

Augustine and Avicenna on the Puzzle of Time Without Time

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There is a remarkable coincidence in Augustine and Avicenna's investigations into the nature of time. Despite the fact that Avicenna wrote in Arabic and Persian, was born in Central Asia more than five hundred years after the death of Augustine, and had no access to Augustine's philosophical works, both consider a strikingly similar objection to the ontological dependence of time on the motion of the heavens. The objection, as found in Avicenna, is as follows:

One might ask: Do you think that if that motion [i.e. eternal, circular motion] did not exist, time would vanish such that the other motions different from it would be without priority (*taqaddum*) and posteriority (*ta'ahhur*).¹

And in Augustine:

I once heard a learned man say that the motions of the sun, moon, and stars constituted time; and I did not agree. For why should not the motions of all bodies constitute time? What if the lights of heaven should cease, and a potter's wheel still turn round: would there be no time by which we might measure those rotations and say either that it turned at equal intervals, or, if it moved now more slowly and now more quickly, that some rotations were longer and others shorter? And while we were saying this, would we not also be speaking in time?²

Both versions of the objection (which I shall henceforth call the Time Without Time objection) share a common structure. Both assume that there can be terrestrial motions in the absence of celestial motion. Both also assume that these remaining terrestrial motions would retain properties necessary to ensure the existence of time. In Avicenna's case, these terrestrial motions must retain their division into the prior and the posterior, for, as Avicenna claimed earlier in his treatise on time, "you know that being divisible into the prior (*mutaqaddim*) and the posterior (*muta'ahhir*) is a necessary concomitant of motion."³ Given this division of motion into the prior and the posterior, it seems that time too must exist, since, following Aristotle, Avicenna defines time as "the number of motion when it is differentiated into what is prior and what is posterior."⁴ Thus, if terrestrial motions can exist without celestial motion, time can exist in the absence of celestial motion. In Augustine's case, terrestrial motions guarantee the existence of time because their durations can still be measured and compared to each other, for "when a body is moved, I measure by time how long it was moving from the time when it began to be moved until it stopped."⁵ Thus, in the absence of celestial motion, the remaining terrestrial motions would still be measured by time. In structure, then, Avicenna and Augustine's versions of the Time Without Time objection are essentially the same. This similarity is even more remarkable given that there is no clear line of transmission connecting the two.

The source for Avicenna's version of the Time Without Time objection appears to be Alexander of Aphrodisias. Avicenna would have had access to his version of the objection because several of the Arabic translations of Aristotle's *Physics IV* included Alexander's commentary.⁶ Unfortunately, the Greek originals and Arabic translations of these commentaries have been lost, but fragments of Alexander's comments can still be found in the works of

Simplicius. In one such fragment, Alexander objects to the theory of time found in Plato's *Timaeus* as interpreted by Galen.⁷ On Galen's reading of the text, Plato identifies time with the ordered motion of the heavens. This ordered motion, however, was preceded in time by the chaotic and disordered motions. Thus, for Plato, time comes to be after motion, since time begins only after the Demiurge imposed order on the motion of the cosmos.⁸ Against this view, Simplicius records that Alexander argued that:

if all movement is in time, it is clear that the faulty and irregular movement is also in time. If, then, such time was before the heaven came to be, it is clear that time was also before the circular motion of the heaven. If, then, this is time, there would be time before time.⁹

From this quotation we can see that Alexander's objection has the same structure as both Augustine's and Avicenna's. Like theirs, Alexander's turns on the premises that (1) there can be motion in the absence of celestial motion and (2) this motion takes place in time. This structural similarity is what makes Alexander the likeliest source for Avicenna's Time Without Time objection even though Avicenna's target is not a Platonic theory of time, but his own Aristotelian theory of time as the magnitude of the motion of the heavens.¹⁰ This change of target, however, presents no difficulty because, due to its structure, the Time Without Time objection works just as well against Aristotle as against Plato.¹¹

Now, given the similarity between Alexander's objection and Augustine's, it would be unsurprising if Alexander turned out to be the ultimate source of Augustine's objection as well. In fact, Alexander's version of the Time Without Time objection is closer to Augustine's than to

Avicenna's, since both Alexander and Augustine object to making time the motion of the heavens rather than its measure. The secondary literature on Augustine's version, however, offers two immediate sources for his version, only one of which traces back to Alexander.

