# The Architecture of Reality: A Comprehensive Analysis of Temporal Metaphysics

## Introduction

Temporal metaphysics is the branch of philosophy that investigates the fundamental nature of time, reality, and becoming.1 As a domain of inquiry, it addresses questions that are foundational to nearly all other areas of human thought. The Greek philosopher Aristotle designated metaphysics as "first philosophy," suggesting it is the most basic form of inquiry upon which all other disciplines depend.2 Indeed, our understanding of causation, identity, consciousness, and the physical world is inextricably linked to our conception of time.

The field of temporal metaphysics is structured around a profound and persistent tension between two competing visions of reality. The first is the "manifest image" of time—our intuitive, common-sense experience of the world. In this view, time is a dynamic, flowing river; the present moment is a privileged, moving "now" that travels from a fixed, unchangeable past into an open, undetermined future.4 This dynamic conception of "becoming" is deeply embedded in our language, our psychology, and our experience of agency.

Opposed to this is the "scientific image" of time, a picture suggested by logical analysis and, most powerfully, by the theories of modern physics. In this view, reality is a static, four-dimensional "block universe" in which past, present, and future are ontologically on par, co-existing in a timeless sense.1 The flow of time is considered a subjective illusion, and the fundamental nature of reality is one of static "being" rather than dynamic "becoming".5 This dichotomy is not a modern invention but is rooted in the very origins of Western philosophy, in the ancient debate between Heraclitus, who famously declared that "everything flows," and Parmenides, who argued with austere logic that all change is an illusion and true reality is static and eternal.8 This ancient conflict between flux and stasis serves as the primary engine of metaphysical inquiry into the nature of time.

This report will provide a comprehensive analysis of this complex and vital field. Part I will examine the fundamental ontological question of time's structure, exploring the great divide between the dynamic A-theory and the static B-theory, along with the specific models of reality they entail, such as Presentism and Eternalism. Part II will address the related problem of persistence: how objects maintain their identity through change, a puzzle that leads to the competing theories of Endurantism and Perdurantism. Part III will trace the historical genealogy of these ideas, from their origins in ancient Greece through the pivotal contributions of Aristotle, Augustine, and J.M.E. McTaggart. Part IV will analyze the critical and often paradoxical dialogue between temporal metaphysics and modern physics, particularly Einstein's theories of relativity and the strange implications of quantum mechanics. Finally, Part V will explore the far-reaching implications of these abstract theories for other core philosophical domains, including personal identity, causation, and free will.

## Part I: The Ontological Status of Time: Dynamic Becoming vs. Static Being

The most fundamental question in temporal metaphysics concerns the ontological status of the past, present, and future. Is the present moment metaphysically special? Do past and future events exist in the same way that present events do? The frameworks developed to answer these questions reveal a deep chasm between dynamic and static conceptions of reality, a division first articulated in the modern era by the Cambridge philosopher J.M.E. McTaggart.

### The A-Theory and the B-Theory of Time

The entire modern debate about the nature of time is framed by a conceptual distinction introduced in a paper that famously argued for time's *unreality*. In his 1908 work, "The Unreality of Time," J.M.E. McTaggart distinguished between two ways of ordering events, which he called the A-series and the B-series.9 McTaggart’s argument was that time required both series to be real, but that the A-series was logically contradictory, forcing the conclusion that time itself is unreal.11 While few philosophers accepted his conclusion, his initial distinction proved so powerful that it became the indispensable vocabulary for the subsequent century of debate. Instead of abandoning the topic, philosophers were forced to choose which part of McTaggart's analysis to reject. In doing so, they gave rise to the two great opposing camps in contemporary temporal metaphysics: the A-theory and the B-theory.

#### The A-Theory (Tensed Time)

The A-theory of time posits that the A-series—the characterization of events by their properties of being *past*, *present*, or *future*—is a fundamental and objective feature of reality.13 These "A-properties" are not merely subjective descriptions but are real, monadic properties of events that change over time.6 An event that is now present was once future and will soon be past.

