now has never been found wrong- and which we still do not know the limits of' (Rovelli 2022: 19).

Its correct predictions and practical applications range across medicine, astronomy, chemistry and computing, as well as being integral to the development of semiconductors, lasers, teleportation, and nuclear weapons (Rovelli 2022: 18-19). The extent of its success and its high regard amongst physicists makes it a worthy consideration when it comes to a philosophical enquiry into reality's structure.

1.1 Observations

The first of four big 'need to knows' about quantum physics, is that it was developed from the key idea of focusing only on what can be observed, even when the information that can be observed tells an incomplete story. The development of quantum physics came from the study of bizarre behaviour of electrons inside the atom that seemed to 'leap' between orbits. Physicists set out to find a force which could account for such movement of the electron. In 1925, Werner Heisenberg tried a different approach; instead of attempting to

[164] A theory of quantum gravity is generally taken to be a theory aimed at reconciliation of the inconsistencies between classical mechanics and quantum mechanics. I choose not to discuss quantum gravity directly any further, due to its vast variation and conflicting interpretations, and being in its infancy, relatively speaking, when it comes to well established physics.

describe the movement of an electron, he focussed only on describing quantities that can be *observed*- the effects of the electron 'leaps' that emit a certain frequency and amplitude of light. This shift of focus produced a swift advancement in understanding. Heisenberg's colleagues in Göttingen credit the *principle of observability* as being crucial to the early development of quantum mechanics. The principle of observability was met with criticism, notably from Einstein, who rejected it as misguided (Wolff 2014: 19). Heisenberg writes in his famous 1925 paper, that his objective in the early development of QM was to 'lay the foundations for a theory based exclusively on relations between quantities that are in principle observable' (Rovelli 2022: 20).

Despite the criticism, the idea of limiting attention only to what is observable became a key, distinctive feature of QM. We cannot describe where an electron is and what it is doing when it is not being observed. Einstein, and others working at the time, were familiar with working with physics that obeyed laws such that phenomena could be predicted with certainty at any given time, since phenomena always possessed a definite set of properties. What changed with the dawn of quantum physics, was that the unknowability of the position of electrons when not observed became accepted, not due to the acceptance of limits on our epistemic capacities, but due to the acceptance that hard determinism may not be true.

Heisenberg's early observability principle became better known as the 'uncertainty principle', since the state of electrons when observed is truly uncertain. When observed, there is no objective truth about the position of an electron. 'Being uncertain about where the electron is, is not a failure in our observation – it's **because the electron does not have a definite position**.' (O'Connell 2016). The obvious question and mystery that remains, put neatly by Rovelli, is 'why does nature care whether there is anyone to observe it or not?' (2022: 20).

1.2 Probability

The second key ingredient of QM is Schrodinger's *wave function*. The wave function is a tool that enables one to calculate the probability that an event involving an electron will occur. 'The value of Schrodinger's wave at a point in space is related to the probability of observing an electron at that point' (Rovelli 2022: 26). There remains an active debate as to whether this tool should be reified and considered as a *real entity* in the world, or whether it is merely an instrument for finding out the probability of something *real happening*. Positions in this debate can be labelled 'realism' or 'anti-realism' about the wave function. This distinction will become important later in the chapter.

Whether one is realist or anti-realist when it comes to the wave function, the key point to note is that QM gives physicists information about probabilities, and not certainties. This is because it is commonly accepted that positions of quantum phenomena can be truly *undetermined* at given times.[165] Deterministic laws that allow for certain predictions do not exist in the way that we are used to, when it comes to the quantum level. Rovelli notes that this implies the laws of nature may not be completely deterministic. These two core components of QM introduced so far are again summarised neatly by Rovelli:

'The wave function is something which determines the probability that an electron will be observed in one place rather than in another. It evolves in time according to the equation written by Schrodinger, as long as we do not look it (as long as it is not being observed).' (2022: 27)

1.3 Superpositions

The third puzzle presented by quantum phenomena is the 'superposition state', in which a physical system can effectively possess two incompatible properties simultaneously. For example, a system could be in two different locations, at a single time, through something other than extension. The most famous illustration of this phenomena is Schrodinger's example about a cat, possessing inconsistent properties of being both alive and dead simultaneously. The cat is shut in a box that is linked to a device which realises a toxic gas upon the occurrence of a quantum phenomenon that has a one in two chance of happening. Whilst unobserved, the cat is in two states of being alive and being dead. The cat is in a superposition state.

'Standard QM, at least at first sight, violates the classical supposition of 'value definiteness', according to which the observables, or properties of a system have precise values at all times' (Calosi and Mariani, 2020: 160)

A quantum superposition is not something we can ever observe, but we can observe its consequence - quantum interference. Whenever an observation or measurement of a quantum system is made, the interference disappears, and the contradictory properties choose a certain path, becoming determined. This is known as the 'collapse' of the wave function - the wave that indicates the probability of a certain outcome upon observation. An explanation for this phenomenon is still yet to be agreed upon, and continues to pose the most challenging problem of quantum physics - the measurement problem. Together the issues of i) why observations or measurements determine the way the world is, ii) the indeterminacy indicated by the possibility of predicting only possibilities rather than certainties at the quantum level, and iii) the phenomena of superposition states with

[165] See Lewis (2016), chapter 4- *Indeterminacy* (pp. 72-106).

incompletable properties prior to observation, suggest that the world works in a radically different way to the way that classical physics had once suggested.

1.4 Entanglement

The fourth and final element of quantum mechanics that I will mention in this brief introduction is the phenomenon of quantum entanglement. The reader might recall the mention of entanglement in chapter 2, as a possible example of symmetrical dependence in the physical world. Quantum entanglement is when a pair of quantum objects maintain a "spooky"[166] connection across vast distances. For example, entanglement might occur when two photons, which are in a quantum superposition, are sent to two distant locations. When observed, and the wave function collapses, their properties instantaneously become correlated. This correlation can neither be explained through a super-fast travelling signal that is sent between them[167], nor through the predetermination of the correlation prior to the observation.[168] Entanglement is another way that the quantum world demonstrates significant difference compared with the world captured by classical physics. The instantaneously determined correlation in cases of entanglement suggest that there can be two-way relations of ontological dependence between parts of the world that we would usually expect to be independent.

'Even if we know all that can be predicted about one object and another object, we still cannot predict everything about the two objects together. The relationship between two objects is not something contained in one or the other of them: it is something more besides. This interconnection between all the components of the universe is disconcerting' (Rovelli 2022: 84).

A simple example of an entangled state is the entanglement of two electrons that are anti-correlated with respect to spin, most clearly illustrated by the Einstein, Podolsky, and Rosen (EPR) thought experiment. The case involves a singlet state containing two electrons. The two electrons are entangled, and both possess a single quantum property: spin. There are two possible combinations of spin properties for electron 1 and electron 2:

(a) $\{|\uparrow>, |\downarrow>\}$ (E1 has spin up and E2 has spin down).
(b) $\{|\downarrow>, |\uparrow>\}$ (E1 has spin down and E2 has spin up).

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[166] Eistein famously dubbed quantum entanglement "spooky action at a distance" in his letter to Max Born, 3 March 1947.
[167] This explanation is ruled out since such communication between system could not happen at speeds faster than the speed of light.
[168] This explanation is ruled out by the violation of Bell inequalities.

When the electron pair in the singlet state gets measured, there is 0.5 chance of the outcome being (a), and 0.5 chance of the outcome being (b). The important point to note, is that there is zero chance of both electrons measuring out as spin-up, or both electrons measuring out as spin-down. In this way, the electron pair is entangled, through their anti-correlation with respect to spin.

When discussing the EPR case, Schaffer notes: 'The singlet state seen in EPR is entangled, and as such is not derivable from the state vectors of its two electrons. A pure spin state can be attributed to neither electron individually. A pure spin state can be attributed to the electron pairs only collectively, as a system… Entangled particles seem as if telepathic. They act as a unit.' (2010: 51-52).

2. Rovelli's Relational interpretation of QM

In what follows, I will show how Rovelli's interpretation can address the four puzzles just raised (observability, probability, superposition and entanglement) in a way that can reconcile QM with the way in which the world was understood prior to QM's discovery by Heisenberg. Recall that the aim of this chapter is to show that the anti-foundationalist interdependence, the metaphysical view that I endorse, is consistent with current physics. In order to achieve this, I need only show that RQM is an adequate interpretation of QM, rather than attempt to argue for the stronger claim that RQM is the best interpretation of this QM. Arguing for the second stronger claim would be a huge task - one that might perhaps be a whole doctoral project in itself. Therefore, I will offer some modest suggestions for the potential success of RQM. These are intended to show that it is a promising interpretation, and to point to some interesting future directions that one might want to take if one were interested in developing a case for RQM (and its union with anti-foundationalist metaphysics) as the best position.

2.1 From Observations to Interactions- Making Sense of the Measurement Problem

The first problem for all interpretations of QM to address is how to make sense of the role of observations, and how making a measurement can impact a world that should evolve objectively and independently from those who might be observing. Carlo Rovelli's response to this issue forms one of the key distinguishing features of this relational interpretation of QM. Rovelli highlights that observers are just like any other physical systems- they are not special or 'outside' of nature. It doesn't matter whether an observer is conscious or has scientific knowledge or equipment. If it were the case that an observer required these things, then QM would ultimately imply some form of idealism - the physical world would depend on some perceiving subject.

Therefore, Rovelli answers the question 'what is an observer?' by claiming that an observer can be any other physical system that interacts with the system being 'observed'. An observer is only required to enter into some interaction; it is not required to be conscious or have the capacity to perceive. We should consider an observation in the same way as any other interaction between two physical systems.

'Scientists and their measuring equipment are all part of nature. What quantum theory describes, then, is the way in which one part of nature manifests itself to any other single part of nature. At the heart of the 'relational' interpretation of quantum theory is the idea that the theory does not describe the way in which quantum objects manifest themselves to us (or to special entities that do something special called 'observing'). It describes how every physical object manifests itself to any other physical object' (Rovelli 2022: 67)

Rovelli's recommendation to understand observations in broader and more general terms of interaction, implies that QM's focus on only what we can observe, should be translated into a focus on interactions between objects, rather than objects in isolation.

2.2 No Interaction, No Properties

In Rovelli's words, 'individuals *are* the way in which they interact' (2022, 68). This means that an entity's identity depends on its interactions and relations with other entities. There are no properties of any entity that are entirely its own, intrinsic, or independent. Further to the understanding of observations in terms of interactions, RQM addresses the issue of indeterminate properties of a superposition state prior to observation (or interaction), by suggesting that properties only get determined through interactions. Rovelli suggests understanding physical systems as having no[169] defined properties that are independent from their interactions with other systems. When two physical systems interact, this determines properties of *both*, relative to one another.

This understanding of the importance of interactions in QM supports both the existence of symmetrical ontological dependence relations (argued for in chapter 2) and the non-existence of purely intrinsic properties (argued for in chapter 3). Therefore, the determination of properties of physical systems upon their interactions, is an idea that is

[169] I present Rovelli's view as claiming that prior to interaction, systems have *no* defined properties. Other presentations of his view might suggest that systems have *a multitude of inconsistent* defined properties prior to interaction, making the properties of undetermined systems *glutty* instead of *gappy*. (These terms are used by Calosi (2021). Gappy indeterminacy is when x has *no determinate*, and glutty indeterminacy is when x *has more than one determinate*). Regardless of which characterisation of undetermined systems is more accurate, the key point that matters is that individual systems *are indeterminate* prior to interactions with others.

important for development of the anti-foundationalist account that I am headed towards pinning down in the next chapter.

Whilst textbook quantum mechanics takes an observer to be uninfluenced by any measurement it makes, relational quantum mechanics takes both the observer and the observed to be part of the interaction of measurement (Rovelli 2022: 47, 67-69). This interaction has an effect on both. Rovelli's revision suggests that observers do not hold any privileged or objective perspective.

'Instead of seeing the physical world as a collection of objects with definite properties, quantum theory invites us to see the physical world as a net of relations. Objects are its nodes. The radical consequence is that to attribute properties to something when it does *not* interact is superfluous and may be misleading. It is talking about something that has no meaning: for *there are no properties outside of interactions*' (2022: 70).

This is an indication from the physical world of quanta, that we should accept the argument made in Chapter 3: that no properties are intrinsic, and all properties are relational. We should accept the indeterminacy of properties of anything we have not interacted with, *relative to us*, meanwhile that system may have determined properties relative to another system. There are no absolute values of variables that are independent from interactions with other physical systems. In this way, it can be consistent for something in a superposition state to have undefined, or incompatible properties prior to being observed (or prior to interacting with something that can measure it).

2.3 Indeterminacy and relativity

A radical consequence of Rovelli's interpretation, is that facts are relative. A quantum state can be in a superposition state (with properties undetermined) relative to one observer (or object), because that observer (or object) has not interacted with the quantum state yet. However, a different observer (or object) that *has interacted*, has determined the quantum states' properties relative to it and only it. Rovelli himself highlights the 'main cost' of RQM which is its 'challenge to a strong version of realism, which is implied by its radical relational stance' (2018: 6).

An example to illustrate this strange relativity is needed. Imagine again, Schrodinger's cat. The cat, it can be said, is in a superposition state prior to interaction with an external observer. From the perspective of the cat, its properties have been determined, because the cat has interacted with the quantum state that determined its fate. There is a fact of the matter that is true relative to the cat. However, from the perspective of the external observer who is yet to interact, there is no fact of the matter about whether the cat is alive or dead, because its properties are undetermined relative to that external observer.

The relational interpretation of QM allows for multiple inconsistent states of affairs to be true- due to a system being related in multiple different ways through different interactions with different observers. According to Rovelli's interpretation, facts and properties may be real with respect to an object, whilst not necessarily being real with respect to another object. Such a view can make sense of indeterminate properties prior to interactions, and relative determinate properties post interaction.

To make sure that this idea is clearly illustrated, imagine another simple case involving three quantum systems; S1, S2 and S3. Systems S1 and S2 interact, which determines their properties relative to each other. Similarly, S2 and S3 interact, which determines their properties relative to each other. S2 may have a different set of properties relative to its interaction with S1, compared with its set of properties relative to its interaction with S3. Meanwhile, S1 and S3 have not interacted. S1's properties are undetermined relative to S3 (from S3's perspective, S1 is in a superposition state), and the same case runs in the opposite direction between S1 and S3. In this way, relativity of properties between interactions with each system can account for superpositions and indeterminacy.

'The problem of quantum mechanics is the apparent contradiction between two laws of the theory: one describes what happens in a 'measurement', and the other in 'unitary evolution (or in isolation), namely, when there is no measurement. The relational interpretation is the idea that both are correct: the first regards the events relative to the systems in interaction, the second regards the events relative to other systems' (Rovelli 2022:72).

'The crux of [non-representationalist][170] interpretations [including the relational interpretation] lies in their commitment to the claim that quantum theory's probabilistic predictions should be accounted for by information-theoretic means, where the information in question is thought to be relative to some observer. Hence, according to these views, the quantum state is regarded as an irredeemably relational concept.' (Krismer 2018: 1).

The relativity of facts, whilst perhaps disconcerting to some readers who prefer staying loyal to standard realism, should not be regarded as a problematic feature of RQM. As I argued in chapter 3, there are already many properties that we understand as relational, and we should extend this relational understanding to all properties. Consider the example of the property of being 'tall'. My property of being 'tall' will vary depending on what I am being compared with, whether that be a table, another person, or a rollercoaster. Therefore, the fact of the matter as to whether or not I am 'tall', will have multiple consistent truth

[170] Rovelli's relational interpretation can be understood as 'non-representationalist' since it endorses the idea that the quantum state does not represent (or correspond to) an objective physical reality.

values, depending on the scale or relevant system for measuring height. I may be tall relative to common household objects like a table, or relative to the human population, but short relative to rollercoasters around the world. This property only exists with respect to something else. What RQM suggests is to apply this thinking to all properties.

'There are many similar examples: since the Earth is a sphere, 'up' and 'down' are not absolute notions, but *relative* to where we find ourselves on earth. Einstein's special relativity is the discovery that the notion of simultaneity is relative, and so on. The discovery of quantum theory is only slightly more radical: it is the discovery that *all* the properties (variables) of *all* objects are relational' (Rovelli 2022: 73).

2.4 Accounting for entanglement

RQM can make sense of entanglement in a similar sense to the way it makes sense of the measurement problem. It does so by emphasising that facts are only determined *in relation to something else.* The measurement of a single quantum system relies on a second system to measure it. The measurement of two correlated entangled systems relies on a third system to observe their correlation. 'A correlation between two objects is a property of the two objects- like all properties, it exists only in relation to a further, third object' (Rovelli 2022: 86). Entanglement is a phenomenon that can only be observed by from the standpoint of a 'third party' system, that is not itself directly involved in the entanglement. Given that all facts are relative to the perspective of a system, and that system determines properties relative to its particular interactions, the entanglement of two systems only ever occurs relative to an interaction with a third system. 'The correlation manifests itself when the two correlated objects both interact with a third object, which can check [for the correlation]' (Rovelli 2022: 86). In the EPR case of entanglement illustrated earlier, the anti-correlation of the spin properties of electron 1 and electron 2 is determined relative to an interaction with a third system, an observer, which can notice the anti-correlation. The same happens whenever an external observer interacts with two systems and compares them- there is a correlation (or anti-correlation).

'From an external perspective, any manifestation of one object to another, which is to say any property, is a correlation; it is an entanglement between an object and another. Entanglement, in sum, is none other than the external perspective on the very relations that weave reality: the manifestation of one object to another, in the course of an interaction, in which the properties of the objects become actual' (Rovelli 2022: 88).

'In a nutshell, the RQM solution is to stipulate that a physical interaction is a measurement-style event. However, this is only true for those systems directly involved: the systems are merely entangled from the standpoint of other "third-party" systems. The appearance of

two sorts of interaction arises from a difference in perspective. This is weird, of course, since particular values of the physical quantities revealed in an interaction are manifest only relative to the interaction partner(s) involved. They don't exist in a fully objective way. All interpretations of QM ask us to accept something unintuitive or revisionary. This is the "ask" made by RQM' (Esser 2021).

2.5 Evaluating the "Ask" Made by RQM, Compared With Other Interpretations

By explaining the way that RQM can tackle the key puzzles that arise from quantum theory, such as the measurement problem and entanglement, I aim to have shown that RQM is an adequate interpretation of quantum theory - which itself is one of our most successful current theories in physics. One tentative reason for preferring RQM over alternative interpretations, is because the "ask" or costs incurred by accepting RQM can be considered as more reasonable and justifiable that the costs incurred by the other major interpretations.

For example, alternative major interpretations of QM that are realist about the wave function,[171] ask us to commit to additional entities or 'extreme possibilities', [172] in order to fill the gaps that QM leaves. Filling in these gaps is intended to recover some determinacy, so that the quantum world can be understood within the picture that classical physics paints. The extreme additions may include multiple universes,[173] invisible variables[174] or other strange phenomena that have never been observed.[175] If these

[171] Alternative interpretations of QM that take the wave function to be a real entity seek to avoid indeterminacy in quantum theory. Calosi and Mariani (2020) sketch the idea of quantum indeterminacy with reference to a lack of 'value definiteness', violating the idea that 'the observables, or properties, of a system have precise values at all times' (2020: 160).

[172] Rovelli (2022: 51).

[173] The 'many worlds' interpretation of QM, first proposed by Hugh Everett in 1957, holds that when a superposition state occurs, all incompatible properties exist concretely. When an observation happens, the real wave of the quantum object separates into parts, each displaying one of the properties, and creating a separate world around each. Each property creates a different version of the world, all of which exist concretely. In parallel worlds that are equally as real as the world that we experience, properties get determine in all possible alternative ways.

[174] Bohmian mechanics, first proposed by David Bohm in 1952, suggested that there are no quantum superpositions, but instead, in accordance with classical physics, quantum systems always have a single set of defined properties. Bohm suggested that the wave function guides the location and other properties of electrons, and there will always be a single true fact of the matter about the properties that the electron possesses at any given time. The wave function has multiple components- one that corresponds to the 'real' properties of the system, and one that corresponds to 'empty', unrealised properties, that bring about interference. It is this empty component that means that proponents of the Bohmian interpretation must commit to hidden variables.

[175] A third alternative is that wave function collapse does not happen because an observation is made, but it happens spontaneously and regularly, due to some independent, yet unobserved, physical process.

additions remain unobserved, or if it can be argued that they are not necessary, then RQM can be the considered as the preferable interpretation on the grounds of parsimony.

'Unlike these [other] approaches, RQM is truly an interpretation, rather than a modification, of orthodox QM, a successful theory that was motivated by experimental findings and is extremely well supported by decades of further testing. The measurement process, in particular, is not some problematic add-on to quantum theory – it is at the heart of it. Human beings and our experiences and interventions are part of the natural world. RQM does justice to this fact by explaining that measurements- the connections between quantum systems and ourselves- are just like any other physical interaction.' (Esser 2021).