The immediate source that can be traced back to Alexander is Basil of Caesarea's *Adversus Eunomium*. John F. Callahan first proposed this work as the immediate source of Augustine's version (despite the lack of a known Latin translation) because of the striking similarities between the objections in the *Adversus Eunomium* and the *Confessions*.¹² In the *Adversus Eunomium*, Basil argues against Eunomius, a fourth-century advocate of Arianism, who claimed that time is the motion of the stars. Basil, however, insists that this cannot be true and objects to Eunomius' claim by pointing to the account of creation in Genesis, which asserts that the motion of the Sun and stars began only on the fourth day of creation. Thus, the identification of time with celestial motion would imply that there was no time during the first three days of creation. Thus, Basil, like Augustine, thinks that there can be time without celestial motion and so time cannot be identical with it. Furthermore, like Augustine, Basil holds that the existence of any motion, great or small, is sufficient for the existence of time. Finally, if Callahan is correct that Basil is Augustine's immediate source, then Alexander of Aphrodisias is the common ultimate source for both Augustine and Avicenna, for as Mark DelCogliano has shown, Basil of Caesarea grounded his objection to Eunomius in his understanding of Alexander's commentary on Aristotle's *Physics*.¹³

Jason Carter, however, has suggested that Augustine's version is borrowed from the Neo-Pythagorean astrologer Nigidius Figulus because both compare celestial motion to that of a potter's wheel.¹⁴ Thus, according to Carter, there is no need to suppose Augustine had access to an unknown Latin translation of the *Adversus Eunomium*, when we know from Augustine's *City*

of God that he was familiar with Nigidius Figulus' potter's wheel example. If, however, Carter is correct, there will be no earlier version of the Time Without Time objection to which both Augustine and Avicenna had access, since Avicenna obviously had no access to the work of Nigidius Figulus. It is, of course, also possible that the line of transmission is not clear because there is no line of transmission, for it seems perfectly possible that the Time Without Time objection is obvious to any philosopher considering a theory of time that makes time dependent on a single privileged motion.

Regardless of how Avicenna and Augustine came to consider the puzzle of Time Without Time, understanding their different approaches to the puzzle is of both philosophical and historical interest. It is of philosophical interest because Augustine and Avicenna disagree about whether the objection is successful. Augustine thinks that it is and so dismisses the idea that time is ontologically dependent on celestial motion.¹⁵ Avicenna, however, is at pains to show why it is not successful. Thus, looking at Augustine and Avicenna's assessments of the strength of the objection can give us deeper insight into what philosophical commitments are necessary in order to make a theory like Plato's or Aristotle's coherent. Second, assessments of the strength of the objection will also make clearer what was driving two different and independent traditions in the development of the ancient Greek philosophy of time, one that accepted and built on Aristotle's theory and another that rejected it. This opposition is of particular historical interest given that later Medieval Latin philosophers would have to adjudicate between Augustine's rejection and Avicenna's acceptance of Aristotle's theory of time. Thus, my aim for this article is to lay out why it is that Avicenna thinks the Time Without Time objection does not work. As we shall see, it is because, unlike Augustine, Avicenna thinks that time and motion must be eternal.

Avicenna's Theory of Time

Before examining Avicenna's response to the Time Without Time objection, we must understand what he thinks time is. As quoted above, time, for Avicenna, is "the number of motion when it is differentiated into what is prior and what is posterior."¹⁶ This definition appears to be circular but is not because "the prior and the posterior are found in [motion] only as a result of relation of the prior and the posterior in distance."¹⁷ That is, it is not circular because 'prior' and 'posterior' are spatial as well as temporal terms. Indeed, for Avicenna priority and posteriority in motion is in the first instance a matter of being spatially closer or farther away for the starting point of the motion.¹⁸ To get a sense of what this means, consider a train trip from Ottawa to Vancouver. This trip, like all motions for Avicenna, is defined as the actualization of a potentiality and thus is goal-oriented. So, Vancouver is the end of the trip not because the train arrived in Vancouver at the latest time. Instead, Vancouver is the end of the trip because the goal of the trip is to actualize the train's potentiality to be in Vancouver. Furthermore, the other stages of the trip can be ordered into prior and posterior without using time, for during the trip the train passes through one spatial position and then through another until it reaches Vancouver, its destination. The order in which the train passes through these spatial positions is determined by the order inherent in the positions itself. Thus, given that, from East to West, the provinces between Ottawa and Vancouver are Manitoba, Saskatchewan, and Alberta, it is necessarily the case that the train's motion through Manitoba is prior to its motion through Alberta. This necessary priority, moreover, is explained entirely due to the goal-oriented nature of the train trip and Canadian geography. Thus, the priority of motion that Avicenna mentions in his version of the Time

Without Time puzzle is not temporal. The existence of motion, however, entails the existence of time as well since:

time, owing to what it is in itself, is essentially a magnitude, possessing [the states] of being prior and posterior, the posterior part of which does not exist together with what is prior, as might be found in other types of [things that might] be prior and posterior.¹⁹

Thus, time is a magnitude ordered into prior and posterior states that do not co-exist.

Furthermore, whenever motion exists, such a magnitude will as well. The reason is that all motion through distance is divided into the prior and the posterior as a result of its goal-directed nature and the order inherent in any spatial magnitude. Furthermore, as Avicenna claimed above, “the prior part of the motion will not exist together with its later part in the way that the prior and posterior parts in distance exist together.”²⁰ That is, it is a necessary feature of motion that its prior and posterior states do not co-exist. Indeed, it is this inability to co-exist that differentiates prior and posterior states of motion from those of position. There must be magnitude that separates them, and this magnitude is time. Thus, it seems that Avicenna’s account of time does fall prey to the Time Without Time objection and that the motion of any body through space produces time, regardless of whether this motion is terrestrial or celestial.