The central tenet of the A-theory is the reality of "temporal becoming" or the "passage" of time.1 For the A-theorist, time genuinely flows or passes, and this passage is an objective feature of the world.11 This implies that the present moment holds a special, metaphysically privileged status; it is the locus of becoming, the moving frontier where the future becomes actual and then recedes into the past.1 The primary strength of the A-theory is its powerful correspondence with our subjective experience. It aligns with our deep-seated intuition of a dynamic world, our perception of a moving "now," and the tensed structure of our language, which makes a sharp distinction between past, present, and future.4 Expressions of relief, such as "thank goodness that's over," seem to refer to a genuine change in an event's A-property (from present to past), a fact that A-theorists claim the B-theory cannot adequately explain.9

#### The B-Theory (Tenseless Time)

The B-theory of time, also known as the "tenseless theory of time," offers a starkly different picture. It argues that the B-series—the ordering of events by the permanent, two-place relations of *earlier than*, *simultaneous with*, and *later than*—is all there is to the objective temporal structure of reality.6

According to B-theorists, the passage of time is not an objective feature of the world but is a subjective illusion of human consciousness.4 Reality is conceived as a static, four-dimensional spacetime manifold, often called the "block universe," in which all events—from the Big Bang to the final heat death of the cosmos—are equally real and exist on an ontological par.1 The B-theory's central analogy is between time and space.1 Just as no particular place is objectively "here," no particular moment is objectively "now." These terms are indexicals: their meaning is relative to the spatiotemporal location of the speaker.1 For the B-theorist, the assassination of Julius Caesar is not "in the past" in any absolute sense; it is simply located at a temporal coordinate that is

*earlier than* the coordinate of this sentence being written. The entire sweep of history is a fixed landscape, and our consciousness simply "travels" through it, creating the illusion of movement.

| Feature | A-Theory of Time | B-Theory of Time |
| --- | --- | --- |
| **Core Thesis** | The tensed properties of past, present, and future (A-series) are fundamental. | The tenseless relations of earlier/later than (B-series) are fundamental. |
| **Nature of Time** | Dynamic, flowing, characterized by "temporal becoming." | Static, unchanging "block," characterized by "being." |
| **Tense** | Tensed facts (e.g., "It *is* raining") are objective features of reality. | Tensed facts are subjective; all truths can be expressed in tenseless terms. |
| **Status of the Present** | Objectively real and metaphysically privileged; the locus of actuality. | Subjective and perspectival, an indexical like "here." |
| **Associated Views** | Presentism, Growing Block Universe, Moving Spotlight Theory. | Eternalism (Block Universe Theory). |
| **Primary Strength** | Aligns with human experience of temporal passage and tensed language. | Aligns with the spacetime model of modern physics (especially relativity). |
| **Primary Challenge** | Reconciling an objective, global "now" with the relativity of simultaneity. | Explaining the powerful and persistent subjective experience of the passage of time. |

### Ontological Models of Temporal Reality

The broad frameworks of the A- and B-theories give rise to more specific ontological models, each making a distinct claim about what exists. The debate between these models reveals a recurring philosophical pattern: the high metaphysical and scientific "cost" of preserving common-sense intuition. The theories most aligned with our everyday experience often face the greatest challenges from logic and physics, while the most scientifically parsimonious theories demand that we abandon our most deeply held beliefs about the nature of reality.

#### Presentism (A-Theory)

Presentism is the most intuitive and, for many, the common-sense view of time. Its core thesis is stark and simple: only present things, events, and properties exist.5 The past is no more, and the future is not yet. Ontologically speaking, Aristotle and future Martian colonies are on the same footing: they do not exist.18 This view provides a natural grounding for an "open future," a concept many see as essential for genuine free will, as it posits that future possibilities are not yet real and can be actualized by our choices.21

Despite its intuitive appeal, presentism faces formidable challenges. The first is the **Truthmaker Problem**: if past entities like Aristotle do not exist, what in reality makes the statement "Aristotle was a philosopher" true? Truth, it is often argued, must be grounded in being; if there is no being corresponding to Aristotle, the truth of the statement becomes mysterious.18 A second, related issue is the

**Problem of Cross-Temporal Relations**, particularly causation. If a cause (e.g., the striking of a match) exists in the past and its effect (the flame) exists in the present, how can the cause bring about the effect if, at the moment the effect occurs, the cause no longer exists? A relation, it seems, requires its relata to exist.24 The most severe challenge, however, comes from modern physics. Presentism requires a single, universal, and absolute "now" that slices across the entire cosmos. This notion is directly contradicted by Einstein's Special Theory of Relativity, which demonstrates that simultaneity is relative to an observer's frame of reference. There is no single, privileged "present" in the universe, a fact that seems to render presentism scientifically untenable.4

#### Eternalism / The Block Universe (B-Theory)

Eternalism is the ontological model associated with the B-theory. It holds that past, present, and future events and objects are all equally real and exist *simpliciter*.1 Reality is a four-dimensional spacetime block, and the passage of time is an illusion.6 This view is scientifically parsimonious, as it is the model of time most naturally aligned with the spacetime of Special and General Relativity.5 The relativity of simultaneity, which is a major problem for presentism, is often wielded as a positive argument

*for* eternalism. The Rietdijk-Putnam argument, for instance, uses this feature of relativity to show that events that are "future" for one observer are "present" for another, implying they must all co-exist in a single reality.5 Eternalism also neatly resolves the truthmaker and causation problems that plague presentism: past-tensed statements are made true by the past events that exist in the block, and causation is a relation between events that co-exist at different temporal locations.