3. Ontological Consequences of Accepting RQM

I have shown that Rovelli's interpretation, RQM, is a promising way of making sense of the mysterious phenomena in quantum mechanics. Quantum mechanics itself, with its reliability, predictive successes and productive applications, should be taken as a good guide to the structure of reality. In this section, I turn to discussing the metaphysical direction in which RQM points us, in regard to the fundamentality debate. The crux of the argument I make in this section is that RQM should not be considered as compatible with either priority monism (the view that exactly one entity is fundamental) or priority pluralism (the view that more than one entity is fundamental). Since together these represent exhaustive foundationalist options, I conclude that RQM is not compatible with foundationalism, giving us reason to favour anti-foundationalist alternatives.

3.1 Surveying the Current Literature on Ontologies for RQM

I begin by exploring the ways that RQM has been treated in the philosophical literature, and note the foundationalist commitments that each of these ontological interpretations make. The overview that follows is intended to give the reader a sense of the various ways in which the positions have been cashed out and how it has been suggested that they mesh with RQM. After presenting the following options, I argue that there are problems with each of the following ways of understanding RQM, because the commitments made by each of the options to various forms of fundamentalia create some inconsistency with RQM.

Priority Monism

Morganti and Dorato (2022) claim that a natural connection might be made between RQM and priority monism, of the kind defended by Schaffer (2010). Given the characteristics of

RQM, a monist ontological interpretation might emerge, 'according to which the truly fundamental physical entity is the universe as a whole, which however, is constituted by a plurality of systems that acquire a physical characterisation only in relation to one another' (2022: 5).

Schaffer's view postulates the priority of the universe as one single whole, above all physical systems taken as parts contained within, which he argues to be the best explanation for quantum phenomena like entanglement.

Schaffer's view is a universalisation of a more moderate *holism,* which holds that there are instances where wholes are ontologically prior to parts. According to Schaffer, cases that exhibit holism include a simple case of two entangled physical subsystems. The single overall system containing two subsystems is more fundamental than each subsystem taken separately, since the properties of both subsystems are dependent on one another, and hence neither can be described fully and accurately when described independently. The system as a whole contains all of the information relevant to the explanation of each subsystem, whereas some relevant information is lost when giving an explanation of a subsystem in isolation. Systems as wholes contain more information than subsystems taken as individual parts.

This idea could be thought to mesh with the upshots of RQM. The whole produced by two sub-systems and their interaction contains more information, *including determinate properties of the two subsystems*, than each of the subsystems taken individually, which possess indeterminate properties prior to interaction. A whole is only formed when two subsystems interact, and their properties get determined relative to one another. Parts of the system in isolation possess no such properties. Hence, it could be argued that the priority of wholes over their parts can be used to account for systems (post interaction) containing more information than individual subsystems (prior to interaction) in RQM.

Schaffer extends holism universally, to produce an all-pervading monism, according to which all physical systems are derivative parts of one maximal, fundamental whole. Such a move is made through Schaffer's argument that the entire universe is in an entangled state, and all entangled states as wholes, are more fundamental than their parts (2010: 51-52). Hence, this entails that the universe as a whole is the only entity that is ontologically independent, and the one single fundamental foundation.

Monism can then be unified with RQM, by suggesting that the one fundamental whole is prior to all of its interacting parts. Within the whole, all parts must interact in order for their properties to be determined. It is only at the maximal level that all information about all interacting subsystems could be gathered. Therefore, the universe as a maximal whole

is prior to all of its parts. Priority monism makes a commitment to a fundamental entity, albeit only one, which is enough for it to qualify as a form of foundationalism.

Ontic Structural Realism

Candiotto (2017) argues that Ladyman and Ross' (2007) *ontic structual realism* (OSR) provides the best metaphysical framework for understanding RQM. RQM's upshot is that quantum systems have no definite properties or absolute values that can be regarded as intrinsic to a system treated as an individual. OSR provides a way to account for such a lack of intrinsic features: by inflating the ontological priority of relational structure above, or at least on par with the systems that relations hold between (Ladyman 2023: §4, McKenzie 2017: 3). Variations of OSR which hold that relations are more fundamental than their relata, render entities and their properties as derivative from the relational structure that holds between them.

The dependence of a quantum system's properties upon the interactions between that system and another (in RQM), is reflected in OSR by the dependence of entities and their properties upon fundamental relations that hold between them. Strong forms of OSR take relations as physical, primitive or ontologically independent (Morganti and Dorato 2022: 14), demoting the entities they hold between to derivatives. Candiotto (2017: §2) argues that the dependence of entities on the relational structure that holds between them can explain the inability to understand physical systems independently from their interactions on RQM. OSR is an alternative form of foundationalism, as (most of its forms) revise the view that traditional objects constitute fundamental foundations, to instead hold that *relations* constitute reality's fundamental foundations (Morganti and Dorato 2022: 14).

Processualism/ Event Ontology

Event or 'flash' ontology is the idea that fundamentalia are local events in space-time. This idea, when applied to RQM, would render fundamental events to be 'those corresponding to local interactions between physical systems, determining the (perspectival, relative) state-dependent properties of those systems' (Morganti and Dorato 2022: 16).

Rovelli himself suggests an ontology on which events that occur when quantum systems interact, are to be considered as fundamental (2005: 117). It is within these relational quantum events that systems acquire their determinate properties, meaning entities and their properties could be considered to rely on such events, and events could be considered to rely on nothing else, making them fundamental.

Dorato (2015) addresses this suggestion from Rovelli, claiming that events of interaction are indescribable and require no explanation. 'According to RQM… attributing definite

states to non-interactive physical systems has no meaning' (2015: 10). It is only possible to talk of *interactive phenomena* as definite states. It is worth noting that Dorato goes further to argue that fundamental events are an appropriate ontology for all physical interpretations of QM, of which RQM is just one:

'Events are *necessary* both in realistic and in antirealistic views of the wave function: in virtue of their interpretation-independence, events turn out to be a central ontological component of quantum mechanics' (2015: 12).

An ontology of events might be thought of as a kind of processualism, which holds that dynamic processes with temporal parts are fundamental. All entities such as individuals or universals are derivative from these dynamic fundamentalia. Proponents of processual interpretations of QM, like Barad (2007), recommend thinking past a world that is fundamentally made up of bits of matter that have determined properties and identities, and towards a world where such identities are dependent upon the activities that they are a part of. According to RQM, entities cannot be determined independent from their context amongst processes of interaction. The processualist would argue that this implies processes of interaction must be prior to entities with determined properties. According to processualism, events are the ultimate foundations of reality.

Indeterminacy

A key upshot of RQM that any metaphysical interpretation must account for is indeterminacy. Systems only acquire determinate properties, or variables only acquire determinate values, relative to another system, meaning that 'value definiteness' and complete determinism in nature, fail. It is not the case that all entities or properties of a system have precise values at all times, contrary to the determinism of classical physics.[176] Recall the classic example of Schrodinger's cat. Prior to observation (or interaction with another system), the cat's properties are indeterminate.

Calosi and Mariani (2020) interpret this to mean that there could be metaphysical indeterminacy at the fundamental level. They suggest that accepting indeterminacy may help solve the issue of properties of quantum systems before interaction with another system. This indeterminacy is not just at the level of derivatives, but is part of what we should consider as RQM's fundamental ontology. They argue that indeterminacy is due to non-interaction between quantum systems, therefore the fundamental constituents of

[176] It could be claimed that even if systems lack determinate values prior to interaction, the probabilities that can be calculated prior to interaction are determined and fixed. In response to this kind of claim, I highlight that dispositions and probabilities are not the kinds of phenomena that could be considered as candidates for fundamentalia. This is because they rely on the existence of systems of which they could be considered properties.

indeterminacy, the non-interacting systems, mean that indeterminacy is fundamental. Their view holds that when we accept indeterminacy, quantum systems can be considered as fundamental, whether they interact or not. This discussion of RQM as indeterminate relies on another foundationalist metaphysical picture: one that commits to indeterminate quantum systems as the foundations of reality.

Each of the accounts mentioned in this brief survey of metaphysical interpretations of RQM commits to some form of fundamentalia, whether that be the cosmos as a whole, physical relations, events or processes, or indeterminate quantum systems. In the following section I will object to these options, and construct an argument to suggest it is worthwhile developing a metaphysical account of RQM that commits to no fundamentalia at all.

3.2 An argument in favour of interpreting RQM as anti-foundationalist

The possibilities just surveyed fit into two categories of interpretation. Priority monism-foundationalism commits to exactly one fundamental entity, and priority pluralism-foundationalism commits to more than one fundamental entity. My reasoning for favouring anti-foundationalism involves discussing why both these foundationalist possibilities can be found wanting. Thus:

1) Priority monism and priority pluralism are exclusive and exhaustive foundationalist positions.[177]
2) Priority monism does not provide a good interpretation of RQM.[178]
3) Priority pluralism does not provide a good interpretation of RQM.
4) (If neither foundationalist interpretation can provide a good interpretation of RQM, then we should adopt an anti-foundationalist interpretation).[179]

Therefore,
C) We should adopt an anti-foundationalist interpretation of RQM.

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[177] It may be objected, that this premise relies on Schaffer's controversial *tiling constraint* (2010: 38–39, 2015: 24–25). However, in the simple ways that I characterise foundationalism's commitment to at least one fundamental entity, (monism: commitment to exactly one fundamental entity, and pluralism: commitment to more than one fundamental entity), it follows that monism and pluralism are exhaustive foundationalist positions. The issue of exclusivity, challenged by objections made to the tiling constraint, is not important for the sake of my argument- monist and pluralist positions may overlap. What is important is that, overlapping or not, they exhaust all the ways in which one might be foundationalist.

[178] It is important to note that these premises are not strong claims of logical inconsistency between both forms of foundationalism and RQM. They are weaker claims of best explanation or interpretation.

[179] Of course, at this stage one might want to opt for rejecting RQM. Since RQM is an assumption at the heart of the investigation, this option is ruled out here.

Premises 1 and 4 seem relatively uncontroversial. That being so, I'll turn my attention to premises 2 and 3. Section 3.3 defends premise 2, and section 3.4 defends premise 3.

3.3 Against monism

We should reject the union of monism and RQM. In outline, the problem is this: RQM rejects the existence of absolute states with independent properties; monisms posit an absolute state which is the totality of the universe and which itself has independent properties. Thus, RQM and PM are incompatible.

Drawing upon work by Dorato (2016) and Morganti and Dorato (2022), there are at least three ways of cashing out this problem, using indeterminacy, asymmetry, and locality. I take each in turn.

1. Determinate properties from fundamental indeterminacy

According to RQM, a single physical system can only have indeterminate properties, prior to interaction. According to priority monism, there is only one single fundamental physical system.[180] This means that if we conjoin RQM and priority monism, then the single fundamental system must have only indeterminate properties. Since we do not think that the actual world has only indeterminate properties (at least, not at the level of the non-fundamental), we should reject the union of RQM and priority monism.

The only obvious defence of this union would require us to locate a means of spelling out how the actual world's *non-fundamental* determinate properties can arise from a world that, at the fundamental level, is fully indeterminate. Since we lack any such account—we cannot give a systematic story about how determinacy arises from indeterminacy—so we lack any means of unifying RQM and priority monism. This is also a problem for any interpretation of RQM that accepts physical indeterminate quantum systems as fundamental, like that described in the final part of §2.[181]

2. (A)symmetry of dependence relations

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[180] My characterisation of monism takes the prior fundamental whole to be *a physical fundamental whole*. This is the only way I have come across monism presented, so it is the account of monism I address. It may be possible that if the prior whole is not a physical prior whole, then determinate properties need not come from an indeterminate physical quantum state. However, I put this issue aside until such an account of non-physical priority monism is developed.

[181] Calosi and Mariani (2020) give two examples to illustrate how indeterminate quantum states could be thought of as fundamental. Both of these cases involve some interaction with a second quantum system. Neither example gives an explanation of how a completely isolated, independent fundamental indeterminate system might give rise to determinate states.

Priority monism is defined as the view that the whole is fundamental and that the parts of the whole depend upon it for their existence (Schaffer, 2010: 33). There is an asymmetry of existence, here. The one whole exists and the parts depend upon it. The whole does not depend upon its parts. As Schaffer notes (2010: 37), this requires a relation of asymmetry between the fundamental and the derivative.

In contrast, RQM requires symmetrical dependence relations between parts of the universe- for reasons I'll explain in a moment. This difference in properties of dependence relations between PM and RQM could be a second reason to doubt a connection between them (Morganti and Dorato, 2022: 11).

Why think a simple case can be made from RQM to the existence of symmetrical dependence relations? According to QM, a system requires interaction with another for the determination of its properties. If this is the case, then such a system is dependent for the properties that determine its identity on the system it interacts with. Per RQM, *every* system depends for its identity on its interactions with other systems. Thus, every system depends upon another for its identity. When interaction occurs, both systems involved acquire determinate properties. Therefore, when an interaction occurs, both systems involved become symmetrically dependent upon each other for their existence and identity.

3. Locality and Holism

RQM posits symmetrical local dependence connections between subsystems *within* the universe. PM posits asymmetric dependence between parts of the universe and the universe itself. If we are to assume RQM, then there can only be dependence between the parts of the universe, since interactions happen at a local level. Conversely, if we assume PM to be true and the universe is more fundamental than its parts, then all parts must depend on the totality, and the totality must not depend on any of its parts.

As Dorato puts it: 'Failure of ontic priority of the One [whole] follows from the fact that there is no consistent sum of all possible perspectives yielded by the parts, so that there is no definite One whose identity is non-relational or non-structural' (2016: 23).[182]

3.4 Against Pluralism

[182] A further illustration of this point comes from Morganti and Dorato's analogy between RQM and Leibnizian Monads: a Monad will 'reflect' other Monads or parts of the universe from its particular perspective. However, there is no 'Monad of Monads', because Monads can only 'reflect' from within. Each system can only have partial information about the universe as a whole from their particular internal perspective (2022: 8).

The remaining suggestions from §3.1 are forms of priority pluralism, characterised by their commitment to more than one fundamental entity. In §3.3 (section 1) I discussed concerns with the idea of indeterminate quantum systems as fundamental entities. For that reason, I will spend no more time discussing fundamental indeterminate systems, and will focus instead on the two current most popular priority pluralist options for interpreting RQM: relations as fundamental, and events as fundamental.

According to the analysis of fundamentality in earlier chapters, what sets fundamentalia apart from all other phenomena is their ontological independence. Accordingly, if relations/events are fundamental, they must be treated as ontologically independent. In this section, I will explore two strategies to show that, given the constraints of RQM, neither relations nor events can be considered as ontologically independent. If these strategies succeed, then we should reject the union of RQM and priority pluralism.

Challenge 1: Spatiotemporal Location Argument

The most popular account of relations as fundamental discussed in the context of RQM is Ladyman and Ross' ontic structural realism. OSR is clear in its commitment to *physical* fundamental relations. According to OSR, dependencies between physical systems must be reified and considered as *physical* irreflexive symmetrical relations.[183] Similarly, all accounts of dynamic events classified by Meyer (2013: 14)[184] presuppose the existence of spatiotemporal regions, lending them to being understood as *physical.*

A tension can be highlighted between the putative physicality of both fundamental relations and fundamental events, and their ontological independence, given RQM. This tension is shown through the conjunction of the following principles:

Physicality (P):
$Px \rightarrow STLx$ (if x is physical, then x possesses a spatiotemporal location)

Independence (I):
$Fx \leftrightarrow OIx$ (x is fundamental iff x is ontologically independent)

Determinate properties principle (DPP):
$RQM \rightarrow (STLx \rightarrow \neg OIx)$ (Given RQM, then if x has a spatiotemporal location, then x is not ontologically independent).

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[183] In cases of entanglement, dependencies between systems may be understood as physical relations of 'having the opposite spin to…'. In such cases, Morganti and Calosi (2021: 884) raise the issue of whether these dependencies should be considered as genuine physical relations.
[184] Summarised by Dorato (2015: 4).

Principles (P)[185] and (I)[186] come from commonly used understandings of physicality and fundamentality. I won't spend time offering further support of them here. The third principle, (DPP), is more interesting and controversial. Nonetheless, I argue that RQM implies that any entity that has a spatiotemporal location cannot be ontologically independent.

RQM's central move is to interpret all physical variables as relationally *dependent*. In Rovelli's words, 'there are no properties outside of interactions' (2022: 70). According to (P), all physical things possess at least one property- the property of a spatiotemporal location. Given RQM, possessing a property like spatiotemporal location means that an entity must be interacting with some other system. Rovelli himself discusses such a case. The example he gives is about the orbit of an electron. To enquire about the orbit of an electron when it is not interacting with anything is to ask an empty question. 'When the electron does not interact with anything, it has *no physical properties. It has no position; it has no velocity*' (2022: 71, my emphasis added). Thus, nothing that possesses a spatiotemporal location can be ontologically independent.[187]

For this reason, DPP must be correct: given the core commitments of RQM, if x has a spatiotemporal location, then x is not ontologically independent. If relations or events are considered as our best candidates for x, and relations or events are thought of to be physical, then this creates a problem regarding our ability to accept relations or events as ontologically independent. To see this by way of reductio, assume that our putative fundamental relation or event R, is physical and holds to the above theses. Semi-formally, suppose that R is fundamental, and that R is physical.

[1] Given Physicality, it follows that R is spatiotemporally located.
[2] Given Independence, it follows that R is ontologically independent.
[3] From DPP and [1] it follows that it is not the case that R is ontologically independent.

As is clear, [2] and [3] yield a contradiction. If R is physical (if our event or relation is physical) and RQM is true, then R both is and is not ontologically independent. Thus, we have our reductio. Assuming that we wish to hold on to RQM, we should not posit physical

[185] See Markosian (2000)
[186] See Tahko (2018)
[187] Physical properties require interactions between physical systems according to RQM. Any physical system with properties must be dependent upon the existence and nature of second system that it interacts with.

events or relations as fundamental. And since events and relations in this context are taken to be paradigmatically physical,[188] we should reject fundamental events and relations.

Challenge 2: Ontological Dependence Argument

The second challenge to priority pluralist accounts of RQM is intended to cast doubt about whether any candidates for fundamentalia can be successful, given only the requirement that fundamentalia must be ontologically independent. The challenge involves an enquiry into the ways that pluralist candidates for fundamentalia (relations and events) are connected to other ontological categories, like objects or physical systems.

In outline, my argument is that if we assume RQM, then given pluralist candidates for fundamentalia (relations and events), the only way to make sense of the existence of physical objects is to posit symmetrical dependence between physical objects and our pluralist candidates for fundamentalia. Since pluralist foundationalism presupposes asymmetric dependence, this result rules out pluralist foundationalism.

To generate this conclusion, let us start from the fact that either physical objects and relations/events are totally distinct from one another, or they are connected. It seems implausible that they are totally distinct from one another. For example, there can be no event of tumbleweed movement without the object, the tumbleweed, moving. There can be no relation of distance between the tumbleweed and the rock without there being a tumbleweed and a rock. That being so, relations/events and physical objects must be connected.

If they are connected, then how? Nolan (2011) suggests that we should understand objects as reducible[189] to dynamic processes because the two are simply identical: objects *are* processes. Similarly, ontic structural realists who adopt a strong form of their position might argue that objects are reducible to a complex set of relations. Objects *are* a complex set of relations. If either of these positions are defensible, and the best way of understanding the relationship between these putative ontological categories is through identity, then this

[188] It is possible to explore non-physical relations/ events as potential fundamentalia, however this would be an odd route to pursue, especially given the background of interpreting QM. Given RQM, any relation that could be considered as fundamental must be one which relates physical systems, ensuring that they acquire determinate properties upon interaction. Non-physical relations such as functions, linguistic, logical or mathematical relations are not the kinds of relations that could play this role.

[189] In logic, reduction is thought of as asymmetric. If facts about tables reduce to facts about spacetime points, then facts about spacetime points do not reduce to facts about tables. However, in metaphysics, reduction implies that whatever is reducible is identical to what it is reduced to. If tables are reducible to spacetime points, then tables are identical to those spacetime points. They are two descriptions of the same phenomenon. If they are the same phenomenon, neither has any metaphysical priority of the kind that would imply asymmetry.

relationship is reflexive, transitive, and most importantly *symmetrical*. If that is correct, then we do not have the kind of asymmetry that pluralist foundationalism requires.[190]

A final option is that they are connected through dependence, but they are not reducible. The dependence of events on objects can be established through the internal complexity of events. An event, such as an interaction, must be temporally extended. By definition, it must include a change in the properties or physical systems that constitute the event (for example, see Lombard 1986: ch.7). This means events cannot be ontologically simple - they must possess complexity.[191] Complex events depend on their constituents, including physical systems.[192] Any given interaction between two physical systems requires those systems as parts of that event, in a way that means the individual event is dependent for its existence and nature on those physical systems. Events, then, cannot be ontologically independent.[193]

What about relations? A particular instance of a relation can only be individuated by reference to the relata between which it holds. For example, to refer to a distance relation, we must refer to the two spatiotemporal locations or objects that the distance exists between. Even in cases of causation or grounding, the relata must be referenced in order to reference the particular occurrence of the relation. For instance, a propelled ball and a smashed window in the case of the causation, or arguably, H^2O and water in the case of the grounding. Physical relations must depend on physical systems for their identity, nature and individuation. Consequently, relations cannot be ontologically independent either.