Avicenna and the Puzzle of Too Many Times

Avicenna, however, cannot allow that any and all motions can cause the existence of time and not only because of the Time Without Time objection. Instead, he must find a way to claim that

only the eternal motion of the spheres can. To understand why, we need to see how Avicenna thinks that the puzzle of Time Without Time works in conjunction with another objection to identifying time with the magnitude of motion. This puzzle (which I henceforth call the Too Many Times puzzle) tries to show, first, that if time is the magnitude of motion, then there are as many numerically distinct times as there are motions. Second, it argues that two numerically distinct times cannot be simultaneous and, therefore, no two motions can be simultaneous.²¹ We must consider these two objections because Avicenna raises the problem of Time Without Time in the context of responding to the Too Many Times puzzle. Indeed, as we shall see in the penultimate section, Avicenna's response to the two are intricately connected because both are based on the same mistake: thinking that time can depend on a motion with finite duration.

Returning to the Too Many Times puzzle, in order to establish its first step, Avicenna reports that his opponents:

say [1] that there inevitably belongs to a motion, insofar as it is a motion, a certain amount of time and [2] that this motion, insofar as it is a motion, does not require that another body that is distinct from its body is also moved (there perhaps being a requirement for this in some cases is not due to it being motion but [due to] its existence requiring of [the body] that moves[it] that [this body] moves; but this is neither a condition of motion in so far as it is a motion nor one of its necessary concomitants.) [3] So, given these [assumptions], any motion that you posit as existing, insofar as it is a motion, necessitates that a time belongs to it ; but [this motion], insofar as it is a motion, does not necessitate that there is another motion. [4] If that is the case, then each motion

is accompanied by a private time that does not apply to any other motion, just as each is accompanied by a private place.²²

In this passage, the objector reveals why there must be as many times as there are motions: every motion possess its own private time. Thus, just as two moving bodies do not, and indeed cannot, occupy the same place, so too must every motion occupy its own time. To establish this, the objector considers how the relationship between motion and time differs from the relationship between two numerically distinct motions. In the case of the relationship between motion and time, [1] the existence of time is a logical consequence of the existence of motion. As we saw above, motion is just the ordered succession of spatial states that do not co-exist, and time just is the magnitude of change between these states. Thus, it appears to follow from the definition of motion that it exists in time. Nevertheless, [2] it does not follow from the definition of motion that if one body moves, another must move as well. Granted, as the objector points out, one motion might need the motion of another body to exist, but it does not need it to be motion. Thus, [3] while the existence of time is a logical consequence of the existence of a motion, the existence of another motion is not. Thus, the existence of any motion is sufficient for the existence of a time and it is sufficient for said time to be independent of the existence of another motion. From this it follows that the times that belong to each motion will be only generically rather than numerically the same. So, just as it follows from the nature of motion that they all traverse *a* distance but not the *same* distance, so too it follows from the nature of motion they traverse *a* time but not the *same* time.

The next step in the objection is to show that if the times of distinct motions are numerically distinct, it is impossible for two motions to be simultaneous. The reasoning for this conclusion goes as follows:

So, [1] when motions are together, their times must also be together, [2] and their [time's] togetherness must be with respect to place, subject, rank, nature, or anything else but togetherness in time. [3] However, every one of these ways [of being together] fails to prevent some of [these times] from being before and some after— that is, some of them existing while others do not. [4] So, it remains that their togetherness is togetherness in time, where togetherness in time is the occurrence of many things in a single time, or a single instant which is a single limit of time. [5] This necessitates that the many times would have a single time; but [6] the reason for each of these times [being] together with them [the many times] is, in this sense, just like the reason that they are joined together in [the single time], [7] in which case there would necessarily be an infinite number of simultaneous times.²³

The argument in this passage begins with two assumptions: [1] two motions are simultaneous (together or *ma'*) if and only if their times are simultaneous; and [2] the simultaneity of two times is not a matter of the two times' existence at the same time. This second assumption, of course, stems from the objector's prior conclusion that the times of two motions are not numerically identical. If this is the case, their simultaneity cannot be explained by their existence at the numerically same time. The objector, however, quickly shows that assumption [2] cannot be correct given that simultaneity cannot be explained in terms of any other kind of sameness,

for [3] no other kind of sameness necessitates that the two times and motions co-exist. For example, two times or motions are not simultaneous because they occur in the same place. Indeed, the only way that, say, Socrates and Plato can move through the same place is if their movements are not simultaneous. Likewise, two motions are not simultaneous because they occur in the same subject. So, a walk to the Athenian agora and a walk to the Areopagus are not simultaneous because they both occur in Socrates. Again, the two motions can occur in Socrates only if they are not simultaneous. Thus, as the objector concludes, [4] simultaneity must mean existing at the same time, and so [5] the times of two motions can be simultaneous only if they exist at the same time. As the objector argues, however, two times that are genetically identical but numerically distinct can never be simultaneous. The reasoning seems to be that the times of two motions can only be simultaneous if (a) they are numerically identical or (b) they are both simultaneous with a third time. Now, since the times of two motions cannot be numerically identical, it follows that they can be simultaneous only if they are both simultaneous with a third time. This third time, however, is not numerically identical with the first two, so [6] there must be a fourth time that explains why the third time is simultaneous with the first and second. This same problem would occur again and again. Thus, the objector concludes that [7] one could posit an infinite number of times without ever explaining why the first two were simultaneous. Thus, the definition of time as the magnitude of motion cannot be correct since it leads to the absurd conclusion that no two motions can ever be simultaneous.²⁴