The cost of this scientific and logical elegance is a radical departure from common sense. Eternalism requires us to accept that our most fundamental experience of reality—the dynamic flow of time—is a profound illusion, a feature of our psychology rather than of the world.1 Furthermore, the notion that the future is "already there" in the block universe raises deep and troubling questions about free will and determinism. If all of my future actions already exist, in what sense are my choices free?.21

#### Hybrid Models (A-Theory)

In an effort to mitigate the high costs of both pure presentism and pure eternalism, philosophers have developed hybrid theories that attempt to combine elements of each.

* **The Growing Block Universe:** This A-theory posits that the past and the present exist, but the future does not.1 Reality is a block that is continuously growing as the present moment—the leading edge of existence—adds new slices of spacetime to the already existing past.29 This model attempts to preserve the fixed reality of the past and the open, non-existent nature of the future, which aligns well with intuitions about becoming and free will.21 However, it fails to escape the central objection from physics that plagues presentism. The "growing edge" of the block must be a privileged, absolute present, a notion that relativity undermines.5 It also introduces a unique epistemological puzzle: how can I be sure that I am currently at the "growing edge" and not merely a part of the fixed, lifeless past?.29
* **The Moving Spotlight Theory:** This model is a peculiar hybrid of the A-theory and eternalism. It accepts the eternalist's block universe, agreeing that all of time—past, present, and future—exists.5 However, it adds a distinctively A-theoretic element: a metaphysical "spotlight" of presentness that moves along the timeline, illuminating one moment at a time as the objective, privileged "now".1 This theory attempts to have it both ways: a four-dimensional ontology that is compatible with physics, and a dynamic, moving present that is compatible with our experience. Critics, however, often dismiss it as the worst of both worlds. It is seen as metaphysically unparsimonious, requiring both a static block  
  *and* an additional, mysterious moving spotlight. Furthermore, it invites questions about the rate at which the spotlight moves—presumably at "one second per second"—a phrase that appears to be either trivially true or viciously circular.

| Model | Core Thesis | Ontological Status of Past | Ontological Status of Present | Ontological Status of Future | Theory Type | Key Strength | Key Weakness |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Presentism** | Only present things exist. | Does not exist. | Exists. | Does not exist. | A-Theory | Aligns with common-sense intuition of a dynamic "now" and an open future. | Incompatible with Special Relativity; faces truthmaker and causation problems. |
| **Eternalism** | Past, present, and future things all exist equally. | Exists. | Exists (but not privileged). | Exists. | B-Theory | Compatible with modern physics (spacetime); solves truthmaker/causation problems. | Fails to explain the subjective experience of passage; raises issues for free will. |
| **Growing Block Universe** | Past and present things exist; the future does not. | Exists. | Exists (as the "leading edge"). | Does not exist. | A-Theory | Combines a fixed past with an open future, aligning with intuitions of becoming. | Incompatible with Special Relativity; faces the epistemological problem of knowing one is in the present. |
| **Moving Spotlight Theory** | All times exist, but one moment is objectively "present" and this moves. | Exists (but not "actual"). | Exists (and is "actual"). | Exists (but not "actual"). | A-Theory | Attempts to reconcile the block universe with a dynamic, privileged "now." | Metaphysically unparsimonious (requires a block *and* a spotlight); defines passage circularly. |

## Part II: The Metaphysics of Persistence: Identity Through Change

Having examined the nature of the temporal landscape itself, the inquiry now turns to the objects that inhabit it. How does an object—a person, a table, a planet—remain the same entity through time while undergoing change? This is the philosophical problem of persistence, and the proposed solutions are deeply intertwined with the ontological models of time discussed in Part I. The choice between a dynamic and a static view of time has profound consequences for whether one views objects as three-dimensional entities that are wholly present at each moment or as four-dimensional entities spread across time.