Neither relations nor events can be understood completely independently from objects or physical systems. There must be some dependence that holds in at least one direction between the ontological categories. Given, according to RQM, that objects cannot possess determinate properties in isolation, they must also be dependent. Therefore, we must accept either that RQM should be understood in terms of symmetrical dependence between relations and objects, or symmetrical dependence between events and objects. For example, there cannot be the event without its constituents, and the constituents have no

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[190] Asymmetry is required by the foundationalist in order to create differences in ontological priority between the fundamental level and derivative levels.

[191] Simons (2005: 377-378) backs up this point: 'Most or all events, being spatio-temporally extended, have segments or phases corresponding to subdivisions of their extents. In this bare geometrical sense, all events other than point-events have parts and are thus complex, or non-atomic.'

[192] For examples of this sort of dependence, see Fine's (1995) essentialist notion of dependence, and the generic essential dependence formulated in Tahko and Lowe (2015).

[193] This is supported by Bennett (1988: 12): 'Events are not basic items in the universe; they should not be included in any fundamental ontology…. all the truths about them are entailed by and explained or made true by truths that do not involve the event concept'.

definite properties without the event. Physical systems rely on relations with other physical systems for their determined properties, and relations rely on physical systems for their existence, identity and individuation.

Perhaps there are other options that will help us to preserve the asymmetry required for pluralist foundationalism. However, if that's right, then we should be told what they are, and the options should be evaluated. In the absence of that, we should conclude that neither pluralist foundationalism nor monist foundationalism is viable. Since pluralism and monism are exhaustive categories of foundationalism, we should reject foundationalism, and favour anti-foundationalist alternatives.

4. Conclusion: RQM Supports Anti-foundationalist Interdependence

I have argued that RQM supports a picture on which nothing is fundamental, since nothing can be understood as ontologically independent given the commitments of RQM. If RQM is a promising way of understanding quantum theory, and RQM cannot be reconciled with the existence of any ontologically independent fundamentalia, then this gives us reason to accept anti-foundationalist interdependence as the most appropriate ontology for RQM. The reason that there cannot be any phenomena that exist independently of anything else is because all phenomena are part of an interdependent network. I will finally come do developing the details of such a view in the following chapter.

The conclusion that RQM supports metaphysical interdependence is similarly reached by Morganti and Dorato (2022), albeit a foundationalist form of interdependence. They argue that RQM is best understood through the lens of *coherentism*,[194] as opposed to through OSR or priority monism. They argue that the importance of relations and interactions in RQM is best understood by accepting symmetrical dependence between quantum systems, as opposed to through the priority of relations or the priority of wholes (2022: 18). However, in doing so, they make the move of suggesting that we should remain committed to fundamentalia. In order to preserve this foundationalist commitment, they suggest that fundamentality should not be understood in terms of ontological independence, so that quantum systems that depend on others can be considered as fundamental (2022: 16). This means that whilst arguing in favour of a coherentist structure of interdependence, Morganti and Dorato conclude with what I understand to be a foundationalist form of interdependence, as opposed to a typical anti-foundationalist interdependence.

[194] I will say much more about how to understand coherentism and its various formulations in the coming chapter.

I understand Morganti and Dorato to be correct in their assessment that understanding RQM in terms of symmetrical ontological dependence makes an improvement on understanding RQM in terms of the priority of relations or the priority of wholes. They highlight the coherentist's ability to avoid untenably strong claims made by both OSR and Priority Monism, that cannot be read directly from RQM. Consider the following statements:

'The proposed coherentist construal is more plausible than priority monism because the postulation of a symmetric dependence between proper parts of the universe by no means entails that the whole is (asymmetrically!) prior to the parts… Also, the proposed coherentist construal is more plausible than structuralism because hypothesising ontological dependence relations between physical systems by no means entails that those physical relations are more fundamental than objects with their monadic properties' (2022: 18).

I agree that these are reasons for preferring coherentism. However, this reasoning can be extended further, to demonstrate why we should prefer anti-foundationalist coherentism as the most appropriate ontology for capturing RQM. A coherentist interpretation of RQM is preferable to interpretations in terms of PM and OSR, not only because it avoids committing to differences in metaphysical priority,[195] but also because it can avoid committing to an understanding of phenomena like wholes or relations *as fundamentalia* altogether. Not only is there nothing in RQM to suggest a difference in relative fundamentality between these categories, there is also nothing in RQM to suggest that anything is *ultimately* fundamental. Anti-foundationalist coherentism (or any form of anti-foundationalist interdependence in general) does best to read off exactly the commitments that RQM suggests we make: that we should commit to the dependence of all things. In the absence of further argument, the burden of proof lies on Morganti and Dorato to show why there must exist some fundamental entity. In order to justify giving up the idea that fundamentality is marked by ontological independence, Morganti and Dorato must either give some reasoning as to why some physical systems must be fundamental, or give some reasoning in favour of an alternative way of characterising fundamentality.[196] Without some convincing reasons to this effect, we need not give up commitment to the view that fundamental entities are ontologically independent, and we should accept that if RQM is best interpreted using coherentism, then RQM is best interpreted as anti-foundationalist.

[195] The quotation above suggests that committing to differences in metaphysical priority between ontological categories like entities, relations and wholes, is not necessary for the proponent of RQM and coherentism.

[196] I will do more in the next chapter to suggest why adopting alternative characterisations of fundamentality may not be a move open to those who accept coherentism as an ontology for RQM.

According to RQM, the existence and properties of all entities are dependent on the entity's position in a vast network of dependence relations. Neither the relations, events of interaction, nor the entities between which they occur, are metaphysically prior according to this picture. This is made possible due to the acceptance of symmetrical dependence. There is no requirement for any foundational, independent entity, or metaphysical category, to do the work of giving rise to the rest of reality.[197] It is possible for all that exists to be dependent on something other. Dispensing with commitment to ontologically independent foundations addresses RQM's central perplexing feature of the indeterminacy of all properties of physical systems prior to interaction. It ensures that these physical systems are always regarded as ontologically dependent for their nature, and hence, non-fundamental. Each element of the system is dependent on another element. An anti-foundationalist understanding of RQM avoids the problems that occur if we regard other ontological categories like relations or events as fundamental. For instance, it avoids the problem of how we are able to understand these categories independently of the physical systems they involve. Rovelli himself warns that accepting RQM will mean accepting novel metaphysical consequences. I have shown why foundationalism should be considered as the commitment that must be dispensed with in order to provide a metaphysics for interpreting RQM.

The upshot of this chapter is that anti-foundationalist interdependence can be shown to be consistent with, or even supported by RQM, hence, it is consistent with a good interpretation of current physics. This further serves to support the development of an account of anti-foundationalist interdependence. The next chapter finally sets out the details of the account I endorse, informed by all of the conclusions made from Buddhist metaphysics as well as RQM thus far.

[197] The anti-foundationalist version of coherentism can also helpfully adhere with the perspectivalism that results from Rovelli's account. Rovelli's interpretation implies the impossibility of a complete and objective account of reality, since all values of variables are *relative* to the systems they interact with. As Rovelli puts it, "Different observers can give different accounts of the same set of events" (1996: 1643). The lack of fundamental foundations allows for there to be a lack of a fundamental perspective from which all of the physical world can be understood. Anti-foundationalism makes room for this.

Chapter 6: Developing the Interdependent Network

The six chapters leading up to this point have motivated the need for development of an account of anti-foundationalist interdependence, and outlined its key ingredients. This chapter is where I finally put the account together. Once developed, the final chapter defends it from objections, with the aim of establishing it as a novel alternative and promising rival to standard orthodox foundationalism.

Recall from Chapter 2, that *standard foundationalism* is made up of three key elements: orthodox structural properties of dependence, the hierarchical structure that they produce, and the existence of something fundamental. The rejection of these three key elements are the core components of the account of reality's structure I defend: anti-foundationalist interdependence. I spend this chapter fleshing out the details of this account.

Throughout the thesis so far, I have motivated four requirements for the account to meet. These four requirements must be satisfied when clarifying the details of the account. They are as follows:

(1) The account must be anti-foundationalist.
(2) The account must feature some instance(s) of symmetric dependence.
(3) The account must be consistent with Buddhist *emptiness.*
(4) The account must be consistent with relational quantum mechanics.

(1) According to my assessment of characterisations of fundamentality in chapter 1, my understanding of anti-foundationalism can be summarised simply: anti-foundationalism refers to any account which lacks commitment to some fundamental entity, where a fundamental entity is understood in terms of ontological independence. Hence, anti-foundationalism is characterised by the dependence of all entities on something other than itself. Any account that denies the existence of ultimate, independent foundations is to be considered as anti-foundationalist. Anti-foundationalism was motivated in chapter 2, where it was shown that ontologically independent entities are problematic in regard to metaphysical explanation and the principle of sufficient reason. Chapter 3 offered an argument to the effect that all entities are dependent on something other than themselves, since all properties of all entities are relational and essential to their identity. Hence, my account must commit to the lack of ontologically independent, fundamental foundations. I call this requirement '(AF)' (anti-foundationalism).

(2) Chapter 2 recommended dropping the traditional commitment to the asymmetry of dependence relations, in light of numerous examples of symmetric dependence. Accepting the possibility of mutual dependence or 'interdependence' opens up a range of underexplored options for the way that reality might be structured, beyond those that a commitment to asymmetric dependence limits us to. In order to be able to utilize these alternative structures, my account must drop the traditional commitment to asymmetric dependence, and feature at least some instance of mutual dependence between phenomena. I call this requirement '(SD)' (symmetric dependence).

(3) The account I defend must be able to receive support from the arguments from the Buddhist tradition set out in chapter 4. In order for this to be the case, the account must contain no entities that have svabhava, and therefore the account must do justice to the idea of universal emptiness. The lack of svabhava should be ensured through the dependence of all things for their existence and nature on something other than themselves. I call this requirement (BE) (Buddhist emptiness).

(4) Finally, the account I defend must be able to receive support from theories in quantum mechanics. In the previous chapter I argued that a promising interpretation of QM is Rovelli's *relational* interpretation, which suggests that all physical systems have their properties determined through interactions with other systems. Therefore, there is no physical system with its own ontologically independent nature. The account that I develop should be able to receive support from the picture of physical reality painted by RQM. I call this requirement (QM) (quantum mechanics).

Developing an account of reality's structure involves addressing three questions.[198] The four requirements just set out must be satisfied by the way that these three questions are answered. This chapter addresses the following three questions in turn, keeping the four requirements for a promising anti-foundationalist account in mind:

i. What is represented by the nodes in the structure?
ii. What is represented by the relations in the structure?
iii. What shape should the structure of nodes and relations take?

To illustrate what is meant by nodes, relations and shape of structure, consider the following representation of a possible example of reality's structure:

[198] These questions come about based on the assumption that reality's structure can be represented as a graph containing a series of nodes and relations between them.

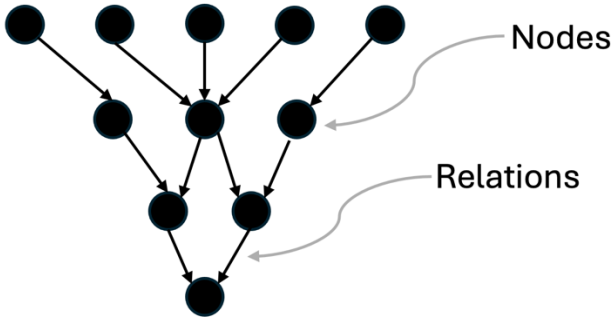

Figure 11

The above example represents a possible structure of reality that abides by the commitments made by the proponent of standard foundationalism. It commits to independent foundations (represented by the node at the bottom of the structure, which is dependent on nothing else for its existence), as well as asymmetric dependence relations (represented by all arrows having a single arrowhead, pointing in only one direction). As indicated, the nodes are represented by black circles. These are entities, phenomena, or parts of reality that are held together by relations of dependence. The relations, represented by the arrows that connect the circles, are ontological dependence relations that hold between parts of reality, indicating what depends on what. The shape of the structure, is represented by the arrangement of arrows and circles, and indicate which parts or reality are related to which other parts, through ontological dependence. Getting clear on the details of each of these three elements- nodes, relations and shape- is necessary for building a fully developed account of reality's structure, and position within the fundamentality debate.

I will begin by clarifying metaphysical nature of the nodes and relations that make up the interdependent network (§1), before evaluating the options for the shape of the structure according to the four requirements above (§2). Different metaphysical pictures will vary according to what the relations and relata (nodes) represent. Foundationalist pictures are best characterised by what is represented by any independent nodes in the structure, as outlined in chapter 1. Of course, according to my view, there will be no independent nodes. Every node will be related to some other. In the following section, I will clarify how I understand the nature of these nodes, and the relations that exist to link them.

1. Nodes and Relations

1.1 What is Represented by the Nodes?

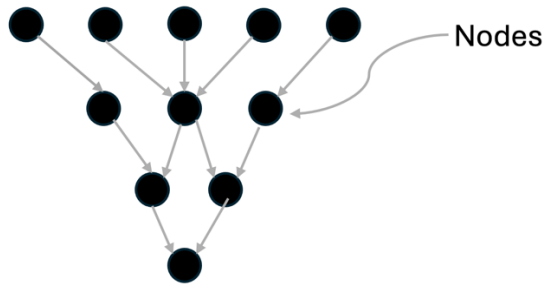

Figure 12

The key point to emphasise about nodes in the network I defend, is that they are to be understood as *entities* as opposed to facts. Much of the literature on grounding which I draw upon in order to make arguments about ontological dependence and fundamentality, talks about grounding as a relation that holds between *facts.*[199] Whilst grounding can refer to a relation that holds between facts, the picture that I endorse involves ontological dependence relations that hold between parts of the world.[200]

One reason that can be given in favour of treating nodes as facts, is because pursuing an interdependent network of facts can support mutual and holistic *explanations.* [202] If facts are what underpin explanations, and facts are related by mutual dependence relations, then this can account for why some explanations require a bigger picture, containing multiple interdependent facts. In response to this reason, I offer the reply that whilst facts may underpin epistemic explanations, they do so by tracking underlying metaphysical structure, made up of *things.* The metaphysical structure and relations between *things* are what back metaphysical explanations. For example, a metaphysical explanation of some phenomenon, including its nature, properties and development, may refer to the other parts of the world that the phenomenon depends upon. The North Pole's magnetic properties are explained through reference to its dependence on the South Pole, and vice versa. Nodes must not necessarily be understood as facts to be able to reap the rewards of mutual explanation.[203]

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[199] For example, Bliss and Trogdon (2024), Swiderski (2022), Correia and Schneider (2012).

[200] Fact theorists, who take facts as parts of the world, can adopt my view and include facts as possible nodes. The point I make here, is that all manner of things potentially depend on one another, not just facts.

[202] See for example, Swiderski (2024: 4).

[203] Some may want to understand the above case in factive terms. For instance, the fact that the North Pole has the magnetic properties that it has, depends on the fact that the South Pole has the magnetic properties

An example of grounding discussion that takes place in the context of concrete objects as opposed to facts is Schaffer's (2010) work on the ontological priority of the whole.[204] His work towards a priority monist view involves all concrete objects being derivative, and dependent on the one maximal concrete object- the cosmos. This puts grounding talk in the context of 'things', like objects, substances, or spacetime regions, rather than facts. When talking about mutual grounding between things that occupy spatiotemporal locations, cases for interdependence can be made from the physical phenomena, such as entanglement in quantum mechanics, as shown in the previous chapter.

I will remain neutral on the issue of how we are to understand the kinds 'things' or entities that are related through dependence in the network. For example, I will leave it up to the reader's own ontological preferences to determine whether we should permit mental or abstract phenomena, as well as physical or concrete phenomena as nodes. Given one's ontology permits physical entities as nodes, I will also remain neutral in regard to the substantivalism/ supersubstantivalism debate. Preferences in regard to this debate will determine whether nodes are best understood as purely spacetime points or regions, or whether they are objects or entities that occupy spacetime regions.[205] If one were to prefer super-substantivalism, then the interdependent network could be understood as a structure in which relations of interdependence hold between spacetime points, represented by the nodes. In contrast if one were a substantivalist, the interdependent network would hold between some nodes that represent spacetime points, and some nodes that represent physical entities.

One more question needs to be answered in regard to clarifying how to understand the nodes in the network. This is the question of what unifies each node? The question of unification arises as a result of my argument that all properties are relational and essential (made in chapter 3). As Barker (2013: 628) explains, 'standardly, people think of concrete particulars as constituted by their intrinsic properties, not by their relational properties… in short, relations must link things that are ultimately constituted independently of relations'. However, according to the view I have put forward, there are no intrinsic properties to constitute entities independently from their relations. This view then invites

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that it has, and vice versa. My account can accept this dependence between facts, but it is not limited to dependence between facts.

[204] For other examples where grounding relations are treated as holding between all manner of things, and not just facts, see Cameron (2008) and Wilhelm (2020).

[205] For discussion of the issues of substantivalism and supersubstantivalism in regard to the fundamentality debate, see Schaffer (2009). Schaffer argues that spacetime regions are *identical* with material objects, therefore spacetime should regarded as the single substance that is fundamental (in accordance with his monist view of the priority of the whole).

the question, 'how are nodes, particulars or entities, constituted purely by their relations?' or, in other words, 'how are we to understand how a set of relational properties are unified to produce a node, particular, or entity?'

There are two standard ways of answering this kind of question. First, is to suggest that there are bare particulars that instantiate all relational properties. In other words, a 'thin' particular is 'thickened' by its instantiation of relational properties (Barker 2013: 628). It is the bare particular that holds together the terminuses of a particular set of dependence relations, and that gives each node its unity. The second way of answering, is to suggest that nodes are to be understood as 'bundles' of the terminuses of relations. There is no extra thing that needs to be posited in order to account for the unity of a node - the unity is produced by the bundling.

I consider there to be problems with both of these kinds of answers. These problems are highlighted by Nāgārjuna's argument from properties explored in chapter 4, §3.2. Nāgārjuna argues that particulars cannot be understood independently from properties, and properties can be understood independently from particulars. The first way of answering the question does not work, because the notion of a bare particular is problematic. A bare particular implies that a particular can be understood independently from properties. A bare particular would be something that resists explanation, and would therefore be something I reject. As Nāgārjuna puts it, 'A thing without a characteristic has never existed' (MMK 5.2). The second way of answering the question also doesn't work, because the bundle theory implies that relational properties can be understood independently from particulars. Again, this is something I reject. To refer to Nāgārjuna once more, 'If the characterised object is not posited, there will be no characteristic either' (MMK 5.4).

In light of these problems, I suggest a third way of characterising the relationship between the particular and the relational properties. This provides a third way of answering the question of what unifies a node in the network. I suggest, in line with Nāgārjuna, that particulars and their relational properties are interdependent. The notion of bare particular is incoherent, since a particular must always be dependent upon its properties. Similarly, a set of relational properties cannot be unified without a particular to unify them. Therefore, the unification of each node, and what it means for each node to be 'relationally constituted', is to be understood through the interdependence between particulars and properties.[206]

[206] I will delve deeper into the details of what this might mean in §2 of the final chapter.

1.2 What is Represented by the Relations?

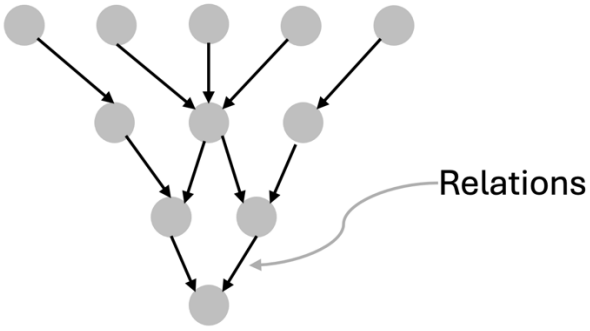

Figure 13

Thus far, I have been talking in general terms of a network containing relations of mutual ontological dependence. However more work needs to be done in order to clarify the kind of ontological dependence that the network contains.

Lowe's *The Possibility of Metaphysics* explores the difference between existential dependence and identity dependence. Existential dependence relations can be understood as relations that follow the form:

"*x* depends for its existence upon *y* = $_{df}$ Necessarily, *x* exists only if *y* exists." (Lowe 2001: 137).