We can now see how the Time Without Time objection works in conjunction with the Too Many Times objection and why Avicenna raised the latter in the course of responding to the former. He did this because his version of the Time Without Time objection seeks to block his answer to the Too Many Times objection. As we shall see in Section 4, Avicenna tried to avoid

the Too Many Times objection by making time the magnitude of a single privileged motion: the motion of the spheres. Hence, the point of the Time Without Time objection is to show that this solution does not work because it is possible for terrestrial motion to exist and generate time in the absence of celestial motion. Thus, the two objections together try to put Avicenna in a double bind: he must either accept that there are as many independent times as there are motions or accept that there can be motion without time. In the next section, I examine how Avicenna tries to get out of this bind.

Avicenna's Solution to the Two Puzzles

Given that the puzzle of Time Without Time is raised in the context of responding to the puzzle of Too Many Times, it is unsurprising that we can only understand Avicenna's response to the former in the light of his response to the latter. In his view, the latter puzzle arises only because of a misunderstanding in what it means for time to be the magnitude of motion. In particular, it is based on the failure to make two important distinctions. Thus, the way to respond to it is to:

[1] distinguish between someone saying that time is a magnitude (*miqdār*) of every motion and someone saying that its individual existence depends on every motion. [2]

Furthermore, there is a distinction between someone saying that the essence of time is connected to motion as one of its accidents and someone saying that time is connected to the essence of motion as an accident of the essence of motion, because [according to] the first sense, certain things accidentally belong to something, while [according to] the second, certain things are dependent upon something.²⁵

According to the first distinction, time's status as the magnitude of every motion does not entail that it has ontological dependence on every motion. Thus, time is not an accident of motion in the same way that whiteness is an accident of bodies. In the case of whiteness, a group of five bodies can be white only if there are five individual instances of whiteness, each of which depends ontologically on the body in which it inheres. Time, however, can be the magnitude (*miqdār*) of every motion without depending on every motion because:

it is not a condition of what measures that it be something accidental to and subsist with the thing; rather, it might measure something distinct [from itself] by being brought next to and juxtaposed with what is distinct from it.²⁶

To understand Avicenna's reasoning in this quotation, we need to understand that the Arabic word *miqdār*, which I have translated as 'magnitude,' can also mean 'measure.'²⁷ Indeed, the term was used by the Arabic translators of Aristotle to render both *μέτρον* (measure) and *μέγεθος* (continuous quantity). Thus, in the above quotation, Avicenna takes time's role as the *miqdār* of motion to mean that time is the *μέτρον* (measure) of motion and thus not ontologically dependent on it. However, in the *Metaphysics of the Healing*, Avicenna frequently uses *miqdār* to refer to *μέγεθος*, as when for example he writes:

[Now,] it has become evident that this magnitude (*miqdār*) is in matter and that it increases and decreases while substance continues to exist. [Magnitude] is, hence, necessarily an accident. But it is one of the accidents that attaches to matter and to something in matter-because this magnitude does not separate from matter [...].²⁸

Thus, Avicenna uses *miqdār* to refer to either a magnitude, that is, a continuous quantity existing in a body, or to the measure of that quantity. Furthermore, in his treatise on time, Avicenna plays with this ambiguity in the definition of time as the *miqdār* of motion by claiming that:

what was demonstrated for us concerning time is only that it depends upon motion and is a certain disposition (*hay'a*) of it, while, concerning motion, it is only that every motion is measured (*tuqaddar*) by time.²⁹

In this passage, we can see that Avicenna makes time as both the *μέγεθος* and *μέτρον* of motion. It is the former because it is ontologically dependent on motion and because time is a disposition of motion just as motion, whiteness, and blackness are dispositions of body.³⁰ It is the latter because every motion is measured by time. Thus, Avicenna's understanding of time's status as a magnitude appears to be similar to the modern understanding of the meter. The meter is the base unit of length in the International System of Units (SI) and so is the unit that determines the length of all other bodies. Furthermore, the meter is itself the length of a particular body, namely the International prototype meter, which is a bar of platinum-iridium alloy kept in a vault near Paris. Thus, like time, the meter both determines the length of every extended body and is the length of one body in particular.