### The Problem of Temporary Intrinsics

The puzzle of persistence is most sharply formulated as the "problem of temporary intrinsics," a term coined by the philosopher David Lewis.30 The problem arises from a set of three plausible but seemingly contradictory claims 31:

1. **The Persistence Condition:** Objects persist through time and through changes in their properties. For example, a person named Brian is the same individual at age one and at age twenty.
2. **The Incompatibility Condition:** Persisting objects have incompatible properties at different times. Brian at age one has the property of *being one foot tall*, while Brian at age twenty has the incompatible property of *being six feet tall*.
3. **The Law of Non-Contradiction:** No single object can have incompatible properties at the same time. Brian cannot be both one foot tall and six feet tall.

The challenge is most acute when considering *intrinsic* properties—qualities an object has in and of itself, like its shape, mass, or chemical composition—as opposed to *extrinsic* or relational properties, like its distance from another object.31 Any coherent theory of how things persist must provide a way to resolve this apparent contradiction. The two dominant rival theories, Endurantism and Perdurantism, offer fundamentally different solutions.

### Endurantism: The Wholly Present Object

Endurantism is the theory that objects are three-dimensional (3D) entities that persist by being "wholly present" at every moment of their existence.30 According to this view, which aligns with common sense, you are a complete entity right now. You have spatial parts (hands, feet, etc.), but you do not have temporal parts. The person who existed yesterday was not a mere part of you; it

*was* you, in your entirety.33

This model of persistence is the natural counterpart to the A-theories of time. If, as presentism holds, only the present moment is real, then an object can only exist as a complete entity within that present moment.30 It cannot have parts located in a non-existent past or future.

To solve the problem of temporary intrinsics, endurantists must modify how they understand properties. The most common strategy is **Relationalism**, which denies that Brian has the properties *being one foot tall* and *being six feet tall* simpliciter. Instead, he has complex, relational properties: *being one foot tall-at-t₁* and *being six feet tall-at-t₂*. Since these two relational properties are not incompatible, the contradiction dissolves.30 A more sophisticated variant,

**Adverbialism**, argues that the time-relation modifies the *instantiation* or *having* of the property, not the property itself. Thus, Brian *has-at-t₁* the intrinsic property of being one foot tall. This approach, championed by philosophers like Sally Haslanger, aims to preserve the intrinsic nature of the properties themselves.30

However, endurantism faces significant objections. Critics charge that relationalism fails to capture genuine intrinsic change, effectively turning all properties into extrinsic relations to times.31 More fundamentally, the very notion of an object being "wholly present" at a given time seems to presuppose the kind of absolute, universal "now" that Special Relativity denies, making the view difficult to reconcile with modern physics.33

### Perdurantism: The Four-Dimensional Spacetime Worm

Perdurantism, also known as four-dimensionalism (4D-ism), offers a radically different solution. It is the theory that objects are four-dimensional (4D) entities that are extended in time just as they are in space.16 An object persists by having different *temporal parts* (or "stages") at different moments in time.32 On this view, an object is a "spacetime worm" that stretches from its beginning to its end.34 The thing sitting in your chair right now is not the whole you, but merely your current temporal part.

This view is the natural partner to the B-theory of time and eternalism. If all of time is equally real in a block universe, then it is natural to think of an object's entire history as a real, extended entity within that block.30

Perdurantism provides an elegant solution to the problem of temporary intrinsics. The 4D spacetime worm that is Brian does not, as a whole, have incompatible properties. Rather, its distinct temporal parts have them. The *t₁-temporal-part* of Brian has the property of being one foot tall, while the *t₂-temporal-part* has the property of being six feet tall. There is no contradiction, any more than there is a contradiction in a road being paved in one spatial part and gravel in another.31 Change is simply the variation of properties across different temporal parts of a 4D object.36

Variants of this view include **Stage Theory**, which holds that an object is identical to a single instantaneous stage, and it persists by having "counterpart" stages at other times to which it is appropriately related.36

**Exdurantism** is similar, viewing an object as a sequence of stages whose identity is maintained by a similarity relation between them.36

The primary objection to perdurantism is its profound counter-intuitiveness. We tend to think of ourselves as wholly present, not as vast spacetime worms of which we are only experiencing an infinitesimal slice.33 The view also generates difficult puzzles, such as the "problem of too many thinkers," which asks why both the person-worm and the organism-worm that constitutes it are not both conscious entities.33

The deep connection between these two debates—the ontology of time and the nature of persistence—reveals a hidden architecture within metaphysics. A commitment to a dynamic, A-theoretic view of time, like presentism, logically pushes one toward an endurantist account of objects as wholly present 3D beings. Conversely, a commitment to a static, B-theoretic block universe strongly suggests a perdurantist account of objects as 4D spacetime worms. These are not isolated positions but rather form coherent, mutually supporting philosophical "packages."