This is perhaps the simplest way of understanding dependence claims. The existence of one entity depends on the existence of another. The term 'necessary' in Lowe's statement of existential dependence implies that it has a modal element. Fine (1995: 271) notes that a modalised account of existential dependence is so commonly used amongst metaphysicians, that it is rare to find an alternative. However, there is an alternative notion that is offered by Lowe, which is identity dependence:

"x depends for its existence on y iff necessarily, the identity of x depends on the identity of y" (Lowe 2001: 147). An example of identity dependence that Lowe gives, is that the identity of a set depends on the identity of its members. Lowe highlights that identity dependence is a stronger relation (entailing, but not entailed by) existential dependence (2001: 146-147).

Lowe recommends employing the notion of identity dependence, as opposed to existential dependence, in order to rule out cases of symmetrical dependence between non-identical entities. The example he gives to show why identity dependence improves on existential

dependence involves the dependence of Socrates on Socrates' life. Given an understanding of existential dependence, the existence of Socrates depends on the existence of Socrates' life. Similarly, we might say that the existence of Socrates' life depends on the existence of Socrates. In this way, examples of symmetrical dependence arise when using the notion of existential dependence (2001: 143-144). Lowe argues that such cases must be ruled out, since dependence must be asymmetric: 'We want to say that Socrates' life only exists because Socrates does, whereas it would be putting the cart before the horse to say that Socrates exists because his life does. Now, the conjunction 'because' is asymmetrical, because it expresses an explanatory relationship and explanation is asymmetrical' (2001: 145).

Of course, I am not in the business of ruling out cases of symmetric dependence,[207] and actively welcome them. Therefore, I do not take this as a reason for preferring the use of identity dependence to existential dependence. However, I recommend using the relation of identity dependence in the interdependent network account, for a different reason. The reason for using the identity dependence relation, is because I have argued previously (see chapter 3) that all properties are in some sense essential to the identity of any entity - there should not be a distinction made between essential and contingent properties. If this is the case, then any change in identity implies a change in existence. An entities' existence cannot survive a change in its properties or identity. Whilst Lowe argues that identity dependence is a 'stronger' relation than existential dependence (since all cases of identity dependence entail, yet are not entailed by existential dependence), I argue, as a consequence of the points raised in chapter 3, that identity dependence and existential dependence should be thought of as equivalent. For this reason, my account can be understood to use an existential-identity dependence relation, which we can call 'identity dependence' for the sake of simplicity.

Moving on to another relevant issue about dependence - clarifying whether my account uses a *rigid* or *generic* notion of dependence. The distinction between the two can be characterised as such: *generic dependence* involves statements like 'x exists only if some y exists, such that y is of type T'. Generic dependence is the dependence of an entity on another entity of a certain type, whilst the exact identity of this entity need not be specified. An example given by Correia (2008: 1016), is that according to a generally accepted view of universals, the existence of the universal *redness* depends on the existence of *some red thing*. The universal *redness* does not depend on the existence of any red entity in particular.

[207] Moreover, as will become clear later in this chapter, I also do not rule out cases of symmetrical *explanation*.

Rigid dependence involves statements like 'x exists only if y exists'. Rigid dependence expresses the idea that x's existence depends on some entity, y, *in particular* (as opposed to any entity of type T). For example, the existence of a table may depend on the existence of its parts- being *those particular parts, as opposed to any other parts.* A rigid characterisation of existential dependence requires the existence of a specific object, whereas a generic characterisation of existential dependence requires the existence of an object of a certain type (Correia, 2008: 1015). We can make comparisons about the strength of both of these kinds of dependence. Rigid dependence is the 'stronger' kind, since if x rigidly depends on y, then it must also depend generally on something of the type that y belongs to. However, this does not hold in reverse. If x generically depends on something of type T, then x does not necessarily also depend on something in particular that belongs to type T.

Now that the notions of existential dependence, identity dependence, rigid dependence and generic dependence have been distinguished, I can apply this machinery from Lowe (2001) and Correia (2008) to the account that I am developing. As already noted, I take identity dependence to be most appropriate for capturing the relations that exist between nodes in the interdependent network. Since all properties are relational, and an entity's identity depends on all of its properties, then an entity's identity and existence are dependent upon other entities in the network. For this reason, I also employ rigid dependence between entities in the network. Each entity and its particular set of properties depends on particular other entities, and their particular sets of properties, meaning dependence relations are rigid. Each node in the network is dependent on some particular entity in some particular way. Put together, the relations in my account should be understood as rigid dependence for existence and identity.

Such an understanding follows the form of dependence employed by Morganti and Calosi (2021), which they label as 'rigid essential necessitation', a notion introduced by Correia (2008):

$\Box x (Ex \rightarrow Ey)$

(The sentential operator $\Box x$ expresses 'x is essentially such that' and E expresses the 'existence predicate')

'The thought is that something depends on something else if and only if the existence of the latter (as the very entity it is) is a necessary condition for the existence of the former (as the very entity it is). Essentialist talk should thus be understood in terms of the existence and distinctive properties of the entity or entities in question' (Morganti and Calosi 2021: 8). Interestingly, Morganti and Calosi use this kind of dependence to construct an account of a *coherentist* network, of the kind that I come to explore in the following section.

2. The Shape of the Structure

Now that I have clarified what is represented by the nodes and relations in a structure that represents reality, I turn to clarifying the shape of the structure itself. The options that I assess represent an exhaustive list of metaphysical positions present in existing literature that have some resemblance with anti-foundationalism or interdependence. The possibilities that I consider regarding the shape of reality's structure are as follows:

- Infinitism
- Priority Monism
- Structuralism
- Aspectualism
- Hierarchism (Coherentism)
- Rebarism (Coherentism)
- Insularism (Coherentism)
- Holism (Coherentism)

The sections below evaluate each of the possibilities above according to their independent merits, and their abilities to satisfy requirements (1)-(4). I group them according to the requirements that they meet, and the requirements that they do not. The option that I will eventually arrive at, that satisfies all four requirements to the fullest, is a form of *coherentism*, in which all entities depend on all other entities.

2.1 Infinitism

To reiterate a point made earlier in the thesis, the debate between foundationalists and anti-foundationalists has often taken place within the boundaries of the commitments made by *standard foundationalism*, (besides the commitment to fundamentalia). These other commitments include the commitment to the hierarchical structure of reality produced by the partial ordering of dependence chains. Committing to an understanding of dependence that must be irreflexive, asymmetric and transitive limits the debate between foundationalists and anti-foundationalists to a debate between foundationalism and some version of *infinitism*. An infinitist account can abide by all the rules of standard foundationalism apart from commitment to the existence of fundamentalia, by structuring reality using 'vertical' chains of dependence, which hold between entities at different degrees of relative fundamentality, and fail to terminate in some ultimate 'bottom' level. In such a structure, foundations are never reached, because chains never end.[208] See Figure 14 for an illustration of this kind of picture.

[208] See, for example, Cameron (2008: 8)

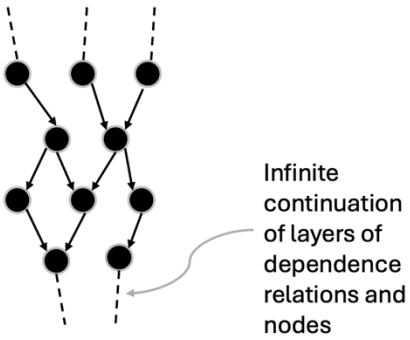

Figure 14

The example of an infinitist structure represented by Figure 14 has no upper or lower bounds, meaning that the structure both ascends and descends infinitely. It is possible for a structure that contains an infinite number of nodes and relations to be foundationalist, if it has a lower bound, while ascending infinitely. [209] There are other possible ways for an infinite structure to contain ontologically independent entities and qualify as foundationalist, for example, if the independent foundation of the structure is infinitely large (Rabin & Rabern 2016: 363, Dixon 2016: 446) . In such a case, the dependence chain does not terminate, since the foundation is infinitely large, yet, the structure still qualifies as foundationalist, since it contains an independent foundation.

Infinitist proposals which qualify as forms of foundationalism are not what I am interested in, since the commitment to foundations violates requirement (AF). Infinitist proposals which lack a lower bound, or any independent foundations such as the structure represented by Fig 14 achieve the criteria for anti-foundationalism that I endorse. In such a structure, the lack of any ontologically independent entity is ensured by the dependence of all entities on another that is 'below' in the great chain of dependence. Therefore, it satisfies requirement (AF). However, due to the endorsement of the orthodox properties of ontological dependence, including asymmetry, this form of infinitism fails to meet requirement (SD). The lack of any ontologically independent entity is achieved through the ever-descending linear chain of dependence, as opposed to through the utilisation of the possibility of symmetrical dependence. For this reason, I reject an infinitist chain as the shape of the structure of reality for my account. Failing to include some instance of interdependence (failing to satisfy (SD)) also rules out infinitism's ability to satisfy (BE) and (QM), as each of these also requires the account to demonstrate interdependence between entities.

[209] Bliss and Priest (2018: 6) clarify the distinction between a dependence chain being well-founded, and having a lower bound. Well-foundedness requires both the presence of a lower bound, and a 'finite number of steps between any member of a chain and the fundamentalium that it terminates in'. Therefore, a well-founded chain cannot contain an infinite number of nodes and relations.

2.2 Priority Monism and Structuralism

Monism and structuralism have both been proposed as options that meet requirement (QM)[211], which is why I include them here. Moreover, they both show resemblances to the interdependent network structure I'm working towards, since they both hold that an accurate understanding of reality's structure can only come from a broader appreciation of a bigger picture, involving the relations between phenomena, rather than just the world's most simple, discrete elements. However, according to monists and structuralists, there are still fundamental entities, even though they should not be understood as discrete parts of the world like atoms or objects.

Monism, the view that there is exactly one fundamental entity (the totality of the cosmos) is a foundationalist view. The cosmos as a whole is fundamental, since it depends on nothing else for its existence. The monist also holds onto differences in relative fundamentality between parts of reality with differing mereological complexities. This is illustrated by Figure 15 below. The entities represented by nodes which are lower layers in the hierarchy, beneath the node representing the independent cosmos as a whole at the top, are less mereologically complex than the maximally complex fundamental whole. The fundamental whole must contain all parts of the cosmos. Entities that depend on the whole contain fewer parts, and are therefore less mereologically complex.

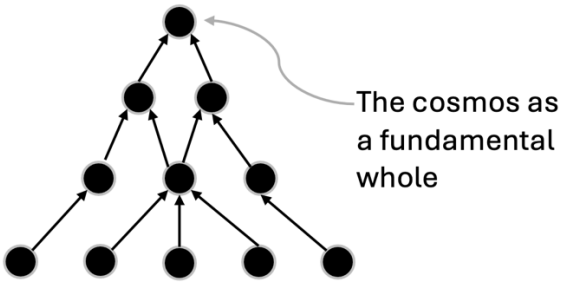

Figure 15

Despite initial resemblances with my preferred account, I reject monism for its foundationalist commitment to the whole universe as a mereologically maximal, ontologically independent entity. Monism's commitment to the universe as a whole as fundamental means that monism fails to satisfy desideratum (AF). In effect, this means it also fails to satisfy desideratum (BE) (since committing to the whole as fundamental introduces a form of svabhava- the universe as a whole has svabhava). Further, there are reasons to doubt its ability to meet requirement (QM)- as I argued in the previous chapter (§3.3), monism's foundationalist commitment makes it incompatible with RQM.

[211] See Schaffer (2010) and Calosi (2014) for arguments in favour of a priority monist interpretation of QM, and Candiotto (2017) for a structuralist interpretation of QM.

Moving on to structuralism, proponents of Ontic Structural Realism accept the existence of symmetric dependence relations (Calosi and Morganti 2021: 870), meeting requirement (SD). All forms of structuralism are marked by the 'inflation the ontological priority of structure and relations' (Ladyman 2014: 23). This inflation is often taken to the level where relations are ontologically prior to the objects that they relate. For example, in Figure 13 above, the relations represented by arrows are more fundamental than the nodes represented by circles. Further, structuralists typically inflate the level of relative fundamentality so far that relations are considered as ultimately fundamental (Calosi and Morganti 2021: 870- 871). This means that structuralism typically commits to a form of foundationalism. Similar to the monist case, structuralism takes on the spirit of interdependence, whilst keeping hold of some form of fundamentality. Therefore, structuralism also fails to satisfy (AF), and in effect, also (BE) and (QM).

2.3 Aspectualism

Aspectualism is a position that draws out opposing aspects of each existing entity, and creates a unique picture of the structure of reality according to which aspect is focused upon. My understanding of aspectualism comes from Jones' (2022) explication of the view, and application of it as a way to understand the Huayan Buddhist[212] take on emptiness. It's potential to satisfy requirement (BE) is why I address it here.

Jones draws attention to parts of the Huayan literature that talk of each existing entity having dual roles as both 'chief' and 'attendant'. These terms can be understood as equivalent to 'fundamental' and 'non-fundamental'. By understanding these as distinct aspects, a world made up purely of asymmetrical dependence relations can be preserved. To illustrate, imagine a world which contains only three entities, [a], [b], and [c]. All three entities have an aspect which is fundamental, and an aspect which is non-fundamental. [b]'s non-fundamental aspect, and [c]'s non-fundamental aspect both depend on [a]'s fundamental aspect, through asymmetric relations. Meanwhile, [a]'s non-fundamental aspect and [b]'s non-fundamental aspect both depend on [c]'s fundamental aspect. Finally, [a]'s non-fundamental aspect and [c]'s non-fundamental aspect both depend on [b]'s fundamental aspect. This creates a structure represented by Figure 16 below.

[212] Huayan Buddhism is a distinctively Chinese form of Mahayana Buddhism. The Huayan Buddhist's view, first systematized and recorded by its third patriarch, Fazang (643–712), is most often interpreted in line with coherentism (to be introduced properly in the following section). However, Jones (2022) argues that the coherentist reading can't fully capture what is going on in Fazang's literature, and introduces *aspectualism* to capture the a more extreme form of interdependence than that present in coherentism.

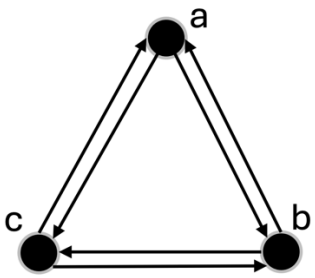

Figure 16

Jones argues that the dual aspects of each entity are not just different perspectives on the same phenomenon, enabled by symmetrical dependence. Instead, the aspects of each entity are distinct, and relations between them can only be asymmetric. According to Jones, all entities have an aspect which has power, and an aspect that lacks power. Asymmetric dependence relations can only hold between the powerful aspect of one entity, and the powerless aspect of another, creating chains of dependence familiar to proponent of standard foundationalism. This idea leads to a picture where all entities have an aspect which functions as the ultimate foundation of a chain of dependence containing every other entity, and containing only asymmetrical dependence relations. Meanwhile this same entity also has a simultaneous derivative aspect, which is non-fundamental as it depends on every other entity in the system.

'Every dharma has two aspects:

1) All other dharmas depend on it, while it depends on nothing else.
2) It depends on others while nothing depends on it.' (Jones 2022: 36)

Jones shows that aspectualism can be represented as a formal model in a way that demonstrates its departure from a typical graph containing a set of nodes and relations. Aspectualism requires a number of different planes or layers, that can be visualised like sheets of translucent paper stacked in a pile. Each layer represents a different graph containing one node as fundamental, and all others depending on it. In this way, the powerful aspect of every node is represented. On all other layers, that same node would be in a derivative position, to represent its powerless aspect. To summarise Jones' aspectualism, it rejects the traditional foundationalist conviction that there is some privileged class of fundamental entities, since all entities have a dual function as both fundamental and non-fundamental. Meanwhile, it also rejects the view no one entity is any more fundamental than any other, since on every different graph or 'layer' there is an entity that is privileged.

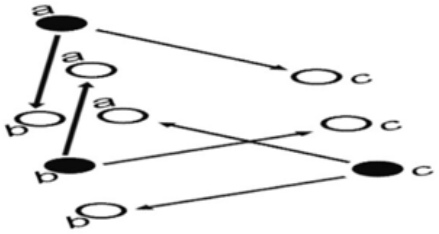

Figure 17 (from Jones 2022: 48)

I object to the aspectualist picture on the following grounds: it's endorsement of only asymmetric dependence relations, which introduces its foundationalist aspect, means it fails to satisfy both requirements (AF) and (SD). The failure to satisfy (AF), brought about by the fundamental aspect of each entity, and hence some form of foundationalism, is a key point on which to critique the Huayan understanding of emptiness. In effect, the fundamental aspect of each entity can be criticised for introducing a form of svabhava into the picture. The fundamental aspect of each entity also puts the view in danger of collapsing into the common trap of preoccupation with fundamental separation and distinctness. Aspectualism takes the dual aspects of each entity as ultimately separate and distinct, in order for them to enter into their own asymmetric dependence relations. I object that the view gives in to the common intuition that there must be something fundamental, even if this is just an aspect, which means the view cannot be called a true view of emptiness. If this is the case, then aspectualism falls short of meeting requirement (BE).

Even if there is just one of two dual aspects that has its own intrinsic nature, this can be thought to be a form of svabhava. By positing a fundamental, or 'independently real' aspect, the view slips away from being able to capture the 'middle way' between existence and non-existence. The kind of 'middle way' of emptiness that has connections with my view, takes interdependence between entities to be the only way of capturing their nature, without an aspect of intrinsic existence. A central commitment of my view is that all entities are non-fundamental, ensured through their mutual dependency. I am committed to the view that there cannot be an aspect of them which is fundamental. Hence, I move on to addressing the final group of options to capture the shape of the structure of an anti-foundationalist, interdependent network, which come under the heading: *coherentism*. In the following section, I will argue that a form of coherentism best captures my interdependent anti-foundationalist position.

2.4 Coherentism

It is in this section that I finally come to introduce coherentism - the position that has been gestured towards throughout the thesis so far. Metaphysical coherentism finds its roots in

an epistemic position with a similar structure, often regarded serious competitor to epistemic foundationalist views. An analogy can be drawn between metaphysical dependence structure, and epistemic justification structure. The epistemic foundationalist holds that if every belief requires justification, then chains of justification must ultimately trace back to basic beliefs that require no justification. The epistemic coherentist, in contrast, holds that justification comes from a belief being a part of a coherent system of beliefs, where there are no basic beliefs (Stetup and Neta 2024).

Similarly, metaphysical coherentism departs from foundationalism by rejecting a linear dependence structure in favour of a network system of dependence, as well as rejecting the need for positing anything basic. A roughly sketched statement of the coherentist's metaphysical picture, can be given as follows: all entities that exist are dependent upon some other entity, forming an interdependent web-like structure where all elements are harmoniously connected, and there is no need for any independent, foundational entity. Diagrams containing arrangements of nodes and relations will be provided later in the chapter in order to illustrate these ideas.

To a greater extent than its epistemological counterpart, *metaphysical* coherentism has been widely neglected and overlooked. A number of notable exceptions have begun paying attention in recent years. These include Bliss (2014), Barnes (2018) and Thompson (2018) who have made important contributions to the case for accepting the possibility of symmetric dependence, as already demonstrated. Morganti (2018, 2019) and Calosi and Morganti (2021) have explored the support that coherentist pictures might receive from current physics, and the ways that coherentism might be applied to provide an ontological interpretation of phenomena in quantum mechanics. Swiderski (2022) puts forward a comprehensive effort to pin down the core features of coherentist accounts, and define and systematize coherentist variations within these boundaries. It is by drawing upon his recent work that I begin my discussion of coherentist possibilities. I aim to build upon Swiderski's initial outline of the varieties of coherentism and their respective problems and solutions, and work towards finding a formulation of coherentism that fits with my requirements for an account of interdependence.

Swiderski outlines a *Coherentist Canon,* that defines a space within which coherentist views must fall (2024: 1864). It consists of two commitments that any kind of coherentist must make:

A) 'For any x, there is some y such that y grounds x.'

(In language of 'dependence': every entity that exists must be ontologically dependent on some other entity.)

B) ‘There is some z and some w such that z (perhaps indirectly) grounds w and vice versa.’

(In the language of ‘dependence’: there is at least one instance of (perhaps indirect) symmetrical dependence).

According to an understanding of fundamentality in terms of ontological independence (set out in the first chapter), commitment (A) would ensure that requirement (AF), anti-foundationalism, is satisfied by all coherentist models. To be fundamental, an entity must not depend on any other entity for its existence or nature. If all entities depend on some other entity, then there is no entity that is independent, which means no entity is fundamental. Hence, this amounts to the rejection of foundationalism.

Commitment (B), the presence of at least one instance of symmetrical dependence, ensures that all coherentist models also satisfy requirement (SD). Things are looking promising for coherentism to fulfil the required elements of the structure of reality that I’m working towards. The decision between which of the varieties of coherentist structure to endorse turns on how well they can satisfy desiderata (BE) and (QM)- their respective compatibility with regard to emptiness and RQM.