Now in the case of the meter, the decision to make the meter dependent on a particular bar of platinum-iridium was arbitrary. In fact, the meter isn't defined as the length of that bar anymore but as the length of the path travelled by light in vacuum during $1/299792458$ of a second. For Avicenna, however, the choice of making time the *μέγεθος* of the motion of the

heavens is not arbitrary at all. This brings us to Avicenna's second distinction, which claims that while time is essentially an accident of motion, it is not the case that every motion essentially possesses time as an accident. The latter does not follow from the former because "it is not the case that when the thing itself depends upon the nature of a given thing, the nature of the thing must not be devoid of it."³¹ That is, it is not the case that every motion by nature possesses time as an accident just because time by nature exists as an accident of motion. Indeed, as Avicenna argues, only eternal celestial motion can possess time as an accident because:

Time does not depend on motions that have a beginning and an end, so how could time be dependent upon them? If time were to belong to them, then it would be divided by two instants, but we have forbidden that. Of course, when time exists (due to a motion that has a character such that it is fitting for the existence of time to be dependent on it and this motion is motion that is continuous and is not delimited by actual extreme limits) all the other motions will be measured by it.³²

When Avicenna speaks in this passage of the impossibility of motion being "divided by two instants," he is referring to the impossibility of time having a beginning or an end. From this impossibility, it follows that time cannot be an accident of terrestrial motion, for if time ontologically depends on terrestrial motions, it will exist only as long as those motions do. Thus, given that all terrestrial motions begin and end, if time depends on these motions, time will as well. As Avicenna claimed above, however, time cannot begin or end and so it cannot depend on terrestrial motion.

With these two distinctions in mind, we can now appreciate how Avicenna responds to the problems of Too Many Times and of Time Without Time. The former relied on the claim that time is a necessary consequence of the existence of every motion. This cannot be the case, however, because given that time cannot begin or end, it cannot be the consequence of finite motion. Granted, every motion possesses a magnitude between its prior and posterior states. This magnitude, however, cannot itself be time since time is, by definition, an infinite magnitude and they are finite. Thus, while these magnitudes are *measured* by time, they cannot *be* time. This distinction, moreover, allows Avicenna to respond to the problem of Time Without Time.³³ This problem also relied on the claim that time is a necessary consequence of the existence of every motion. However, for Avicenna, what is necessary is that these motions are *measured* by time, not that time is a quantity inhering in these motions. Thus, it is Avicenna's understanding of what it means for time to be a magnitude, along with his insistence on the necessary eternity of time, that allows him to respond to the problems of Too Many Times and Time Without Time. His insistence on its eternity, however, represents a significant disagreement with Augustine. In the final section, I discuss why Augustine thinks that time can begin, and Avicenna thinks that it cannot.

Avicenna and Augustine on The Eternity of Time

Augustine addressed the question whether time has a beginning in the context of addressing what God was doing before the first moment of creation and why he created at that moment (and not an earlier or later one).³⁴ Augustine's answer to these arguments against the temporal beginning of the cosmos is grounded in the distinction between time and timelessness. Time depends on

movement, and since God is unmoving, there is no time before creation.³⁵ Thus, for Augustine, time was created when the cosmos was created. The questions “Why not sooner?” or “What was God doing before?” make no sense because, as Augustine says to God, “You have made time itself. Time could not elapse before you made time. But if time did not exist before heaven and earth, why do people ask what you were doing then? There was no ‘then’ when there was no time.”³⁶ Thus, Augustine dismisses the question of what God was doing before the creation by pointing out that there was no *before* before creation.³⁷ To put it another way, Augustine resolves these objections to the temporal beginning of the cosmos by insisting on the beginning of time.

Avicenna argues, by contrast, that time cannot have a beginning because such a beginning is impossible.³⁸ The reason is that if time began, then:

[1] time has no before and [2], since it has no before, [time] could not have been non-existent and then existed, for, if had been non-existent and then existed, its existence would be after its non-existence, and so its non-existence would be before its existence. [3] Therefore, it must have a before, and that before must mean something other than the non-existence that describes it, according to what we stated elsewhere. So, this species of before-ness is predicated of something that exists but is not this time. [4] Thus, before this time, there was [another] time that is continuous with it.³⁹

The above argument works by pointing out that [1] if time began a thousand years ago, then we cannot speak about what happened before a thousand years ago. This claim, however, leads to a contradiction because, as Avicenna argues, [2] if time began a thousand years ago, then we must speak about what happened before a thousand years ago, for to begin is to exist after not existing.