| Feature | Endurantism | Perdurantism |
| --- | --- | --- |
| **Core Thesis** | Objects are 3D and persist by being "wholly present" at each moment. | Objects are 4D "spacetime worms" and persist by having temporal parts at different times. |
| **Object Dimensionality** | Three-dimensional (3D). | Four-dimensional (4D). |
| **Composition** | Composed of spatial parts only. | Composed of both spatial and temporal parts. |
| **Existence in Time** | Is "wholly present" at each moment of its existence. | Is only partially present at any given moment; exists by being spread out across time. |
| **Solution to Change** | Properties are relativized to times (e.g., Brian is *tall-at-t₂*). | Different temporal parts possess the incompatible properties (Brian's *t₂-part* is tall). |
| **Associated Theory of Time** | Typically A-Theory (especially Presentism). | Typically B-Theory (Eternalism). |

## Part III: A Historical Genealogy of Temporal Thought

The contemporary debates in temporal metaphysics, while framed in modern terminology, are the inheritors of a philosophical conversation that stretches back to the dawn of Western thought. The fundamental tensions between dynamic becoming and static being, and between an objective, cosmic time and a subjective, psychological time, have been framed and reframed by successive generations of thinkers. Understanding this historical lineage is crucial for appreciating the depth and persistence of these philosophical problems.

### The Ancient Greek Conception: Flux vs. Stasis

The origins of temporal metaphysics lie in the speculations of the Presocratic philosophers of ancient Greece, particularly in the starkly opposed worldviews of Heraclitus and Parmenides.

* **Heraclitus (c. 535–475 BCE): The Philosophy of Flux:** Heraclitus of Ephesus is the ancient champion of a dynamic, ever-changing reality. His philosophy is encapsulated in the famous fragments "Everything flows" (*panta rhei*) and "No man ever steps in the same river twice, for it's not the same river and he's not the same man".10 For Heraclitus, change is not an incidental feature of the world but its most fundamental principle. Reality is a process of ceaseless "becoming" rather than a state of static "being".37 This vision of a world in constant flux, where stability is an illusion, stands as the clear historical antecedent to modern A-theories of time, which place dynamic passage and becoming at the heart of reality.8
* **Parmenides (c. 515–450 BCE): The Philosophy of Stasis:** In direct opposition to Heraclitus, Parmenides of Elea employed rigorous deductive logic to argue for a reality that is fundamentally static and unchanging. In his poem "On Nature," he presents an argument that change is a logical impossibility. Change requires something to come from "what is not" (non-being), but one cannot think or speak of non-being; it is an incoherent concept.8 From this premise, Parmenides concluded that change, motion, and plurality are all illusions of the senses. True Being must be one, indivisible, eternal, and motionless.38 This radical vision of a timeless, unchanging reality is the earliest formulation of the static conception of the universe, a direct precursor to the B-theory's block universe.8

This foundational disagreement between Heraclitus and Parmenides set the terms for much of subsequent Western metaphysics. Plato, for instance, attempted a grand synthesis of these opposing views through his Theory of Forms, positing a timeless, unchanging (Parmenidean) realm of perfect Forms and a transient, changing (Heraclitean) physical world that is merely a shadow or copy of that higher reality.39

### Aristotle on Time, Motion, and the Soul

Aristotle rejected Plato's two-world metaphysics and sought to ground his account of time firmly in the observable, physical world. In his *Physics*, he undertakes a systematic analysis of time's nature, concluding that while it is intimately related to change, it is not identical to it. He argues that time is something *dependent* on change.41

His formal definition has been the subject of immense scrutiny for over two millennia: time is "**a number of motion with respect to the before and after**".42 Modern scholarship, particularly the work of Ursula Coope, suggests that Aristotle's use of "number" (

*arithmos*) should be understood not as a measure but as that which is *countable*. Time, on this reading, is the formal order of "before" and "after" that a mind discerns in a continuous motion. It is the structure that makes change countable.42 For Aristotle, time is continuous, just as motion and magnitude are; between any two instants, or "nows," there is always an interval of time, not another instant immediately adjacent.42

Perhaps the most perplexing element of Aristotle's theory is his assertion that time's existence depends on the soul (*psyche*). Because time is a "number" in the sense of something counted, it requires a counter. If there were no soul capable of counting, there would be no number, and therefore no time.41 This introduces a fascinating mind-dependent aspect to his theory. While change itself can occur without a soul to perceive it,

*time* as the countable order of that change cannot.