2.5 Hierarchism and Rebarism

Both *hierarchism* and *rebarism* are varieties of coherentism that permit some instances of asymmetric dependence, as well as instances of symmetric dependence. Beginning with hierarchism, the hierarchist structure retains differences in ontological priority, by positing asymmetrical relations between different ‘levels’ of reality. However, each of these ‘levels’ contains extensive webs of symmetrical dependence within. Hierarchism could be seen as a hybrid between foundationalism and interdependence, as it maintains a ‘layered’ conception of reality, whilst also retaining maximally interdependent networks at each layer. Figure 17 illustrates such a structure.

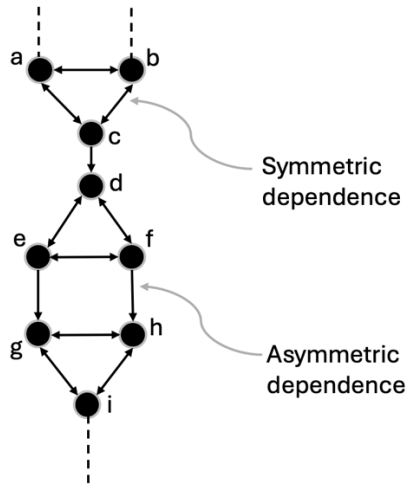

Figure 17: Hierarchism

A hierarchist structure may permit infinite descent or infinite ascent of layers, each consisting of a contained network of mutual dependence (as illustrated above by the dotted lines above and below the structure). If the hierarchist prefers their picture to be open to infinite layers at either end, then their position can be characterised by an infinite chain of layers (that differ in level of ontological priority), in which every layer contains dependence loops that can create complex webs.

The representation of a simple hierarchist structure that is given in Figure 17 contains three layers, each containing the maximum number of symmetrical dependence relations between three nodes (A, B and C), (D, E and F) and (G, H and I). Each layer containing mutually dependent entities is linked by an asymmetric dependence relation to create a linear and hierarchical structure, reminiscent of traditional foundationalism.

Rebarism falls further in the direction of traditional foundationalism. For the rebarist, there is only one 'layer' that is structured as a web of mutual dependence, which is the 'most fundamental' level. This level exists at the bottom of a chain of asymmetric dependence. All other derivative things stand in typical asymmetric relations, producing a standard foundationalist structure. Figure 18 illustrates a rebarist structure, in which the layer of the greatest ontological priority (D, E and F) is the only layer that contains symmetric dependence relations, and is structured as an interdependent web.

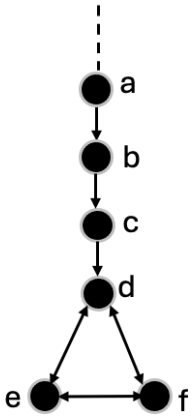

Figure 18: Rebarism

Rather than interdependent webs at every level, rebarists hold that it is only the foundational level where things mutually support each other. The foundation of the rebarist structure is analogous to the physical foundations of a tall building or skyscraper, which give support to the structure through interwoven pieces of metal to create a *rebar*. Rebarism is compatible with infinite ascent of layers, however the structure must be closed at the bottom. There must be a final 'supporting' layer of the chain, which is unique for containing dependence loops, where the rest of the structure contains only asymmetric dependence.

Both hierarchism and rebarism depart from 'pure' or 'full blown' coherentism, due to their inclusion of asymmetric dependence relations. The asymmetry of the relations which hold between different layers of reality introduce differences in ontological priority between parts of the world. The resulting structures fail to retain *maximal interdependence*- the inclusion of some asymmetric relations means that not all entities depend on all other entities. For this reason, hierarchism and rebarism might be considered 'hybrid' views between coherentism and foundationalism. Bliss (2011, 187–188), for example, refers to structures such as these as "weak coherence", that can be contrasted with the "strong coherence" of a structure that contains maximal interdependence. I will discuss structures with "strong coherence" in the following section.

Both of these coherentist possibilities will appeal to proponents of the layered conception of reality,[213] who endorse the difference in ontological priority between different parts of the world. Perhaps these are the options most suitable for those who are convinced by particular cases of symmetrical dependence, but who are keen to fit these cases into the

[213] For example, Oppenheim and Putnam (1958: 409) endorse a hierarchy of scientific levels which is well-founded. They label the 'lowest' level 'elementary particles', and hold that 'anything of any level except from the lowest must possess a decomposition into things belonging to the next lower level'.

hierarchical view of fundamentality that we are most familiar with, and preserve cases of asymmetric dependence alongside symmetric cases.

Swiderski suggests that a reason one may prefer rebarism to hierarchism is that rebarism does well to provide an account of the uniqueness of the fundamental level (2024: 1882-1883). The rebarist can respond well to a question that can challenge any foundationalist, that can be put as such: 'why should reality just stop there? What is it about that part of reality that is so special that it has the ability to support the rest?'. The rebarist has a clear answer to such questions. The fundamental layer of the rebarist structure is significantly different from the rest, since it is the only level that displays instances of mutual dependence. This advantage may be particularly attractive to foundationalists who are concerned by the arbitrariness of the end point of chains of dependence.

Those who are convinced by cases of interdependence, whilst maintaining a commitment to foundationalism, may be inclined to accept either the hierarchist or rebarist forms of coherentism. This is because these kinds of coherentism can remain foundationalist, if one is willing to embrace an alternative characterisation of fundamentality, that departs from terms of ontological independence or 'ungroundedness'. By understanding fundamentality in terms of *indispensability*[214] an entity can be ontologically dependent on another, whilst simultaneously being fundamental. This is as long as the entity is a part of the basic set of indispensable entities- the bare minimum set needed to be the foundation of all others. The entities in this basic set can mutually depend on each other. Morganti and Calosi (2021), and Morganti and Dorato (2022) defend the view that an entity can both be dependent and foundational, so long as it only depends on other entities at the 'same level' of fundamentality.

'Indispensability remains consistent with indispensable facts having grounds, so long as those grounds are equally indispensable… fundamental facts have no grounds which are not themselves grounded by those same fundamental facts.' (Swiderski 2022: 1875).

Hierarchists and Rebarists can utilize this alternate characterisation of fundamentality to produce pictures which are coherentist, meeting both requirements of the coherentist canon, meanwhile maintaining that there are foundations. These foundations are the entities related by a web of mutual dependence, that together form the lower bound of an asymmetric dependence chain. Together, this set can be understood as indispensable to the rest of reality, which, using the alternative characterisation, qualifies them as fundamental.

[214] This understanding of fundamentality is explored in Chapter 1 (§1.3).

2.5.1 Problem of Indispensability

Hierarchism and rebarism commit to variations of the level indispensability between entities, by positing asymmetric dependence relations in their structure. By remaining committed to differences between the ontological priority of layers in their structure, proponents of both views commit to some entities being more dispensable than others.[215]

An entity is indispensable if it belongs to a set of entities without which the rest of the world could not exist in the way that it does. As noted, an indispensable entity can depend on another entity and remain fundamental, so long as the entities they are dependent on are equally indispensable. According to the arguments made in chapter 3 (to the effect that all properties are relational and essential, and an entity's existence cannot endure a change in properties), my view implies that all entities are equally as dependent, as well as *equally indispensable*. Therefore, any structure which commits to varying degrees of indispensability between entities cannot do justice to the picture of interdependence I endorse.

At the end of this chapter, I present an argument to the affect that maximal dependence is required in order for a coherentist structure to meet requirements (BE) and (QM). Neither hierarchism nor rebarism feature maximal dependence. Maximal dependence implies no differences in relative indispensability. Hence, this forthcoming argument will present another challenge for pictures like hierarchism and rebarism that employ differences in relative indispensability.

2.6 Insularism and Holism

Insularism is a form of coherentism within which there are multiple structures which each contain maximal dependence, that are not connected to each other, like 'islands'. Within a single island, all entities are symmetrically dependent on all other entities. However, there are no dependence relations between members of different islands (symmetric nor asymmetric), hence no hierarchical structure is introduced. Insularism, like hierarchism and rebarism, fails to exhibit complete maximal interdependence. This is because there remain entities that exist without any dependence relations between them (entities that belong to different islands). It is possible for there to be a world that contains more dependence relations than the insularists' world of separated islands of dependence. I will shortly discuss why this can be argued to be a problem.

[215] This is the case regardless of whether one takes indispensability as the marker of fundamentality, or whether one takes there to be a fundamental indispensable set.

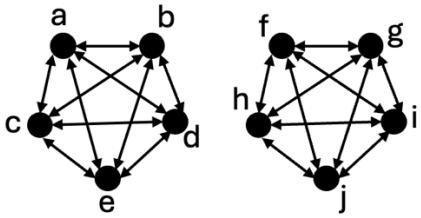

Figure 19: Insularism

One issue that arises for the insularist, is the problem of how to understand the separation of entities into their own remote islands of interdependence. It seems a difficult task to undertake, to divide up entities into groups that have symmetrical dependence between each other, yet no dependence relation with any entity that exists in a different group. One potential suggestion of a way to divide up entities into contained islands, is to divide up entities according to which of the special sciences they belong to. For example, there may be an island of biological entities, an island of chemical entities, an island of physical entities and so on. A problem with this suggestion, which may also occur for any other method of division, is the possibility of cases of entities that straddle two islands. For example, when dividing islands according to the special sciences, there will be many examples of phenomena that lie between or across multiple of the sciences. For example, cortexes of the brain might overlap between biology, neurosciences, psychology or social sciences. Such examples bring into focus an active debate between philosophers of science concerning the unity of sciences are all scientific projects part of a single enterprise to discover a relatively unified set of laws? Or, rather, do they explore disparate and unique corners of a "dappled" world? This disagreement stems from the tension between the discreteness and isolation of different scientific projects, methodology and phenomena on the one hand; and the overall similarity of the sciences taken together on the other. The task of providing a way of dividing the world would seem difficult for any proponent of insularist coherentism to complete.

The final coherentist structure to introduce, which *does* feature maximal interdependence, is what Swiderski refers to as 'holism'.[216] 'Holist coherentism' is the 'purest' form of coherentism- it refers to a structure in which a single web of interdependence relates all entities in the universe through symmetrical ontological dependence relations. Holism could be considered the paradigm coherentist picture. There are those including Morganti (2018) who consider holist coherentism to be the only form of true coherentism, with all other coherentist options explored thus far as 'hybrid', impure forms of coherentism. Its maximal dependence between all entities ensures that there couldn't possibly be any additional unique dependence relations, as represented by the figure below.

[216] This is a form of *holist coherentism* which should not be confused with 'holism' that refers to the view that wholes are ontologically prior to parts.

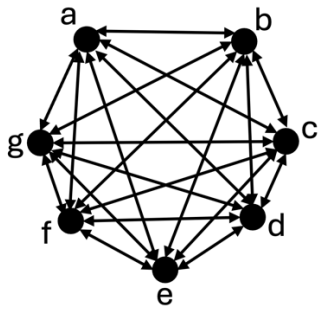

Figure 20: Holism

Every entity is related through symmetrical dependence to every other entity in the network, meaning all relations 'horizontally' connect all entities, that exist at the same level of priority or fundamentality. A change to the dependencies of any entity in the vast web creates a ripple effect across all other entities. Therefore, holism involves accepting some extremely unnatural claims, such as that the thesis I'm writing depends (for both existence and identity) on the particles of a pebble on a Greek island, and vice versa.

These radical dependency claims come with the caveat that they are made through an enormous number of partial dependence relations that link all things. The effect that one of the relata might have on the other is so minute, that it would be far from observable from our perspective. This idea is best illustrated by way of a visual representation. Figure 21 represents the way that entity a is dependent on a multitude of other entities.[217]

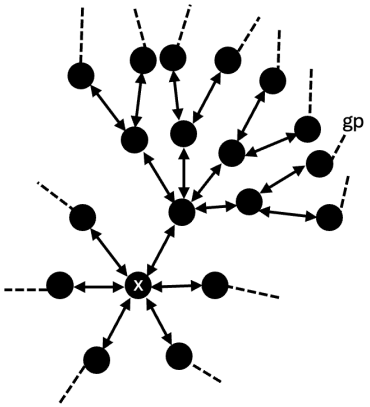

Figure 21: Complexity of webs of dependence

The number of other entities on which an entity depends can be highlighted by reminding the reader that each of x's properties is relational, depending on a number of other external conditions and phenomena. If every feature of x is relational, then x partially depends on an immense number of other phenomena. Each of the things that x depends on, also

[217] Of course, figure 21 represents a heavily simplified picture.

partially depends on an immense number of other phenomena, and so on until we create a dense and complex web of dependence relations and nodes. If this is the case, then the dependence between my thesis (represented by 'x') and the Greek pebble (represented by 'gp') is mediated by a vast number of other entities (and their relational properties), at intermediate stages between the two in the web.[218] Hence, given our own limited perceptive and epistemological capacities, the complexity of the dependence relations that link the two will never be able to be observed or understood.

Nevertheless, Swiderski warns that holist coherentism is strongly revisionary, and as is the furthest way of departing from standard foundationalism of any of the coherentist options explored so far. Swiderski warns that the extreme fragility of the holist coherentist's network is a reason to prefer insularism. 'All [entities] stand and fall together, and no [entity] can survive the loss of any other [entity]' (Swiderski 2022: 8). The insularist's world is not as fragile as the holist world, as a change to the dependencies of an entity in one island will not affect entities in another. Entities that exist in distinct islands do not depend on each other, therefore it is not the case that the entire world is affected by any single entity.

The more links and connections there are between parts of the world, the more fragile the world becomes. Considerations such as those from quantum physics suggest that the world contains more connections than the world that we are familiar with. As beautifully put by Rovelli: 'The quantum world is more tenuous than the one imagined by the old physics; it is made up of happenings, discontinuous events, without permanence. It is a world with a fine texture, intricate and fragile as Venetian lace' (2022: 75). Despite initial counterintuitions we might encounter when faced with extreme fragility, it may be that our intuitions may need re-evaluating and adjusting in accordance with considerations from current physics, such as RQM. As such, the counter-intuitiveness of extreme fragility need not be regarded as a problem for the proponent of holist coherentism.

3. Arguments for Maximal Dependence

In order to meet requirements (BE) and (QM) to the fullest, I argue that a coherentist structure must feature maximal interdependence. As a result of this argument, I recommend adopting the most radical and revisionary coherentist structure: holist coherentism. This section discusses how both Buddhist emptiness, and quantum mechanics point us in the direction of accepting maximal interdependence. This gives us

[218] The dotted lines in Figure 21 represent the continuation of the web of symmetrical dependence linking nodes.

two reasons for preferring holist coherentism over hierarchist, rebarist and insularist alternatives.

3.1 QM Supports Maximal Dependence

I begin with an argument that aims to show that quantum mechanics supports maximal interdependence. I turn to entanglement for evidence that all physical things enter into a single connected web that is best captured by holist coherentism. Borrowing the structure of a famous argument by Schaffer, I argue that entanglement implies maximal dependence as follows:

1. Entangled systems are related through symmetrical dependence.
2. The cosmos is a maximally entangled system.

Conc. The cosmos is maximally related through symmetrical dependence.

3.1.1 Defending Premise One

The argument above is a re-imagined version of Schaffer's classic argument in favour of priority monism, or the priority of the cosmos as a whole maximally entangled system. The re-imagining takes place in the first premise, where I argue contra to Schaffer, that entanglement is not evidence for wholes being more fundamental than parts, and rather it is evidence for symmetrical dependence between entangled particles.

I argue that it is Schaffer's acceptance of the commonly assumed orthodox properties of ontological dependence that leads him to argue that entanglement favours the priority of wholes over parts. In his 2010 paper, he is explicit in his view that 'there are priority relations between actual concrete objects in the structure of a well-founded partial ordering' (2010: 36). Schaffer argues that certain properties such as a pure spin state can only be attributed to electrons that collectively form an entangled system as a whole, and cannot be attributed to the individual electrons as parts, and therefore we should treat entangled systems (as wholes) as more fundamental than subsystems as parts.

My position is aligned with Morganti and Calosi (2021) who argue that 'entanglement via modal connections track dependence, not composition' (2021: 878). They highlight that descriptions of entanglement such as the following: 'if we measure spin up for the first particle we will necessarily measure spin down for the second', show that there is a modal connection between entangled particles, that accounts for the anti-correlation of spin (2021: 866). Morganti and Calosi recommend applying Hume's dictum (no necessary connections between independent entities), to show that we cannot understand particles that are entangled as independent. Since they are modally connected, and there cannot be

modal connections between distinct, independent entities, we can conclude that entangled particles cannot be independent, they must depend upon each other. Morganti and Calosi offer an interpretation of this dependence between entangled particles that does not involve the entangled particles being dependent on an ontologically prior composite whole.

They offer two objections to Schaffer's interpretation of entanglement. First, they argue that there are some properties of entangled particles as parts, that are not dependent on properties of the composite whole. 'As for the claim that all properties are monadic properties of the whole, it appears at odds with at least some physical facts. Consider, for instance… the relational reading of a state … says that quantum systems 1 and 2 stand in the relation of 'being one metre apart along the x-axis' from each other. On the other hand, the holist reading seems less satisfactory, for it should say something like 'the whole is one metre long, and this is prior to the existence of two parts that are one metre apart from each other', which is far from transparent' (2021: 876).

Their second line of objection, is that it is far from clear what the mereological parts and wholes are in all cases of entanglement. 'In fact, there are (i) cases in which we have entangled degrees of freedom within a single particle, and (ii) cases in which non-classical correlations emerge in decomposable systems, systems that may just be regarded as collections of independent, simpler systems (this is known as 'quantum discord'). Thus, the connection between entanglement and composition is far from straightforward' (2021: 878)

Accordingly, they argue that a more accurate way of understanding cases of entanglement is to posit symmetrical relations of ontological dependence that exist between entangled systems at the same level of fundamentality. 'It is always the case that as soon as particles enter into genuine entanglement, they do not have independent complete sets of objective properties, and instead depend on one another with respect to their qualitative profiles' (2021: 869). Considering these arguments for interpreting entanglement in terms of mutual 'horizonal' dependence as opposed to the ontological priority of entangled wholes, leads me to the revision of Schaffer's first premise. Entangled systems are best understood as examples of symmetric dependence, rather than of wholes being more fundamental than parts.

3.1.2 Defending Premise Two

Premise 2 is taken directly from Schaffer's argument from entanglement to priority monism, without adaptation, and can therefore be supported using the reasons that Schaffer gives. The premise states that the cosmos is a maximally entangled system. Schaffer

offers physical and mathematical reasons in favour of this. Physical support for global entanglement that Schaffer gives, comes from the beginning of the universe. During the 'big bang', everything interacts. This initial state of entanglement is preserved through the evolution of all entities according to the universal wave function. 'More precisely, the initial singularity is virtually certain (measure 1) to produce universal entanglement, and the Schrodinger dynamics are virtually certain (measure 1) to preserve it' (Schaffer 2010: 52). Furthermore, Schaffer offers the defence that the presence of a wave function for the entire universe will ensure that all wave functions within the universe are entangled. 'Unless there is a specific form of evolution—such as some form of wave-function collapse—that promotes disentanglement, one should expect universal entanglement. Thus—absent wave-function collapse—it seems virtually certain that… the cosmos is in an entangled state' (Schaffer 2010: 52-53).

According to Zeh (2004) quantum *decoherence* supports maximal entanglement: 'The essential lesson of decoherence is that the whole universe must be strongly entangled' (Zeh 2004: 115). Quantum decoherence is the process of the loss of quantum behaviour of a non-isolated quantum system. When a system is measured or interacts with its surroundings, it shares or 'looses' quantum information to its environment. This process of decoherence means that entanglements are generated between the quantum system and its environment (Bacon 2001, Bacciagalupp 2020). The prevalence of decoherence supports the prevalence of entanglement.

A final consideration in favour of all pervasive entanglement, comes from Jaksland's (2021) effort to show why entanglement should be considered as a promising candidate for a 'world-making relation'. A world-making relation is a relation that holds between all things that exist in the same possible world, and discriminates the entities that we should see as 'worldmates' (2021: 9665). In order for entanglement to be considered as a possible relation to play this role, Jaksland highlights that 'all elements must be connected, which precludes scenarios where subsystems are completely disentangled from the rest' (2021: 9681). Jaksland responds to the possible objection that disentangled, isolated subsystems evidently exist, since they are used in actual experiments. His response highlights that isolated quantum subsystems used in experiments are disentangled to a level that is acceptable for testing, but they can never be fully isolated from their environment: 'the isolation in such experiments, however, is good enough for all practical purposes, but not perfect. No perfectly closed systems can exist in quantum mechanics! Regardless of the care with which these two particle states are prepared, they are inevitably entangled with their environment' (2021: 9681).