Thus, if time began, something must have preceded time.⁴⁰ Moreover, what preceded time cannot be merely the non-existence of time. To explain why, [3] Avicenna refers to a prior discussion in which he gives time the job of ordering non-temporal states into a temporal sequence, or as he puts it:

when something is said to be before and that thing is not time (but, for example, is motion, humans, and the like), [its being before] means that it exists together with a certain thing that is in some state such that when that state is compared with the state of something later, it is inseparable from [that state] if the thing in [the former state] is essentially before. That is, this inseparability belongs to [time] essentially.⁴¹

Thus, time has the job of ordering non-temporal states because time and time alone has prior states that are essentially earlier than its posterior ones. This reasoning, moreover, contains a background assumption that is key to understanding Avicenna's argument against the beginning of time: that there must be an explanation for why one state is earlier than another.⁴² Thus, for example, there must be an explanation for why the birth of Augustine happened before the birth of Avicenna. This factor moreover cannot be the existence of Avicenna and the non-existence of Augustine at some time because, as Avicenna explains:

this factor cannot merely be some relation to nonexistence (or existence), since the existing thing's relation to the non-existing thing might be one of being later just as easily as being earlier (and the same holds with regard to existence).⁴³

Thus, something needs to explain why Augustine lived and died before Avicenna because, in and of themselves, Augustine's life and death are not necessarily prior to Avicenna's. Thus, if we consider only Avicenna *qua* Avicenna and Augustine *qua* Augustine, we could not know who lived and died prior to whom. Instead, as Avicenna explained, to determine who lived first, we need to know that Augustine co-existed with a state that is essentially prior to the state with which Avicenna co-existed. These states will be the states of a body in motion, since, as we have already seen, Avicenna thinks that motion is inherently ordered into prior and posterior states. In other words, these states will be states of time.

With this in mind, we can return to Avicenna's argument for why time cannot begin. Remember that for time to have a beginning, its non-existence must be temporally prior to its existence. Furthermore, as we now know, there must be an explanation for why its non-existence is prior to its existence. This explanation, moreover, cannot be the non-existence of time itself because the non-existence of time does not, in and of itself, entail that it is temporally prior (rather than posterior) to the existence of time. Thus, if time's non-existence is prior to its existence, then, necessarily, time's non-existence co-exists with a state that is essentially temporally prior to a state with which time's existence co-exists. These states, however, will just be time since time is what "turns out to essentially have a before and an after," and so time cannot begin.

Given the above argument, it is obvious that Avicenna would reject Augustine's answer to the question about what God was doing before he created the cosmos. Again, Augustine's response hinged on the view that God created time when he created the cosmos. Thus, we cannot ask what God was doing before creation, because before creation there was no time and without time there can be no before. Now, Avicenna would agree that without time there can be no

before. Rather than resolving an objection to the temporal beginning of the cosmos, however, this just creates a new one, since Avicenna defines a beginning as existence *after* non-existence. Thus, to deny that there was a before prior to the beginning of the world is simply to deny that it began. According to Avicenna, then, it is logically impossible for time to begin. Furthermore, time's inability to begin was a key part of what allowed Avicenna to resolve his version of the Time Without Time objection. Thus, it seems that the ultimate explanation for why Avicenna differs from Augustine in his assessment of the strength of this objection is his different view on whether time can begin.

¹ Avicenna, *The Physics of the Healing*, tr. Jon McGinnis (Provo: Brigham Young University Press, 2009), 2.13.3, 251. Translation modified.

² Augustine, *Confessions (Conf.)*, tr. William Watt (Cambridge MA: Harvard UP, 1992), 11.23.

³ Avicenna, *Physics of the Healing*, 2.11.3, 232. I have followed Andreas Lammer in translating *mutaqaddim* and *muta'ahhir* as 'prior' and 'posterior' rather than as 'earlier' and 'latter' as Jon McGinnis does in order to highlight that these are not temporal terms.

⁴ Avicenna, *Physics of the Healing*, 2.11.3, 232. As we shall see, Avicenna like Aristotle refers to time as a number (ἀριθμός / 'adad) and as a measure or magnitude (μέτρον / miqdār).

Avicenna, like many late ancient commentators, used the two terms interchangeably. However, some contemporary scholars have argued that Aristotle did not and so his ultimately defining time as the number of motion is of philosophical significance. See: Julia Annas, "Aristotle, Number, and Time," *Philosophical Quarterly* 25 (1975), 97-113; Richard Sorabji, *Time, Creation, and the Continuum* (Chicago, University of Chicago Press, 1983), 84–89; Ursula Coope, *Time for Aristotle* (New York: Oxford University Press, 2005), chs. 5–6; and Tony

Roark, *Aristotle on Time: a Study of the Physics* (Cambridge: Cambridge University Press, 2011), ch. 6.

⁵ *Conf.* 11.24.

⁶ For a detailed history of the transmission of the works of Alexander of Aphrodisias into Arabic along with an overview of the scholarship on this transmission, see Andreas Lammer, *The Elements of Avicenna's Physics: Greek Sources and Arabic Innovations* (Berlin and Boston: De Gruyter, 2018), 10-19, 22-25.

⁷ See Galen's paraphrase of the *Timaeus* in the *Compendium Timaei Platonis alioquorumque dialogorum synopsis quae extant fragmenta*, ed. Paul Kraus and Richard Walzer (London: Warburg Institute, 1951), 7. For a discussion, see Robert W. Sharples's annotated translation of Alexander of Aphrodisias' "On Time," *Phronesis* 27, no. 1 (1982), 58–81, here 72-78, and Peter Adamson, "Galen and al-Rāzī on Time," in *Medieval Arabic Thought: Essays in Honour of Fritz Zimmermann*, ed. Rotraud Hansberger, Muhammad Afifi al-Akiti, and Charles Burnett (London and Turin: Warburg Institute and Nino Aragno Editore, 2012), 1–14, here 7-8.