### Augustine and the Subjective Present

With St. Augustine of Hippo, the conceptualization of time takes a radical turn inward, from the cosmic and physical to the theological and psychological. In his *Confessions* and *The City of God*, Augustine breaks decisively with the cyclical views of time common in ancient pagan philosophy. He introduces a linear and teleological conception: time is a creature of God, brought into being *ex nihilo* along with the universe.45 It has a definite beginning (Creation) and moves toward a definite end (the Final Judgment).45 It is therefore meaningless to ask what God was doing "before" creation, because there was no time "before" time was created.46

Augustine draws a sharp distinction between this created, temporal order and God's eternity. God does not exist *in* time; He exists in a timeless, unchanging "ever-present eternity" (later termed the *nunc stans* or "standing now"), from which vantage point all moments of created time—past, present, and future—are simultaneously present.45

When he turns to the human experience of time, Augustine famously confesses his perplexity: "What then is time? If no one asks me, I know; if I wish to explain it to a questioner, I do not know".39 His solution is to locate the measure and experience of time's passage within the human mind or soul. He argues that the past (as that which is no more) and the future (as that which is not yet) do not exist objectively. Rather, there are three "presents" within the soul: the

**present of things past** (memory), the **present of things present** (perception), and the **present of things future** (expectation).48 Time, for Augustine, is a "

*distentio animi*," a "distention of the soul." This profound subjectivism marks a pivotal shift in the history of temporal thought.

### McTaggart's Paradox and the Unreality of Time

The stage for the contemporary debate was set by J.M.E. McTaggart's powerful and paradoxical argument at the beginning of the 20th century. His work represents a return from Augustine's psychological focus to an analysis of the external, logical structure of time. His argument, intended to prove time's unreality, can be reconstructed in four steps 11:

1. **The Two Series:** McTaggart first distinguishes the two ways events can be ordered. The **A-series** orders events according to the tensed, changing properties of being past, present, or future. The **B-series** orders events according to the tenseless, permanent relations of being earlier than or later than.11
2. **The Necessity of the A-Series for Change:** McTaggart argues that the B-series alone cannot account for genuine change. The fact that the Battle of Hastings is earlier than the Battle of Waterloo is a permanent, unchanging relation. For change to be real, events must undergo a genuine alteration, which he identifies as the movement of an event along the A-series—for example, from being in the future to being in the present.11 Thus, he concludes, for time to be real, the A-series must be real.
3. **The Contradiction in the A-Series:** This is the crucial step. McTaggart argues that the A-series is inherently contradictory. The properties 'past', 'present', and 'future' are mutually exclusive. Yet, every single event has all three of them. The death of Queen Anne is past, was present, and was future.11 The obvious reply is that an event has these properties  
   *successively*, not simultaneously. McTaggart anticipates this and argues it leads to a vicious circle. To explain that an event is present, then past, one must say it is present *at a present moment*, was future *at a past moment*, and will be past *at a future moment*. This explanation of the first-order A-series properties requires invoking a second-order A-series of moments, which itself would require a third-order series to explain, and so on *ad infinitum*.11
4. **Conclusion: Time is Unreal:** Since time requires the A-series for change, and the A-series is logically contradictory, McTaggart concludes that time itself cannot be a feature of reality. It is an illusion.11

The historical progression of these ideas reveals a fascinating pendulum swing. The Greek conception of time was largely external and cosmic, tied to motion and the structure of the universe. Augustine initiated a radical shift inward, locating time's essence in the subjective experience of the soul. McTaggart and the subsequent rise of physics-informed philosophy swung the pendulum back outward, grounding the debate in the logical structure of temporal predicates and the objective, physical structure of spacetime. This dialectic between time as an external feature of the world and time as an internal feature of the mind remains a central, recurring theme in the ongoing philosophical investigation.

## Part IV: The Dialogue with Modern Physics

In the 20th century, the abstract debates of temporal metaphysics were thrust into a direct and challenging dialogue with empirical science. The theories of Albert Einstein, followed by the development of quantum mechanics, did not "solve" the philosophical problems of time but rather sharpened them, providing powerful new arguments and paradoxes that have reshaped the entire field. Physics has provided a new language—that of spacetime, simultaneity, and quantum indeterminacy—through which to interrogate time's ultimate nature.

### The Relativistic Revolution: Spacetime and Simultaneity

Einstein's theories of relativity fundamentally altered our understanding of space and time, with profound implications for metaphysics.