3.1.3 Conclusion

If all entangled particles are symmetrically dependent, and the universe is maximally entangled, then the universe is maximally interdependent. In this way, quantum entanglement can be seen to support the 'purest' version of coherentism: holist coherentism. We must adopt a shape of reality's structure where all entities depend on all other entities in order to best meet requirement (QM).

3.2 Buddhist Emptiness Supports Maximal Dependence

It can also be argued that holist coherentism fits best with Buddhist emptiness, hence, best fulfilling requirement (BE). This argument draws on the metaphor of the Net of Indra discussed in Chapter 4. The illustration of the Net of Indra develops a picture in which all entities are dependent for their existence and nature on all other entities - all things have an effect on all other things. Recall, every jewel at every intersection of the net reflects every other jewel in the net, which is cast as wide as the whole universe. Any change to any entity has a ripple effect that crosses the entire network. The structure of Indra's net strongly resembles the structure of holist coherentism. All entities are involved in the development and change of the existence and nature of all other entities in the network.

The Net of indra is most commonly associated with Huayan Buddhism, a later, and more distinctly Chinese school of Buddhism than the Madhyamaka. Priest's (2015) discussion of the metaphor is given in the context of the Huayan school, since he makes a distinction between the Madhyamaka and the Huayan ideas of emptiness as follows: "The Madhyamaka view of emptiness was taken to its limit by the Chinese Huayan school of Buddhism. If something is empty, its nature depends on *some* other things. According to the Huayan, it depends on *all* other things" (2015: 224-225). If this is the case, then the distinction between Madhyamaka and Huayan Buddhist emptiness turns on the issue of maximal dependence.

However, drawing upon interpretations by Cook (1977) and Jones (2022), I argue that this is not the key point that distinguishes the schools, for two reasons. First, because the view that all entities depend on all other entities has been expressed by some in the Madhyamaka tradition. His Holiness the Dalai Lama says, 'We begin to see that the whole universe we inhabit can be understood as a living organism where each cell works in balanced cooperation with every other cell to sustain the whole' (Gyatso 1999: 40–41). Second, because there are other key ways that the Huayan view departs from the Madhyamaka view of emptiness. These other reasons are why I focus on the Madhyamaka school, rather than

the Huayan. One of the reasons was discussed in §2.3 of this chapter. I follow Jones' interpretation of the Huayan structure of emptiness as *aspectualist*- holding that asymmetric relations exist between entities with both fundamental and non-fundamental aspects. The existence of some fundamental aspects is the reason why I reject this view. A second reason why I prefer to focus on the Madhyamaka view of emptiness, is because the Huayan view is best understood in terms *of interpenetration* rather than *interdependence* of entities. The interpenetration view holds that there are aspects of all entities that are *identical,* as well as interdependent. If all things *interpenetrate* then this means two things, according to Cook's (1977: 52-57) interpretation: all dharmas have i) mutual *identity* and ii) mutual *inter-causality* (or mutual ontological dependence).[221] Using this understanding of interpenetration instead of interdependence to characterise emptiness has profoundly different consequences, which I do not have room to discuss.

It is for these two reasons, that I choose to focus on the Madhyamaka understanding of emptiness as opposed to the Huayan. I will argue that even within the Madhyamaka tradition, there is reason to accept that emptiness implies interdependence between *all* entities, rather than just *some* entities, and hence, emptiness implies maximal dependence. This simple reasoning from Madhyamaka emptiness to maximal dependence is as follows (Priest 2015: 225):

1. Everything is empty.
2. Emptiness itself, is empty. (Emptiness does not have svabhava, or independent existence).
3. Emptiness itself must depend on other things.
4. Emptiness itself depends on empty entities.
5. By the transitivity of dependence, this means all empty entities depend on all other empty entities.

To give an example: Take [a] and [b] to be empty objects. [a] depends on emptiness[222], and emptiness depends on [b]. By the transitivity of dependence, [a] depends on [b] (example

[221] This Huayan idea that there are aspects of all entities that are identical, whilst the logic of identity is adapted so that all entities can also retain some distinction, may have interesting connections to Priest's (2014) account of *gluons* discussed in the following chapter.

[222] During discussions about this argument with Barker (2024), the objection has been raised that this argument rests on equivocation of 'emptiness'. The argument relies of there being some 'absolute emptiness', as a universal truth about the world (or about ultimate reality), in order to involve premises about 'emptiness *itself*'. This sense of emptiness can be questioned. I will not defend nor reject it here. To avoid potential problems to do with invoking 'emptiness *itself*', Barker recommends modifying the argument slightly. His revision suggests that all empty entities depend on the interdependent network, and the interdependent network depends on all empty entities. If this is the case, then similarly, through the

from Priest 2015: 225). Priest notes that this kind of reasoning is perfectly sound with the Madhyamaka tradition (2015: footnote 10).

Priest makes an important qualification, given the interdependence of all things:
'This does not mean that all the relations involved are equally important. Consider a person again; for example, say, me. Arguably, the behaviour of my parents toward me in my infant years is more important in making me what I am than, say, the behaviour of my first girlfriend. But all of the relations have some role in the making. The matter is rather like that in classical gravitational theory. Every object exerts a gravitational influence on every other, however far apart. Thus, the net gravitational force on me is partly determined by a rock on a planet in another galaxy. Of course, since gravitation attraction falls off rapidly with distance, this will be very small, but it is there, nonetheless. So it is with the relations that constitute me' (2015: 225).

This is an important point to emphasise, since the reader may be confused as to how everyday local dependence claims might supervene on the 'great network of symmetrical dependence'. For example, how do we establish the success of empirical asymmetric dependence claims, of the kind 'x's mental state depends upon x's brain state, as opposed to y's brain state'? In response to this kind of claim, I argue that x's mental state depends, in some way, on x's brain state *and* y's brain state. However, since x's brain state is 'closer in the network' to x's mental state than y's mental state, it is more useful for empirical and practical purposes to pick out the asymmetric dependence between x's mental state and x's brain state to focus upon.

The Madhymaka Buddhist praises the efforts of other Buddhist schools for finding and endorsing a certain set of relations between certain things that exist. Meanwhile, they critique the other schools for failing to recognise *all* the relations at play in the world. 'Each of these other schools were right in seeing some of the dependence relations. Each were wrong in seeing only some of them' (Priest 2013: 219). By committing to maximal dependence between all things, the Madhyamaka's emptiness view avoids missing any dependence relations from their picture.

4. Conclusion: Anti-foundationalist Coherentism

If the arguments I have offered in both §3.1 and §3.2 of this chapter are successful, then I have shown that requirements (BE) and (QM) are met best by holism coherentism, which features maximal dependence. This is the shape of the interdependent network that my

transitivity of dependence, we reach the result that all entities depend on all other entities. I remain neutral as to which of these formulations of the argument is most appropriate.

account should adopt. A structure in which symmetrical dependence holds between all existing entities, is one where no entity is ontologically independent, one which features symmetrical dependence, one that is compatible with Buddhist emptiness and one that is compatible with phenomena in quantum mechanics, and therefore meets all four of my requirements.

The most promising candidate for an anti-foundationalist account of interdependence is one that takes the shape of holist coherentism. The network connects nodes, which should be thought of as entities, through relations of rigid essential dependence. Maximal interdependence between all entities in the network means that all entities are partially dependent on all other entities. All entities are impermanent, and change their identity with every change to their properties, all of which are relational and depend on the entity's position in the network. In this way, *anti-foundationalist coherentism* does well to capture the Buddhist metaphysical position of universal emptiness, as well as maximal entanglement in relational quantum mechanics.

One of the moments that brought me most joy when researching for the thesis, was when I discovered that Carlo Rovelli, the key figure when it comes to relational quantum mechanics, had written a chapter on the connection between RQM and Nāgārjuna (2022: 121-131). This connection, I defend, is best captured through the metaphysical position of Anti-foundationalist Coherentism, featuring maximal interdependence.

Rovelli himself recognises that much of the history of Western philosophy has been an attempt to answer the question 'what is fundamental?', with disagreements about the answer the forming the foundations of major philosophical positions. However, when finding a metaphysical position that can make sense of quantum mechanics, there is no agreed upon, satisfactory answer to this question. This should prompt us to shift the starting point of philosophical enquiry from the question 'what is fundamental?', to 'is there a fundamental?' (2022: 125). Of course, I take the answer to that question to be 'no'.

Should physicists be required to provide a defence of the idea that elementary particles are really elementary? Yes. As Rovelli puts it, 'the long search for the 'ultimate substance' in physics has passed through matter, molecules, atoms, fields, elementary particles.., and has been shipwrecked in the relational complexity of quantum field theory and general relativity' (2022: 129). He then goes on to suggest that Nāgārjuna might have provided us with a conceptual tool to solve the problems that we get tangled in when embarking on the search for the fundamental, which inevitably happen when assuming that it exists.

'Nāgārjuna has given us a formidable conceptual tool for thinking about the relationality of quanta: we can think about interdependence without autonomous essence entering the

equation. In fact, interdependence - and this is the key argument made by Nāgārjuna, requires us to forget all about autonomous essences' (Rovelli 2022: 129).

Coherentism offers a metaphysical structure that provides tools for understanding a world of emptiness and entanglement, within which there need not exist foundations that have independent or intrinsic existence or essence. It carves out a region of logical space and metaphysical possibility for such an idea to be developed. An interdependent network characterised by anti-foundationalist coherentism links parts of the world that we would never usually recognise as being linked. I will come to discuss the wider significance of this idea in the thesis conclusion. Before that, I spend the final chapter tackling two pressing objections that the proponent of anti-foundationalist coherentism might face.

Chapter 7: Defending Anti-foundationalist Coherentism

All that remains is to respond to the kinds of objections that might be put to anti-foundationalist coherentism of the kind that was put together in the previous chapter, before exploring its prospects for future research (which I will get to in the conclusion of the thesis). This final chapter will respond to two important kinds of objections to the picture I have proposed, taking each in turn. §1 addresses objections involving infinite regresses that occur for the coherentist account, such as infinite explanations that result from dependence loops, and infinite definitions of entities that are relationally constituted. I argue that a lack of ultimate explanation is the most concerning problem that can make a regress vicious, and that the coherentist can avoid this concern by embracing symmetrical explanation. The second kind of objection, which I discuss in §2, is the worry that coherentism indirectly commits to fundamentalia, in the form of the dependence relations that hold between all entities. Dependence relations that are meant to be doing the work of ensuring that nothing is fundamental, may be regarded as fundamental themselves, in a way which defeats the coherentist's commitment to anti-foundationalism. I offer a number of possible solutions to this problem, and conclude (in §3) that the most promising solution is one that also utilizes symmetric explanation. The aim of this final chapter is to show that there are many promising ways for anti-foundationalist coherentism to respond to its most concerning challenges, meaning that anti-foundationalist coherentism is worthy of further investigation.

1. Objecting to Coherentism Through Infinite Regress

Arguably, the most common reason to posit fundamentalia is on pain of infinite regress. The worry concerning regress is that without a starting point, chains of being can never get going, and we have no ultimate explanation of how any entities that exist come into being. In this section I address the objection that coherentism encounters vicious infinite regress. I defend the coherentist's position, arguing that a) If coherentism does encounter regress, then it is not necessarily vicious, and b) coherentism is not explanatorily worse off that is rivals, foundationalism and infinitism. I conclude that coherentism can survive regress objections, and remains a promising metaphysical picture.

Regress objections, and their respective responses, draw heavily upon the relationship between dependence relations and explanations. As already explored in Chapter 2, it is common to accept some connection between dependence and explanation. If this connection can be made, then, as the foundationalist thought goes, positing fundamental foundations can offer *ultimate explanations*. By being at the end of a chain of dependence,

and depending on nothing else themselves, fundamentalia are understood not to require an explanation regarding their existence or nature. They represent an endpoint or completion to an explanatory chain; a point where a chain of questions of the kind 'why does x exist in the way that it does?' must terminate. When asking why a physical object exists in the way that it does, an explanation will involve the entities that the object depends upon. For example, a physical object may depend for its properties upon the properties of the particles that make it up. When continuing in the same way to ask why those particles exist in the way that they do, the explanation may continue by referring to the existence and nature of smaller microphysical entities, for example. The chain of explanation, the foundationalist argues, can only be completed when we reach a level that cannot be explained down further; the fundamental level which provides the ultimate explanation.

On the other hand, fundamentalia, with their ability to play this role of completing explanation, come with the problem of being unexplainable themselves. By nature, they resist any form of explanation concerning how or why they exist. They represent a point where inquiry must end, and hence violate the principle of sufficient reason (as discussed in chapter 2). Entities of such a kind are inherently disturbing, and positing their existence is a price to pay to a project of explanation. Any primitive or fundamental entity simultaneously plays a positive and negative role, by helpfully ending or completing a chain of explanation, whilst itself resisting explanation, and leaving something unexplained. Whilst the trend amongst metaphysicians is to focus on the positive role of fundamentalia, the metaphysical burden they bear is not to be taken lightly.

Positing fundamentalia as a way of addressing worries regarding vicious regress of explanation comes with its own problems. In the sections that follow, I will show that vicious regress can be avoided without resorting to positing problematic fundamentalia. A self-contained coherentist network of mutual dependence is self-supporting. It does not need anything ontologically independent to provide ultimate support, nor ultimate explanation.

1.1 Three Types of Regress, Raising Three Kinds of Objection

Coherentism has only recently (Tahko 2023: §1.3) become an option that has been addressed by metaphysical literature, meaning there has been a limited number of attempts made to defend it or object to it. Of those who have said something on the topic, we can identify three distinguishable yet interrelated kinds of objection that touch on the worry of regress. In the following sections, I will consider how the coherentist might respond to each. Here, I briefly outline three kinds of objection, which each address a different type of regress:

The first type of regress that raises a worry for the coherentist is a regress concerning circles of dependence, which results from the dropping of the commitment to the asymmetry of ontological dependence relations. Circles of dependence are problematic in a similar way to infinite linear chains of dependence, since neither reach an ultimate conclusion. The critic might object that any dependency chain that loops back round to include the same entity twice is equally as problematic, since both circles and infinite chains imply that an explanatory process can continue infinitely.

The second type of regress, is the regress that occurs through the relational constitution of all entities in the coherentist's network. The infinity of relational constitution may be argued to result in the incompletablity of an explanation of each entity. This kind of objection is problematic in regard to our epistemic position, as opposed to being problematic in regard to ontological structure.

Finally, arguably most concerning kind of regress, is the regress that comes from the (holist) coherentist's rejection of well-foundedness. An objection concerning this kind of regress can be compared to the objection most commonly put to the infinitism, about how the entirety of the structure (or any kind of being) can emerge and exist without there being any fundamental foundations. In other words, even if we can provide local explanations of each entity, how are we to account for the global explanation of the structure as a whole? Such an objection is targeted at the coherentist at a more holistic level, demanding that they provide some way of explaining why the network as a whole exists. I will say more about each of these three types of regress, and about why the objections that come from each of them are distinguishable, in the following sections.

1.2 The Objection from Circularity

The first objection to coherentism comes from the regress that immediately occurs once commitment to the asymmetry of dependence is dropped. The worry can be expressed as follows: given that explanation tracks dependence relations, and symmetric dependence allows for an entity to be part of its own dependency story[223], then symmetric dependence allows for an entity to be part of its own explanation. If this is the case, then such an explanation cannot advance understanding. The concern is that explanatory failure occurs whenever an explanation does not give us something new. Take, for example, a case of symmetrical dependence between [a] and [b]. This can be represented as a looping chain of dependence (and hence, explanation), of the form [a]→[b]→ [a]→[b]…, which will continue infinitely. The explanatory worry occurs as the result of each step in the chain failing to tell us something new. The worry is expressed by Passmore: 'It is the first step in

[223] In a case where A↔B, A depends on B, and B depends on A, therefore via transitivity, A depends on A.

the regress that counts, for we at once, in taking it, draw attention to the fact that the alleged explanation or justification has failed to advance matters; that if there was any difficulty in the original situation, it breaks out in exactly the same form in the alleged explanation' (1961, 3.). Bliss comments on Passmore's concern, in a way which further clarifies the objection: 'infinite regresses are vicious, thinks Passmore, when the very thing for which we are seeking an explanation, such that the regress gets going, appears in its own explanation' (2014: 249).

In cases of symmetrical dependence, [a] appears in the list of things that [a] depends on. Infinite regress occurs because we never reach an end to the dependency story of a single entity. There are an infinite number of steps or inferences of the kind '[a] depends on [b]' when we encounter a dependency loop. Once we arrive back at the starting entity, we must embark around the cycle again, infinitely. Bliss (2014) addresses the issue of circles of dependence, and whether they constitute a vicious form of infinite regress. She highlights that with every dependency relation, comes a local metaphysical explanation of the subject. In an example of dependence loop that contains three entities, [a], [b] and [c], and three (symmetrical) dependence relations between them, all three entities have their own local explanation (see figure 22). This circular structure has a finite number of relata, and a finite number of relations, yet there are an infinite number of 'steps' or 'inferences' in the circular explanation. 'Having made our way around the loop once, there is, as it were, no new place to go; no new facts whose existence we are yet to explain; no new relations to uncover' (2014: 253).

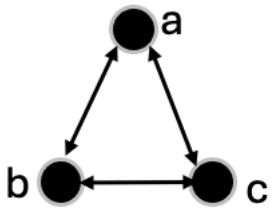

Figure 22

Nothing is gained by continuing to take an infinite number of distinct steps. Bliss argues that, it is unnecessary to embark on the path of circular explanation. If the loop is only completed once, then regress never gets the green light to begin. If one's explanatory project is to provide a local explanation of an entity, this can be achieved by listing all the entities that the subject depends upon- dependent entities can be explained by other dependent entities. Each entity in the circle can have an adequate explanation as an individual. Each element in the loop is explained and accounted for.

'Although our loops contain only a finite number of members and relations, from them we can draw an infinite number of distinct inferences, each at a later moment in time. Why

one would bother drawing an infinity of such inferences is somewhat puzzling. It would seem that nothing is to be gained by continuing on in such a way. As much explanation, or grounding, as is there to be had will be had on the first turn around the loop… Pertinently, however, the hyperintensionality of explanation may also provide us with a justification for continuing to step through what is, otherwise, a loop. We may well feel motivated to continue to draw further explanatory inferences from what is a finite number of relata, either because we are ignorant of moving in a loop or because although our explanations are circular, they are informative and compel us to continue to ask questions. Drawing a potentially infinite number of explanatory inferences from a finite number of relata may not only be for the insane' (2014: 253).

The opponent of dependence loops may can reply that whilst there is satisfactory local explanation at every step in the loop, these local explanations fail to advance understanding without there being an ultimate, independent entity to complete a grander, *global* explanation. Without a fundamental level, we have no global explanation of why the set of local dependencies, or explanations exist. I will return to this kind of objection and offer a response in §1.4.

1.3 The Objection from Relational Constitution Regress

Each entity that exists within the web, depends for its existence and nature on all other entities. As has already been explained and defended, the identity of all entities is relationally constituted- all properties are relational and dependent. [x] is essentially such that it exists with its qualitative profile only if [y] exists with its qualitative profile, and vice versa.[224] No entities in the network have properties that are intrinsic- there is no part of a single entity that is purely its own. Without the existence of [y] with its relationally constituted features, [x] could not exist with its relationally constituted features. Relational constitution that comes as one of the major commitments for the coherentist, and can be argued to cause them problems.

Here's where the problem lies. Imagine entity [e] enters into x number of dependency relations. It is dependent upon [f] [g], [h] and so on to x. Once we are to complete the list of all the entities [e] is dependent on, have we provided a full and satisfactory explanation of the existence and nature of [e]? The answer, it could be argued, is no. Barker[225] raises the objection that when defining [e] in terms of its relations to [f], [g], [h] etc. We are treating [f], [g] and [h] as if they're primitive. But according to the coherentist, entities [f], [g], [h],

[224] According to rigid essential dependence (Morganti and Calosi 2021).

[225] This objection is thanks to many discussions and correspondence with Barker, and a version of it can also be found in his objection to the relational constitution of properties, in 'The Emperor's New Metaphysics of Powers' (2013: 625-633).

and all others that [e] depends on, are not primitive, they too are relationally constituted. This means that the explanation of [e] is not complete because we have not provided a complete description of the constitution of [f], [g], [h], and every other entity e depends upon. In turn, then, the explanation of [e] reaches the level of all things that constitute [f], say [f*], [g*] and [h*], and so the project of complete explanation continues. At each level of explanation, we must define or provide specification of entities in terms of the relations they enter, which Barker argues is the beginning of a vicious infinite regress, as well as circularity.