⁸ Whether Galen's interpretation of the *Timaeus* is correct is a matter of scholarly debate. For an overview of various contemporary interpretations, see Roark, *Aristotle on Time*, 22-33. For an overview of the *Timaeus*'s three main ancient interpretations, see Sorabji, *Time, Creation, and the Continuum*, 268-276.

⁹ Alexander *apud* Simplicius, *In Aristotelis Physicorum libros quattuor priores commentaria*, ed. Hermann Diels (Berlin: Verlag Georg Reimer, 1982), 703.

¹⁰ I have not found any philosopher prior to Avicenna who used the Time Without Time objection against Aristotle's theory of time. Granted, Alexander's *Treatise on Time* (which was extant in Arabic) contains an objection to Aristotle's theory which partially resembles

Avicenna's. In this work, Alexander reports that previous philosophers objected to Aristotle by claiming that "if we were to think of the sphere standing still, its standing still would be in time; and since its standing still would be in time, its movement would be in time" (93.22). This objection, however, differs from the Time Without Time objection in that the latter is grounded in the intuition that the motion of other bodies is sufficient to generate time, while the former is grounded in the intuition that time exists independently of motion. Given this difference, Alexander's objection to Aristotle is at best a partial prefiguring of Avicenna's.

¹¹ Arabic philosophers took the identification of time with the number of the motion of the spheres to be part of the canonical Aristotelian definition on the authority of Alexander. See Sharples, "On Time," 61-2.

¹² John Callahan, "Basil of Caesarea: a New Source for St. Augustine's Theory of Time," *Harvard Studies in Classical Philology* 63 (1958), 437-454, here 439-444.

¹³ Mark Del Cogliano "Basil of Caesarea versus Eunomius of Cyzicus on the Nature of Time: A Patristic Reception of the Critique of Plato," *Vigiliae Christianae* 68, no. 5 (2014), 498-532, here 521-531.

¹⁴ Jason Carter, "St. Augustine on Time, Time Numbers, and Enduring Objects," *Vivarium* 49, no. 4 (2011), 301-323, here 314, note 39.

¹⁵ I shall not attempt to answer in this article whether Augustine makes time a distention of the soul. For arguments for and against this identification, see Robert Jordan, "Time and Contingency in St. Augustine." *Review of Metaphysics* 8 (1955), 394-417; Roland Teske, SJ, "The World-Soul and Time in St. Augustine," *Augustinian Studies* 14 (1983), 75-92; James Wetzel, "Time After Augustine," *Religious Studies* 31, no. 3 (1995), 341-357; Katherine Rogers,

“St. Augustine on Time and Eternity,” *American Catholic Philosophical Quarterly* 70, no. 2 (1996), 207-223; and Carter, “St. Augustine on Time.”

¹⁶ Avicenna, *Physics of the Healing*, 2.11.3, 232. Translation modified. According to McGinnis, Avicenna also identifies time with a moving object’s possibility of traversing more or less distance at higher or lower speeds. See McGinnis, *Avicenna* (New York: Oxford University Press, 2010), 198. However, Lammer, *Elements*, 431–438, argues that Avicenna does not identified time with the possibility itself, but with the magnitude in which that possibility obtains.

¹⁷ Avicenna, *Physics of the Healing*, 2.11.3, 232. Translation modified. The first known charge of circularity against Aristotle’s definition of time was levelled by Galen and reported by Simplicius. See Simplicius, *In Phys.*, 718.13–18. Whether any Arabic philosophers prior to Avicenna also objected to Aristotle in this way is considered in Lammer, *Elements*, 463.

¹⁸ Avicenna’s account of priority and posteriority in motion resembles Coope’s and Roark’s modern interpretations of Aristotle’s. See Coope, *Time for Aristotle*, 69–75, and Roark, *Aristotle on Time*, chs. 4–5. For a critique of this reading of Aristotle, see John Bowin, “Aristotle on the Order and Direction of Time,” *Apeiron* 42, no. 1 (2009), 33–62, here 57. McGinnis and Lammer have both argued that Avicenna shared this understanding and my understanding of Avicenna’s definition of time is very much indebted to their work. See McGinnis, “Review of *Aristotle on Time: A Study of the Physics* by Tony Roark,” *Philosophy in Review* 32, no. 6 (2012), 518–520, and Lammer, *Elements*, 2018.