* **Special Relativity (SR) and the Demise of the Absolute Present:** The most significant metaphysical consequence of Special Relativity (1905) is the **relativity of simultaneity**.5 In the older Newtonian picture, time was absolute, flowing at the same rate for all observers, and there was a single, universal "now" that encompassed the entire universe. SR dismantled this picture. It demonstrated that whether two spatially separated events occur "at the same time" is not an objective fact but depends on the observer's inertial frame of reference.55 An observer on a fast-moving spaceship might judge two events to be simultaneous, while an observer on Earth judges one to have occurred before the other.5  
  This result poses a devastating challenge to A-theories like Presentism and the Growing Block theory, both of which are built on the assumption of a unique, global, and absolute present moment.4 If there is no single "now," then the presentist claim that "only present things exist" becomes ambiguous or incoherent. Which "present" is the real one? The relativity of simultaneity is often used to construct a direct argument for eternalism, known as the  
  **Rietdijk-Putnam argument**. This thought experiment shows that because different observers have different planes of simultaneity, the set of "real" events for one observer includes events that are in the "future" for another. If reality is not observer-dependent, the argument concludes, then all events—past, present, and future for all observers—must be equally real.5
* **General Relativity (GR) and the "Block Universe":** Einstein's General Theory of Relativity (1915) deepened this revolution by treating spacetime not as a passive background for events but as a dynamic, four-dimensional substance or manifold.7 Mass and energy curve spacetime, and this curvature is what we experience as gravity. This conception of a unified, four-dimensional spacetime provides strong physical grounding for the B-theoretic "block universe" model.6 In this picture, the universe's entire history is laid out as a geometric object. Time is simply one of the dimensions of this block, and the distinction between space and time becomes less fundamental.61

### Quantum Quandaries and the Arrow of Time

While relativity seems to point decisively toward a static, B-theoretic block universe, the other great pillar of modern physics, quantum mechanics (QM), introduces concepts that appear to pull in the opposite direction. This has created a deep tension within the "scientific image" of time, meaning that science has not provided a single, unified answer to the metaphysicians, but rather a more complex and contradictory set of problems.

* **Quantum Mechanics and Indeterminacy:** In its standard interpretations, QM describes the world as fundamentally probabilistic and indeterminate.61 A quantum system, before measurement, exists in a "superposition" of multiple possible states. The act of measurement causes the system's "wavefunction to collapse," and one of these possibilities becomes actual.4 This process of collapse is often seen as a moment of genuine, objective "becoming"—a transition from potentiality to actuality. This appears to support an A-theoretic view of an open, indeterminate future, in stark contrast to the fixed, "already there" future of the relativistic block universe.5 The apparent conflict between the static, deterministic picture of GR and the dynamic, indeterministic picture of QM is one of the greatest unsolved problems in physics, leaving the metaphysical status of becoming profoundly ambiguous.61
* **The Arrow of Time:** Another deep puzzle is the origin of the "arrow of time." The fundamental laws of physics (with very minor exceptions in particle physics) are time-reversal symmetric; they would work just as well if time ran backward. Yet, the macroscopic world we experience is manifestly asymmetric in time: entropy always increases (the Second Law of Thermodynamics), eggs break but do not un-break, we remember the past but not the future, and we believe causes always precede their effects.40 Metaphysicians and physicists debate the status of this arrow. Is the thermodynamic arrow of time—the tendency of systems to move toward greater disorder—the fundamental source of time's directionality? Or is it merely a statistical consequence of the universe's low-entropy initial state, an indicator of a more fundamental metaphysical passage of time that is truly objective?.4 This question remains a frontier of both physics and philosophy.

The incomplete revolution of modern physics has thus not settled the ancient debate between Heraclitus and Parmenides. Instead, it has internalized it. General Relativity provides the strongest scientific argument for a Parmenidean block universe where change is, in a sense, an illusion of perspective. Standard quantum mechanics, conversely, seems to describe a fundamentally Heraclitean world of flux and becoming. The philosopher of time cannot, therefore, simply "read off" the nature of time from science. Instead, one must engage in the difficult interpretive work of weighing these conflicting physical pictures and exploring how they might be reconciled, a task that places metaphysics at the very heart of our quest to understand physical reality.

## Part V: The Wider Implications of Temporal Metaphysics

The abstract and often counter-intuitive debates within temporal metaphysics are not mere intellectual exercises. The positions one takes on the nature of time and persistence have profound "ripple effects," shaping our understanding of some of the most fundamental aspects of the human condition: who we are, how we act in the world, and how the world works. This final part explores the connections between temporal metaphysics and the philosophical problems of personal identity, causation, and free will.