In order to assess how problematic this kind of regress from infinite relational constitution is, I will compare it with the regress produced by a standard infinitely descending chain of dependence. In a standard, 'turtles all the way down'[226] dependency chain multiple potential regress problems can be noted. First, there are an infinite number of dependency relations between an infinite number of entities. The linear chain never ends, meaning both dependency relations and their relata multiply to infinity. As a product of this, a second problem is that the explanation of any entity in the chain is also infinite, never complete, as there is always another step in the direction of ultimate explanation, which is never reached.

In contrast, the relational constitution regress that the holist coherentist faces, may not encounter both of the same problems. The key difference is that whilst facing the problem of an infinite number of steps in an explanation of a single entity, the coherentist's regress does not necessarily encounter the problem of an infinite number of relations and relata. The crucial point of comparison between standard linear infinitism and holist coherentism is the number of entities that the pictures posit. Whereas for the infinitist entities are necessarily infinitely multiplied, they are not necessarily infinitely multiplied for the coherentist. There is the possibility to have a picture of a coherentist network on which there are a finite number of entities, and a finite number of symmetrical dependence relations posited between them.

With this in mind, let's return to the relational constitution regress objection raised by Barker. The objection goes: whenever we try to give a definition of any entity in the network, the definition is always incomplete at every layer of explanation. The layers or levels of explanation refer to the definition of any given entity, followed by the definition of the entity that it depends upon, followed by the definition of the entity within the previous relational definition, and so on. The infinity refers only to the definition, explanation or specification of each entity in the network, rather than to the number of entities in the network.

[226] See for example, Cameron (2008).

But will the definition of each entity really be infinite? Imagining a series of definitions that each expand, exponentially, to involve the complex relational constitution of such a huge number of entities at every deeper level is far beyond our epistemic capacitates. It seems natural to assume that a series of definitions, each involving relational constitution, must be viciously infinite. In order to show that they are not viciously infinite, we can make a move similar to that made in response to the previous objection from circularity. It is possible for a coherentist network to contain a *finite* number of entities, relata or nodes. If there are a finite number of relata and relations in the network, then there can only be a finite number of references in each definition, no matter how far they expand. Then, in each definition, the infinite regress can only come with circularity, the referencing of a single entity more than once in the definition, rather than due to an infinite number of entities to reference. Here we can reference back to Bliss' reasoning again, that circles of dependence are acceptable, as long as there aren't an infinite number of relations and relata.[227]

Circular definitions generate infinite regress. At some point, the definition of [e] that includes the relational constitution of [f] [g] and [h] etc, and their relational definitions, and their relational definitions, will circle back to [e]. Here we encounter the same kind of objection that definition, explanation and dependency can only be asymmetric, as a definition of an entity cannot contain that entity, since an entity can't depend on itself. As we have seen, this need not be a fatal worry at a local level, and may only become problematic at a global level, which is where I am headed in the final kind of regress objection.

1.4 The Objection from Global Explanation

In addition to complete explanations of single entities, a satisfactory picture of the structure of reality should also have the ability to indicate the source of the structure as a whole. Where foundationalism offers fundamentalia as the source from which all other things arise, the anti-foundationalist faces the problem of lacking such a source.

The foundationalist may challenge the coherentist to offer an explanation of why the coherentist network as a whole exists, without resorting to positing unexplained fundamentalia. Coherentism provides no ultimate, independent entities on which all other

[227] In this way, we can understand holist coherentism as providing an improvement to standard linear infinitism, when it comes to countering regress objections.

things depend. Without any independent entities supporting it, how does such a structure emerge?

The coherentist's network contains dependence loops, and whenever there is a dependence loop there are a series of dependence relations, which each offer a local explanation of the existence and nature of the dependent entity. However, without presence of a completely independent entity, the series of local explanations cannot be complete, as there is no global explanation supporting the series. Without a global explanation, a series of local explanations cannot get off the ground.

Bliss (2014: 250) emphasises that this kind of argument relies on the assumption that a dependent entity cannot be explained by any number of other dependent entities. An explanation can only be completed once we introduce an entity that cannot be explained- that is completely independent. This of course, is a standard way of characterising a fundamental entity, so 'the demand for complete explanations is just the demand that our explanatory chains terminate' (2014: 252). For Bliss, it is not so straightforward that any picture on which there are no fundamental entities comes into contact with vicious regress. She responds by raising an important doubt about why such a project of global explanation should be carried out in the first place (2014: 254).

In response to the worry about global explanation, I second Bliss' doubt about the need for one, and I argue that the need for global explanation arises only out of intuitions that favour asymmetric dependence. It seems to me, that the idea that an *ultimate* definition is essential could be a product of the standard endorsement of asymmetric dependence.[228] The 'ultimateness' of definition or global explanation seems to imply a difference in level of fundamentality. An ultimate definition seems to exist at a deeper, richer, more fundamental level than the network itself. However, this intuition that there must be a difference in level of relative fundamentality, is so that we can satisfy our need for dependence to be asymmetric. We need there to be something fundamental on which the network depends- this dependency going in only one direction.

The coherentist already endorses symmetric dependence. When a link between dependence and explanation is accepted, this could mean also accepting symmetric explanation.[229] This means that an ultimate explanation can be symmetrical, and there

[228] I owe the development of this idea to conversations with Steve Barker.

[229] As Thompson (2016: 44) discusses, there are those such as Audi (2012) and Schaffer (2012) who accept that explanation tracks ontological dependence relations. If this is the case, then there is room for the two to come apart. For example, all explanatory relations may be asymmetric, if explanation picks out and tracks only asymmetric dependence relations (whilst examples of symmetric dependence relations still exist). There are also those who say that ontological dependence relations *are* explanatory relations, such as

need not be some entity at a more fundamental level for an asymmetric dependence relation to exist. There is no vertically stacked dependence, only horizontal dependence across the same level.

It is typically thought that explanation must be asymmetric (Khalifa et al. 2018). When we provide a metaphysical explanation of something then the explanation cannot go both ways between the explananda and the explanans. 'Give or take some rare exceptions, if *A* explains *B*, then *B* does not explain *A*' (Khalifa et al. 2018: 929). Whilst we naturally think that a necessary condition of a successful explanation is its asymmetry, in order to give some new information, this is not necessarily always the case. For the coherentist, dependence is symmetrical. The acceptance of symmetrical dependence opens up room for discussion of symmetrical explanation. For the coherentist, the symmetry of dependence means that entities do not occupy different levels of relative fundamentality. Likewise, when explaining an entity, the explanation or definition need not be at 'deeper' or more fundamental level than the explanan. All local explanations track dependence relations, which are kept on the same level of fundamentality. A complete and ultimate explanation or definition can come from the whole network of dependencies in conjunction.

One reason in support of the possibility of symmetrical explanation, comes from the ongoing debate about the plausibility of non-causal accounts of explanation (see Khalifa et al. 2018 for details of the debate). The key point raised in this debate is that explanations which don't come from causation, such as some kinds of inference, or Hempel's deductive-nomological model of explanation, can give rise to cases of symmetrical explanation. For example, in the case of a flagpole and its shadow, we can deduce the length of a shadow from the angle of elevation of the sun and the height of a flagpole. Similarly, we can deduce the height of the flagpole from the angle of elevation of the sun, plus the length of the shadow. According to Hempel's deductive-nomological model, both directions qualify as cases of explanation. However, common intuition tells us that explanation must be asymmetric, and therefore we should prefer a causal account of causation, which tells us that there is only explanation in the first direction. The length of the shadow does not explain the height of the flagpole, because the length of the shadow does not cause the height of the flagpole.

As the debate typically goes, this kind of case gives us reason to doubt non-causal accounts of explanation, since all explanations must be asymmetric, in the way our intuitions tell us in the case of the flagpole and shadow (Khalifa et al. 2018: 931). However, for those more inclined towards accepting non-causal accounts of explanation, this kind of case gives a

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Fine (2001) and Rosen (2010). If this is the case, then explanation and dependence relations must always share the same formal features.

reason for accepting cases of symmetrical explanation. As Thompson (2016: 45) highlights: 'if we understand explanation as causal explanation, then it comes as no surprise that explanation is indeed asymmetric. But explanations involving grounding are paradigmatically non-causal. The asymmetry of causal explanation lends little support to the claim that metaphysical explanation, and even less so grounding, is asymmetric.' The commitment to the asymmetry of all explanations is a key reason behind the ongoing debate over the best model of explanation. Whilst the issue of the best model of explanation remains unresolved, I recommend that we revise such a strong commitment to the asymmetry of explanation. In this way, it may be possible that the coherentist network self supports through mutual dependence and explanation, needing no further means of 'ultimate' explanation'.

1.5 The Coherentist Network is Not a Victim of Vicious Regress

Each symmetrical dependence relation in the coherentist network can provide part of an explanation of both relata involved. The pattern of dependence relations and local explanations in conjunction have the possibility of explaining where the network itself comes from- existence and nature emerge from the interdependency of the network structure. I have argued that worries about infinite regress can only apply to a regress of steps or inferences in an explanation, rather than a regress of relations and relata in the network. This means that a complete explanation of any entity in the network, say, entity [a] can be given by referring to all of the other entities that [a] depends on. A conjunction of all complete relational definitions of all entities in the network can together provide a complete explanation of the network itself. The only kind of regress that the coherentist faces, is the regress of steps in a looping explanation, which is not a vicious regress, as Bliss (2014) shows. When taken together, the pattern of partial dependencies and relational definitions that track those, could advance understanding, be informative, explanatorily complete and coherent.

2. The Problem of Fundamental Relations

In this section, I move on from addressing regress problems, and focus on a potential problem to do with the relational structure of the coherentist network. The relations between all entities do the work of ensuring that no entity is ontologically independent and fundamental. By performing this function, the relations themselves may be considered problematic for the anti-foundationalist. On such a picture, how are we to understand the mechanism through which the relational structure itself avoids becoming fundamental? If all objects are made non-fundamental by their involvement in some dependency relations, how are we to think of the dependency relations themselves as non-fundamental? Where

do dependence relations get their ontological power to play their crucial role of making sure no object is independent, as well as get their lack of fundamentality from? These are the questions I spend this section tackling.

Avoiding a relationist picture that simply accepts the fundamentality of dependence relations is key. A form of coherentism with commitment to ontologically basic relations is tantamount to structuralism or OSR, which for reasons Morganti and Dorato (2022) explain, falls short of being able to provide a metaphysical picture that captures RQM.[230] Hence, I will spend this section suggesting strategies for the coherentist to be able to preserve their anti-foundationalism. The solutions I offer for come under two broad strategies, each of which I explore in turn:

1. Relations are themselves dependent: Relations are non-fundamental due to their involvement in some further dependency relation. Dependency is dependent. There needs to be some other relation added to the picture as a tool to ensure that the dependency structure that holds between all objects is not ontologically basic.
2. Relations are non-fundamental by nature: There is some special feature about the nature of relations that allows for them to do their ontological work, whilst not being fundamental themselves. Their non fundamentality is not a result of them being related through some further dependency to something else, it is simply a part of their nature. There are no other tools added to the picture.

2.1 Strategy 1: Relations are Themselves Dependent

If the relations that form the web-like structure of the coherentist network are themselves relationally dependent, then they cannot be fundamental, and the problem of primitive relations is solved. They become non-fundamental for the same reason that all other objects and phenomena in the network are non-fundamental, because they have no independent, intrinsic nature of their own, due to their dependency on something else.

In order to produce the outcome that relations themselves are relationally dependent, it may be possible to posit further symmetrical dependence relations. These would ensure that the original relations, depend for their existence and nature on the objects they hold between, and vice versa. Consider a picture like that which is represented in figure 23, where two further symmetrical relations are introduced, call them [α] and [β], which hold between the original relation, [R], and the relata [A] and [B]:

[230] Hence, failing to meet requirement (QM), introduced in the previous chapter.

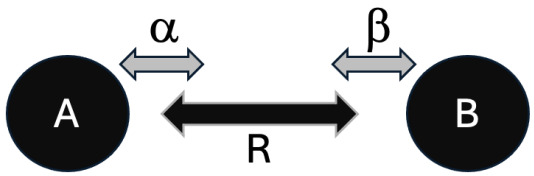

Figure 23

[α] and [β] ensure that the relata [A] and [B] are dependent upon the relation [R], meanwhile the relation [R] is dependent on the relata [A] and [B]. If being dependent upon some other entity is sufficient for [R] being non- fundamental, then introducing [α] and [β] should resolve the worry regarding the fundamentality status of [R]. [α] and [β] serve to ensure that [R] is dependent upon [A] and [B], and hence, [R] cannot be understood as ontologically independent or fundamental. Introducing further relations like [α] and [β], mean that relational structure like [R] can't exist in the way that is does without the relata, whilst the relata can't exist in the way that they do without relation [R].

A worry that may occur for this strategy, is the development of another kind of vicious infinite regress. By adding new relations like [α] and [β] to solve the problem, the problem (regarding fundamental relations) gets transferred onto them. The fundamentality worry becomes attached to relations [α] and [β], requiring the existence of further new dependence relations to ensure that [α] and [β] are non-fundamental, and so on *ad infinitum*.[231]

The worry could alternatively be put as a dilemma. Either we posit further intermediate symmetrical relations, like [α] and [β], and carry on until a point where we posit no more relations. The final relation we stop at is both arbitrary, and most problematically, a fundamental entity. Or instead, we could posit intermediate symmetrical relations 'all the way down', which might be just as concerning due to the infinite complexity of structure.

It could be the case that opting for the second horn of the dilemma, in which a regress occurs, is an acceptable option for the coherentist to take, since the regress may not be vicious. Opting for an infinite number of further dependence relations that connect original dependence relations to entities, could be considered acceptable. The structure of relations in the network must already be extremely complex, so perhaps it need not be seen as a fatal issue if it is considered as infinitely complex.

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[231] One could argue that this solution doesn't lead to an immediate regress, because of the arrangement of the structure involved. This move could be made by highlighting that the fundamentality worry doesn't become attached to [α] and [β], because [α] and [β] aren't ontologically independent; they are dependent back on the original dependency relation [R]. [α] and [β] both are part of a dependency relation themselves, they are connected by [R], so the regress shouldn't begin to occur. The success of this line of thought rests upon whether a dependency relation can depend on another dependency relation.

A reason to think that such an infinite regress of relations connecting relations to relata is a vicious regress, is a comparison with Bradley's (in)famous regress.[232] The idea of positing further symmetrical relations, [α] and [β], to bridge the gap between the original relation [R], and it's relata [A] and [B], has parallels with Bradley's (1893) idea that all relations are unhelpful, because there will never be enough to bridge the gap between relata. Bradley's regress is aimed at showing that no relation can ever achieve its purpose of relating distinct relata, and that a 'relational way of thinking' is merely appearance rather than reality. This is because relations are independent from their relata. According to Bradley, this means that an infinite number of relations would be needed to in order to relate them to their relata (1893: 18). For instance, imagine a dependence relation between a chair and the particles that make it up. In such a case, the dependence relation cannot connect the chair and the particles, since it is independent from both of them. Another dependence relation would need to be posited in order to connect the original relation to each of the relata. This new relation, in turn, is problematic due to its independence, and so on, to form a regress.

Bradley's regress begins from the premise that relations such as [C] are separate and distinct from their relata, like [A] and [B]. [A] and [B] are not constituents of [C]. The relation, [C], being independent from [A] and [B] means that [C] cannot connect [A] to [B], and we would need to introduce a further relation, [D] in order to complete the job. But of course, [D] is also independent from [A], [B] and [C], and therefore needs a further entity to make the connection, and so on *ad infinitum,* as represented by figure 24 .The conclusion is that relations cannot successfully unify relata.

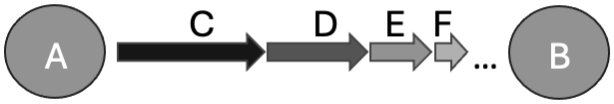

Figure 24

The problem that Bradley's regress presents, about how relations are to perform their unificatory role, and how to reconcile the both the unity and distinctness of the relata, can be compared with the problem that the coherentist faces about the fundamentality status of relations. Both problems seemingly come about because relations are entities which are independent from their relata. Attempts to solve both problems involve finding a way for relations to be considered as not *completely independent*, by positing further relations and resulting in a regress.

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[232] Priest argues that Bradley's regress is a vicious regress, because it is an example of a case where providing a solution creates exactly the same problem, and so on *ad infinitum*. (2018 Interview: *Bradley's regress and the Unity of the Proposition*).

For Bradley, the problem is about how to link a third thing to the existing two (the relation to the relata), whereas for the coherentist the problem is about preventing the third thing (the relation), from having ontological independence, or status as fundamental. A move that might be made to tackle the regress in both cases, is to question the assumption that Bradley's regress is founded on: the assumption that the relations are completely independent from their relata in the first place. Opponents of Bradley's regress have argued against this premise, claiming that the regress only begins due to a misconception about the character and role of relations. For example, Broad (1933), claims that relations are *by definition* relational and capable of relating two relata. This kind of misconception can be illustrated through a disanalogy. Broad compares Bradley's regress to a piece of string connecting two objects, which needs glue to fasten the objects to the string at both ends. This glue doesn't complete the job of fastening, therefore another blob of glue is required, and so on. Broad (1933: 85) argues that this is an obvious disanalogy, and that metaphysical relations are substantially different in their nature to this piece of string. This means that it is simply the nature of relations to perform the function of relating, and the problem that Bradley's regress expresses is misguided. There is something about the metaphysical nature of relations which means that they are non-independent and non-fundamental. This is a potential way for the anti-foundationalist coherentist to respond to the problem of relational structure as fundamental, which I explore in the next section.

2.2 Strategy 2: Relations are made Non-fundamental by Doing the Relating

Strategy (2) for preventing fundamental relations, is to argue that relations are non-fundamental by nature. Solutions that pursue strategy (2) don't involve positing any new tool or relation to solve the problem, but instead work with the picture that the coherentist already has, in order to see how it might be prevented from positing fundamental relations. Therefore, we can return to a simpler structure like the one presented in Figure 25 below, and focus on how we are to understand the special nature of [R], or whatever might bridge the gap between [A] and [B], as something that is not fundamental.

Figure 25

Solutions that fall under this strategy could, for example, suggest that the functional role of a relation like [R] (the role of relating [A] and [B]), prevents [R] from being the kind of thing that could be fundamental. If it could be successfully argued, for instance, that for

something to be fundamental it must be, static, concrete or non-functional, then this might help in the development of a promising solution.

Alternatively, another solution that utilizes this strategy, is to argue that the nature of relation [R] is such that it cannot be understood as *completely distinct* from entities [A] and [B]. We saw, when pursuing the previous strategy, that treating relations as *completely distinct* from relata runs into problems, such as Bradley's regress. Strategy 2 can be pursued instead by suggesting that [R] cannot possibly be fundamental if it is not *completely distinct* from its relata, since fundamentality requires ontological independence. To see more about how this kind of solution might work, I introduce three variations of it, inspired by Frege (1892), Baxter (2011) and Priest (2014) respectively.

2.2.1 Fregean- inspired Solution

The issue of whether relations are fundamental cannot occur if there are no relations which are distinct entities with a nature that we can describe and analyse. However, the existence of distinct relations is necessary, in order for them to be able to perform their function of connecting relata, and ensuring the relata's nature are dependent. A similar kind of tension is discussed by Frege (1892). Frege addresses a parallel case where there is a function that needs to be performed, yet it must be performed by something that cannot be treated as a distinct entity.

The Fregean inspired solution suggests that we should treat relations as both entities and non-entities, and embrace this apparent contradiction, in order to ensure that relations are not fundamental. Frege offers a solution to a generalisable issue of how unity between two entities can be brought about by something that plays a binding or connecting role. Whenever we have two entities, [A] and [B], that are connected to form a more complex structure, an issue occurs when it comes to the third thing that may we posit to connect them. We need something to play the connecting role, yet we need this third thing to avoid being treated as a distinct third entity in the picture, to avoid problems that resemble Bradley's regress (Priest 2014: 10). Treating the third thing as a distinct entity runs into regress difficulties that I have already addressed when discussing the previous strategy. The alternative route that Frege takes is to treat that 'third thing' as both having distinct existence and non-distinct existence. I will return to clarify how this works shortly.

First, let's look at the problem Frege identifies, and how he addresses it. Frege's concern is propositions, and how we can account for their unity. In cases of complex propositions, we need to be able to talk about the special thing that is doing the joining between the parts of the proposition, such as proper names or values. Such 'joining' poses a problem, because the joiner must perform an active functional role, but it cannot be treated like a part of the proposition, or a separate entity itself. Frege's famous solution to this problem

is that we must think of propositions in terms of both *objects* and *concepts*. Objects are the parts of the proposition, which can be described like any other entity, with natures that contribute to the truth or falsity of the proposition. Objects, importantly, are *saturated.* Concepts, unlike objects, are *unsaturated*. They are the bits that connect the proposition together, playing a role similar to a function in mathematics, that can be plugged with values to produce an outcome. Crucially, they are incomplete without the presence of objects, which is how we can understand them as unsaturated. They can be thought of as having a 'gap' in them which, when filled by an object produces a single thing. The unsaturatedness of concepts means that we cannot talk about them as if they are complete entities, in contrast to objects. The idea of 'unsaturatedness' can be applied to the problem of relations, in order for them to be capable of performing a function, whilst not succumbing to being treated as distinct entities themselves, and avoiding the fundamentality worry.