¹⁹ Avicenna, *Physics of the Healing*, 2.11.3, 23. Translation modified. Lammer, *Elements*, 471, offers the following alternative translation: “time is through itself (*li-dātihī*) a magnitude for that (*li-mā*) which in itself (*fī dātihī*) has a priority and posteriority (*taqaddum wa-ta’ahhur*) of which

the posterior does not exist together with the prior as what may be found in other types of priority and posteriority.” Lammer, *Elements*, 465, justifies this alternate translation on the grounds that “if time is the magnitude of motion when differentiated into the prior and posterior and if time is what essentially possesses the prior and posterior—i.e., if “prior” and “posterior” are essentially temporal terms—then the definition is hopelessly circular.” However, all that follows from McGinnis’s translation is that time is defined in terms of priority and posteriority (which are atemporal terms), *not that* priority and posteriority are defined by time.

²⁰ Avicenna, *Physics of the Healing*, 2.11.3, 23.

²¹ To my knowledge, this puzzle has not yet been discussed in the secondary literature on Avicenna’s theory of time.

²² Avicenna, *Physics of the Healing*, 2.10.4, 221. Translation my own

²³ Avicenna, *Physics of the Healing*, 2.10.4, 221-2. Translation my own

²⁴ Thus, Avicenna’s Too Many Times objection appears to be structurally similar to Teske’s objection to the Augustinian identification of time as a distention of the mind. See Teske, “World-Soul and Time,” 89: “If one interprets Augustine’s definition of time in terms of the distention of individual souls, then it would seem that there could be no common temporal frame of reference within which we can date all real events; rather there would seem to be as many distinct temporal series as there are distinct distended souls.”

²⁵ Avicenna, *Physics of the Healing*, 2.13.2, 250. Translation my own

²⁶ Avicenna, *Physics of the Healing*, 2.13.2, 250-1.

²⁷ For a longer discussion of Avicenna’s use of the term *miqdār* as well and that of earlier Arabic philosophers and translators of Aristotle, see Lammer, *Elements*, 443-462.

²⁸ Avicenna, *The Metaphysics of the Healing*, tr. Michael E. Marmura (Provo: Brigham Young University Press, 2005), 3.4.2, 84. Translation modified.

²⁹ Avicenna, *Physics of the Healing*, 2.13.2, 251.

³⁰ Avicenna, *Physics of the Healing*, 2.11.2, 231. Translation modified.

³¹ Avicenna, *Physics of the Healing*, 2.13.2, 251.

³² Avicenna, *Physics of the Healing*, 2.13.3, 251. Translation my own.

³³ Avicenna, *Physics of the Healing*, 2.13.3, 251-2, also replies to the Time Without Time objection by arguing that without the circular motion of the outermost sphere, there would not be any other motion. For a discussion of the other solution, see Lammer, *Elements*, 502-4.

³⁴ For an overview of Ancient and Medieval arguments for the world's age drawn from the nature of time, see McGinnis, "Creation and Eternity in Medieval Philosophy," in *A Companion to the Philosophy of Time*, eds. Heather Dyke and Adrian Bardo (Chichester: Wiley-Blackwell, 2013), 73–86. This work covers Augustine's argument in the *Confessions* and several of Avicenna's arguments not discussed in this article.

³⁵ *Conf.* 11.13.

³⁶ *Conf.* 11.13.

³⁷ For a fuller explication, see Simo Knuuttila, "Time and Creation in Augustine," in *The Cambridge Companion to Augustine*, eds. Eleonore Stump and Norman Kretzmann (Cambridge: Cambridge University Press, 2001), 103–15.

³⁸ For a discussion of why time cannot end, as well as a through discussion of Avicenna's theory of the instant, See McGinnis, "Ibn Sīnā on the Now," *American Catholic Philosophical Quarterly* 73, no. 1 (1999), 73–106, 83-106.

³⁹ Avicenna, *Physics of the Healing*, 2.12.1, 237-8. Translation my own.

⁴⁰ This argument seems to be an elaboration of a brief remark in Aristotle's *Metaphysics*, tr.

William David Ross, in *Aristotle: The Complete Works of Aristotle*, ed. Jonathan Barnes, Vol. 2. (Princeton: Princeton University Press, 1995), 12.6, 1071b8: "it is impossible that movement should either have come into being or cease to be (for it must always have existed), or that time should. For there could not be a before and an after if time did not exist."

⁴¹ Avicenna, *Physics of the Healing*, 2.11.5, 234. Translation modified.

⁴² My understanding of this facet of Avicenna's theory of time is indebted to Lammer, *Elements*, 473-484.

⁴³ Avicenna, *Physics of the Healing*, 2.11.5, 235. Translation modified. McGinnis and Lammer disagree about the role this passage plays in Avicenna's exposition of his theory of time. McGinnis, "Time and Time Again: A Study of Aristotle and Ibn Sīnā's Temporal Theories," PhD dissertation (Philadelphia: University of Pennsylvania, 1999), 236–238, regards this passage as "a response to a potential objection [...] that existence and nonexistence are sufficient conditions to explain priority and posteriority," while Lammer, *Elements*, 485-491, argues that it aims to establish the existence of time, something McGinnis argues Avicenna accomplished much earlier in *Physics of the Healing* 2.11. For Lammer's objection to McGinnis's view, see Lammer, *Elements*, 431-438.