The equally famous objection to Frege's analysis of propositions, involves expressions that use 'concept-senses', such as the expression, 'the concept, horse'. In such cases, the 'concept of x' is treated as a noun phrase, and so refers to an object, which is not unsaturated. This means we have to accept that there are cases where concept-senses are objects, even though they cannot be.[233] Frege's solution to the unity of complex propositions draws upon concepts, which are not objects. However, cases such as this, as well as any time we refer to a concept as an entity, is treating it as an object. We arrive at the apparent contradiction, that concepts are both objects, and not objects.

Returning to the problem at hand (the problem of how to prevent fundamental relations) we might apply Frege's ideas in the following way. By treating relations like Fregean concepts, relations become a special sort of entity that are unsaturated - they have a gap which can only be filled by the relata that they exist between. This is a familiar idea- without relata, there cannot be relations. In a similar way to the objection to Frege, which shows that we must treat concepts as objects in certain circumstances in order to them to do what we need, there are certain circumstances in which we must treat relations as entities, in order for them to do what we need. Just as Fregean concepts are both objects and not objects, a Fregean inspired solution to the problem of fundamental relations would hold that relations are both entities, and not entities. An illustration of such a solution is given in Figure 26 beneath. In this Figure, [R] represents an unsaturated dependence relation, that can be 'plugged' by entities [A] and [B] at both ends to become complete. The special nature of [R] as unsaturated means that it is both an entity (ensuring it can do the metaphysical work of relating [A] and [B] through symmetrical dependence), and it is

[233] This characterisation of the problem draws upon Priest's (2014) characterisation.

simultaneously a non-entity (ensuring the fundamentality worry does not become attached to it).

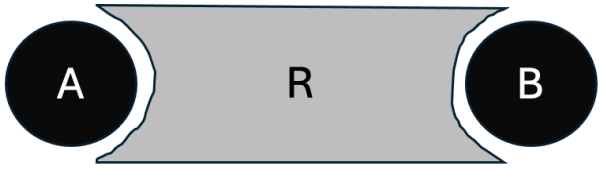

Figure 26

2.2.2 Baxter- inspired solution

A related solution inspired by Baxter (2001) suggests that we do away with the existence of a 'third thing' altogether, and suggests that the relata like [A] and [B] can 'fit' together, in a similar way to how objects 'fit' into concepts, without the need for any intermediaries to tie them together. This solution comes from Baxter's response to Bradley's regress, and answer to the Fregean problem of how to account for the unity of propositions. Baxter's suggestion is to remove the 'third man' and give a non-relational account of the unity of complex propositions. The unity of complex propositions is achieved through the parts of propositions being *partially identical.* They are able to 'fit' together without a third thing to bind them, because of their overlapping identical aspects. He gives an example of how this might work:

'Suppose Hume is a particular, Benevolence is a universal, and Hume is benevolent. Then Hume has an aspect, Hume insofar as he is benevolent. Also, Benevolence has as an aspect, Benevolence insofar as Hume has it. These are the same aspect—Hume's benevolence.' (Baxter 2001: 454)

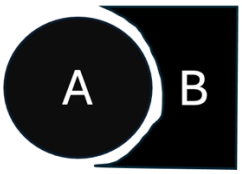

Figure 27

Figure 27 above illustrates this solution as applied to the problem of relations. [A] and [B] are the entities that we usually understand to be connected by a dependence relation. In order to ensure relations are not fundamental, this strategy suggests we remove relations all together, so that the identities of [A] and [B] partially overlap, or 'fit' together like an object and concept, in order to account for their unity.

This solution may prove very useful in cases like the complex proposition of the benevolence of Hume. Unfortunately, things differ when applying the same thought to

eliminate dependence relations. In the case of the coherentist's project, the unification of the two relata needs to be a through a connection of dependence, which crucially, preserves a distinction between their existences, whilst allowing for them to influence each other's natures. If this strategy is pursued by the coherentist to overcome the worry of relations being fundamental, then the coherentist picture, with all entities having overlapping identities, begins to collapse into some kind of monism. At best, this would be priority monism, where the network as a whole becomes fundamental, and at worst, existence monism, where there is only one very complex entity that exists, which is the cosmos. Removing the 'third man' from the picture altogether implies a very different picture than the one that coherentism offers.

2.2.3 Priest- inspired solution

A solution inspired by Priest's (2014) discussion of *gluons*, suggests that relations should be treated as existent, yet not distinct from relata. To address the way in which relata are related, Priest offers the term *gluon* to refer to the entity that does the joining between the two relata. The gluon is the third thing between the two. However, Priest suggests that a gluon is both an object, whilst not being an object. The way that the Priest-inspired solution can be distinguished from the Frege-inspired solution, is because gluons aren't just *unsaturated*, they are *identical to each relata*. This strange suggestion takes some explaining.

Priest's solution involves rethinking the logic of identity, and embracing gluons as dialetheic.[234] Gluons work by being identical to each relata, meaning there is no distinction or gap between, say, relatum [A], and the gluon. If we call the gluon [G], then Priest is saying that [A]=[G]. The gluon, [G], is also identical to the second relatum, [B], so [B]=[G]. The crucial move that Priest makes is then to *deny that identity is transitive*, meaning that [A]=[G] and [B]=[G], but [A]≠[B]. The gluon achieves unification by being identical with each of the relata involved, yet preserves the distinction between the relata by ensuring that the relata are not identical with each other (Figure 28). Priest (2014: 17) goes on to clarify the details of a non-transitive theory of identity that would deliver this outcome.

[234] Dialetheism is the acceptance of contradiction, when cases of contraction are understood as cases where both A and ¬A are true. Hence, gluons, as dialetheic entities, can be understood as entities that are contradictory, in the sense that they are both A (identical with some other entity) and ¬A (non-identical with some other entity). Priest is a famous proponent of dialetheism (see Priest 1987; 2014, Priest and Routley 1983; 1989).

Figure 28

If we apply this way of thinking to the coherentist network, we arrive at a picture where dependency relations between each entity are identical with each entity, whilst it remains that all entities remain non-identical with each other. On the surface, this solution seems less problematic than that produced by the overlap of identical aspects of each entity, as is the case with the Baxter-inspired solution. It seems that a picture that includes gluons delivers a result that all entities remain further from each other, and 'more distinct' from each other, when compared with the Baxter solution.

Two crucial criteria to determine whether the Priest-inspired solution is successful when applied to the coherentist's problem of primitive relations, are that i) gluon-like-relations can play the role of ensuring that no entity in the network has its own independent nature, or status as fundamental; and ii) the gluon- like-relations themselves cannot have fundamental status.

The issue of whether gluon-like-relations satisfy criterion i) is not straightforward. Priest's aim is to address the unity of complex wholes, rather than the relationship produced by dependency relations. Gluons provide an explanation of what does the work of holding together a unified structure, whilst keeping the parts of the structure distinct. Gluons aren't just dependent on relata, they are *identical* to relata. Whether or not the solution works depends upon whether the unification that the non-transitive identity relations produce, functions in the same way as interdependence would. If connected via a gluon, [A] and [B] are non-identical, but crucially, to satisfy the first criterion, they must be in a position to influence each other's nature. If it is the case that they do influence each other's nature, meaning they are not completely independent and not fundamental, (satisfying criterion (i)), then this produces an immediate and clear result that criterion ii) is also successfully satisfied, since, if [A] is a non-independent entity, and [A] is identical to the gluon, [G], then this must mean that [G] is also non-independent.

One reason to suggest that two relata connected by a gluon *do* influence each other's nature, is the properties of Priest's non-transitive identity relation, can compare with the properties of the coherentist's dependence relation. Priest suggests that gluons inherit their formal characteristics from relationships like equivalence, which makes them reflexive, symmetrical, but not transitive (2014: 19). Meanwhile the coherentist parts ways with the traditional characteristic of the asymmetry of dependence relations, allowing for them to be symmetrical. Perhaps, if it were the case that the coherentists' dependence took on all

the same attributes as Priest's gluons, then they might function in the same way, allowing for relata to influence each other's nature. If it is the case that the gluon-inspired solution satisfies both of the criteria (i) and (ii) above, then its success as a solution to the problem of fundamental relations turns on is whether one is willing to embrace dialetheism. If one its willing to forego the traditional characteristics of identity, then they might find that the Priest-inspired solution can successfully solve the problem. However, some might consider this a price too steep for the coherentist to pay.

3. A Nāgārjuna- inspired Solution

Thus far, I have discussed a range of responses that the coherentist can give in order to address the problem of fundamental relations, and preserve their anti-foundationalism. There are likely to be those who are put off by the kinds of compromises that these solutions suggested so far require us to make. For example, some solutions such as positing an infinite number of extra relations, or positing dialetheic gluons, incur costs like giving up on common intuitions, or giving up on traditional logical systems. The coherentist may opt for strategy (1), if they are willing to accept positing an infinite number of intermediate relations between entities. Alternatively, they may opt for strategy (2) if they are willing to accept the idea of 'unsaturated' relations (in the Fregean sense); or, if they are willing to accept Priest's non-standard logic of identity, so that gluon-like relations can hold identically with relata, whilst maintaining the non-identity of those relata.

In this section I offer one more kind of strategy, which may also require us to give up some pre-existing intuition, but one that is already familiar to forego for the coherentist. The intuition that this strategy requires us to give up, is the intuition that metaphysical explanation must always be asymmetric. This third and final strategy is inspired by Nāgārjuna's arguments for emptiness in the MMK. Nāgārjuna can be understood to argue that whilst co-dependent arising (pratītyasamutpāda) explains emptiness (śūnyatā), emptiness (śūnyatā) also explains co-dependent arising (pratītyasamutpāda). This can be adapted to form the third alternative strategy: to argue that whilst mutual-dependency of all entities explains anti-foundationalism, anti-foundationalism also explains the mutual-dependency of all entities. By making this move that utilizes symmetrical dependence and symmetrical explanation, the fundamentality of relations can be avoided, and anti-foundationalism can be preserved.

The previous strategies for solving the problem of fundamental relations explored in §2 have searched for a way that relations can both (i) perform the function of relating entities to ensure that no entity exists independently, whilst (ii) existing non-fundamentally themselves. The problems with many of the solutions explored so far have come from (i) and (ii) pulling in opposite directions. It has been assumed thus far that the proponent of

anti-foundationalist coherentism requires (i), because it is the dependency of all entities on some other entity that does the work of ensuring the anti-foundationalism. The status of all entities as non-fundamental is *because* of the dependencies every entity has on some other entity. This 'because' or 'in virtue of' relation, can be understood as a metaphysical explanation, of the kind that I have discussed as closely connected to ontological dependence. As noted earlier in the chapter (§1.4), we typically understand metaphysical explanations as asymmetric. When accepting this typical understanding, the 'non-fundamentality' of all entities in the network is *explained by* the dependency relations between all entities, doing the work of relating (and not vice versa).

If ontological dependence relations can be symmetric (as I have argued), and ontological dependence is closely connected to metaphysical explanation (see, for example, Thompson 2016: 44) then it is reasonable to think that some metaphysical explanations have the same formal features as ontological dependence, including symmetry.[235] I have already suggested one reason for taking symmetric explanation seriously, from the case of the shadow and the flagpole (§1.4 of this chapter). Another consideration in favour of symmetrical explanation, discussed by Thompson (2016: 45), is the possibility of cases of identity explanations. For example, Achinstein (1983: 233-7) argues that there is nothing intrinsically wrong with examples where the presence of a given micro-property can be used to explain the presence of an identical micro-property, or vice versa. The example that Achinstein defends is that the fact that ice is water can be explained by the fact that ice is composed of H2O molecules. Similarly, we can explain the fact that ice is composed of H2O molecules by appeal to the fact that ice is water. If both of these cases are genuine examples of explanation, then we are forced to accept that explanation can be symmetrical.

The coherentist, who embraces symmetrical dependence, may be more likely to accept these sorts of cases, and embrace symmetrical explanation. By embracing symmetrical explanation, the coherentist can argue that it is not only that dependence relations explain anti-foundationalism, rather, dependence relations and anti-foundationalism are interdependent, and mutually explanatory.

This strategy comes from the existing Buddhist idea: relations are what make the entities they connect empty of intrinsic nature, whilst the emptiness of those entities are what make the relations empty. This can be found directly from Nāgārjuna in the MMK. Nāgārjuna argues for emptiness via causation in two ways. The first way, is an argument from reductio

[235] To reiterate a previous note: depending on how close one takes the connection between metaphysical explanation and ontological dependence to be, their formal features need not always match. If one *tracks* the other, then there is room for some difference- it may only be a of subset one that tracks the other, (which share the same formal features). If dependence relations *are* explanations, then their formal features must always match.

ad absurdum, which systematically denies all the ways that causation could have *svabhava* (see chapter 4, §3.1). After arguing that there is no way that we can understand causation as having svabhava, Nāgārjuna continues by arguing that if all phenomena are caught up in causation, and causation is empty, then all phenomena are empty. The second way that Nāgārjuna argues for universal emptiness, is through an inference in the other direction. Causation *must* be empty, due to the emptiness of all phenomena. This argument involves the thought that if nothing has any intrinsic nature or essence, then there is nothing to be transferred, influenced, or related through causation relations that possess any ontological power (Garfield 1995: 159-178).

If Nāgārjuna's arguments about causation can be generalised to other kinds of dependence relations, including ontological dependence,[236] then we can understand Nāgārjuna to be arguing for both of the following claims. The emptiness of dependence implies and explains the emptiness of all things. The emptiness of all things implies and explains the emptiness of dependence. Hence, we have a case of symmetrical dependence, and symmetrical explanation. In this way, the fundamentality of dependence relations can be avoided, and a coherentist's anti-foundationalism can be preserved.

Figure 29

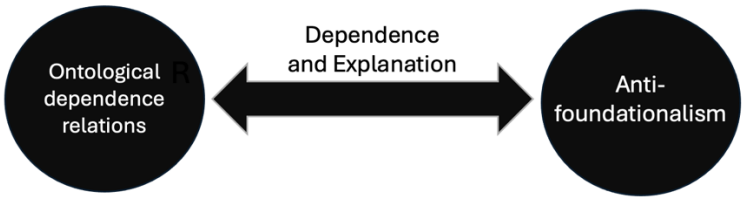

Figure 30

Figure 29 illustrates the solution in Buddhist terms. The argument for emptiness as the result of co-dependent arising can be found in the MMK chapter 1. An argument in the other direction, for co-dependent arising as a result of emptiness, can be found in the MMK

[236] Aitken gives reasons for considering this as appropriate: "It is worth noting that the terms translated as "cause" (hetu) and "condition" (pratyaya) in the context of dependent origination each have semantic ranges that connote explanation more generally. For instance, in addition to "cause," hetu also commonly means "reason" or "ground," being one of the standard terms referring to the reason supplied in an inferential argument as the justificatory ground for a thesis (pratijñā). Most generally, hetu refers to the category of things supplied in response to the question, "why?" Similarly, in addition to meaning "condition," pratyaya also commonly means "explanation," "ground," or "basis." (Aitken 2024: 19).

chapter 6. The two features of reality can be understood as interdependent, and mutually explanatory. A solution to the problem of fundamental relations, inspired by these Madhyamaka arguments, is represented by Figure 30. Whilst anti-foundationalism is the result of symmetrical dependence relations structuring reality, symmetrical dependence relations can be understood as dependent on (or explained by) anti-foundationalism.

4. Concluding Remarks

This chapter has shown that utilising symmetric dependence relations, and embracing symmetric explanations, are key to solving problems that arise for anti-foundationalist coherentism. I have offered multiple possible solutions to both objections involving infinite regress, and objections involving the possibly fundamental status of dependence relations. The solutions I favour are ones that show that the threat of vicious infinite regress can be overcome by utilising symmetrical explanation (§1) and that show that the threat of possible fundamental relations can be overcome by utilising symmetrical explanation (§2). I conclude that anti-foundationalist coherentism remains a live possibility, with the potential to offer us a promising new account of the structure of reality, without any fundamental or explained entities, and with emerging support from our current physical theories. Underhand, residual commitment to some fundamental part of the picture can be avoided, through adopting whichever of the solutions I have presented, that best fits with one's prior metaphysical commitments.

Conclusion and Directions for Future Research

I have shown that there are reasons from analytic metaphysics, Buddhist metaphysics and current physics for rethinking the standard foundationalist structure of reality. I have explored numerous arguments that suggest that the foundationalist's commitment to hierarchical structure and independent foundations is misguided. Instead, we should accept a structure that contains mutual dependence, and an absence of independent fundamentalia- anti-foundationalist interdependence. The most promising account of anti-foundationalist interdependence, I have argued, is holist coherentism, where all entities depend on all other entities. Such a structure may be immediately counterintuitive, yet it reaps the benefits of lacking any unexplained entities, accommodating cases of symmetric dependence, and doing justice to the pictures painted by both Buddhist emptiness and relational quantum mechanics.

The account that I have proposed and defended provides a huge amount of opportunity for future research, in metaphysics and beyond. One example, is the opportunity to explore the effect that such an account might have on the metaphysics of personal identity. Recognising our place in the interdependent network means that we can question the search for an essential personal identity that persists throughout one's life. We can instead explain personal identity in terms of a person's relations to particular times and places that they have and haven't encountered throughout their lifetime.

Beyond metaphysics, opportunities for future research might involve exploring the everyday applications and social impact of adopting a coherentist attitude, using Buddhist ideas about the impact of understanding and accepting emptiness. For the Buddhist, it might seem an alien and arbitrary distinction to discuss issues about metaphysical structure separately from issues about how to live one's life. Those who have explored the import that Asian metaphysical ideas about interdependence can have on ethics, include Ivanhoe (2017) and Priest (2015). For example, Ivanhoe discusses interdependence in the context of his 'oneness hypothesis', and suggests that a more expansive and relational view of the self can challenge 'hyper-individualistic' practises. For example:

'The more expansive view of the self that is part of the oneness hypothesis challenges widespread and uncritically accepted views about the strong (some would say hyper-) individualism that characterizes many contemporary Western theories and conceptions of the self, but it also has direct and profound implications for a range of practical concerns such as how we conceive of and might seek to develop greater care for the people, creatures, and things of the world. How would our view of ourselves change, and how would our approach to and views about ethical, social, and spiritual life change, if we begin with the

belief that we all are deeply and inextricably interconnected with other people, creatures, and things and that our own flourishing and happiness is bound up with the well-being and happiness of at least large parts of the rest of the world? Much contemporary philosophical, economic, and social theory assumes, without evidence or argument, hyper-individualistic conceptions of the self.' (Ivanhoe 2017: 4).

Similarly, Priest (2015) discusses ideas about compassion, and acting in common interest across the Buddhist tradition, given underlying commitment to a metaphysical structure like the Net of Indra. Priest argues that it is emptiness that grounds the virtue of compassion in the Madhyamaka tradition. In future, I would like to purse a similar sort of enquiry, to explore how metaphysical anti-foundationalism and interdependence of the kind that I have endorsed, might have implications on the ways we act in regard to our surroundings. There may be interesting political and social consequences of recognising that things cannot be divided into simple distinct categories or groups, and that there is always a more complex story about the influence of a multitude of other things upon the identity of any one entity.

Another area beyond metaphysics that anti-foundationalist interdependence might impact, is epistemology. For example, following suggestions by Walsh (2015) and Rovelli (2022), an account of interdependence may have an impact on the nature of knowledge, and result in a theory of knowledge that is more relativistic than we might naturally accept. For example, in discussing the relativistic consequences of RQM, Rovelli suggests, 'my knowledge of the world is nothing else than an example of the result of interactions that generate meaningful information' (2022: 148). Meanwhile, Walsh (2015) suggests that a consequence of accepting the Madhyamaka view of emptiness is that knowledge is merely conventional or relative. Of course, each of their discussions is more complex and nuanced that the way I have quickly presented them here. I merely hope to have indicated that my metaphysical account of interdependence provides an opportunity for interesting discussion about the relativisation of knowledge.

To finish, I will leave the reader with a quote from one key figure in this thesis, in praise of another key figure in this thesis. I hope it will neatly wrap up the connections I have made between emptiness and entanglement, which I understand through a metaphysics of anti-foundationalist coherentism:

'Nāgārjuna does not fall into the trap in which so much of philosophy is caught, by postulating starting points that invariably turn out to be unconvincing in the long run. He speaks about reality, about its complexity and its comprehensibility, but he defends us from the conceptual trap of wanting to find its ultimate foundation' (Rovelli, 2022: 130).

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