### Time and Personal Identity

The question of personal identity over time—what makes a person at one time the same person as at a later time?—is inextricably linked to the metaphysics of persistence.64 The choice between endurantism and perdurantism provides two radically different ways of framing the problem.

* **Endurantism and Identity:** For the endurantist, a person is a 3D object that is wholly present at every moment of its existence. Personal identity is therefore a matter of strict, one-to-one numerical identity over time. The person who exists today is the very same entity that existed yesterday.65 This view aligns naturally with theories of personal identity that locate persistence in an enduring, non-physical soul or in the continuous existence of a single, unified body or brain.65
* **Perdurantism and Identity:** For the perdurantist, a person is a 4D spacetime worm. The question of identity is thus reframed: what makes two distinct temporal parts (person-stages) parts of one and the same 4D person?.66 Identity is not a strict relation between stages but a matter of their being unified into a larger whole. This perspective is often seen as more flexible in handling difficult puzzle cases. For example, in a "fission" case where a person's brain is split and transplanted into two new bodies, the perdurantist can say that the original spacetime worm has two branching future paths.33 This view also fits well with psychological continuity theories of identity, which state that what makes person-stage  
  P1​ and person-stage P2​ parts of the same person is the existence of overlapping chains of psychological connections (e.g., memories, intentions, character traits) between them.64

### Time and Causation

The relationship between cause and effect is fundamental to our understanding of the world, but different temporal ontologies offer very different accounts of how it can operate.

* **The Presentist Challenge:** As noted previously, presentism faces a severe challenge in accounting for causation across time. The standard model of causation involves a cause, C, at time t1​ bringing about an effect, E, at a later time t2​. For the presentist, at t2​, the cause C no longer exists. This raises the question: How can a non-existent entity bring about a real effect? A causal relation seems to require the existence of both of its relata.24 Presentists have proposed various solutions, such as positing that past events leave "causal traces" in the present, or that causation is a relation between abstract states of affairs (e.g., "the fact that C occurred causes E") rather than events themselves. However, these solutions are often criticized as being complex and counter-intuitive, fragmenting what seems to be a single causal process into multiple, disconnected parts.18
* **Eternalism and Causation:** Eternalism avoids this problem entirely. Since the cause C at t1​ and the effect E at t2​ both co-exist as real events within the four-dimensional block, a direct causal relation can hold between them. However, this raises its own set of questions. In a static, unchanging block universe, what does it mean for one event to "bring about" another? For many eternalists, causation is understood in a Humean sense, as simply a pattern of constant conjunction or lawful regularity that is mapped onto the static geometry of spacetime.

### Time and Free Will

Perhaps the most significant implication of temporal metaphysics for the human condition concerns the nature of free will. The structure of time seems to dictate the very possibility and nature of our agency.

* **The Core Conflict: Eternalism and Fatalism:** The B-theory's block universe, in which the future is as ontologically real and "fixed" as the past, appears to pose a direct threat to free will.21 If all of one's future actions already exist within the spacetime block, in what sense can one be said to choose them freely? This view seems to lead to a form of fatalism: the future is set, and our deliberations and actions make no difference to what will ultimately happen.21
* **Compatibilist Responses:** Many philosophers argue that eternalism and free will are, in fact, compatible. This position, known as **compatibilism**, requires a careful distinction between eternalism and causal determinism. Eternalism is an ontological thesis about what exists, whereas determinism is a causal thesis that every event is necessitated by prior causes and the laws of nature.69 It is logically possible for the block universe to be eternal but not deterministic. More importantly, compatibilists redefine free will. They argue that a "free" action is not one that is uncaused, but one that is caused in the right way—specifically, by the agent's own beliefs, desires, and deliberations, free from external coercion or constraint.71 From this perspective, even if your choice is a fixed feature of the block universe, it is still  
  *your* choice, flowing from your character and reasoning. The fact that it exists timelessly does not negate the fact that, from your temporal perspective, you are the one making it.73
* **A-Theories and Libertarian Free Will:** In contrast, A-theories—particularly Presentism and the Growing Block theory—provide a much more natural framework for **libertarianism**, the view that free will requires genuine, open alternative possibilities. By positing that the future is not yet real, these theories allow for a future that is genuinely "open" and can be shaped by the choices of free agents.21 For the libertarian, the ability to "do otherwise" is essential for freedom, and this is only possible if the future is not a fixed, existing reality.

## Conclusion

The metaphysical inquiry into the nature of time reveals a landscape of profound philosophical division. The central conflict, inherited from the ancient Greeks, persists to this day: is reality a dynamic process of "becoming," as our manifest image of the world suggests, or is it a static state of "being," as the scientific image derived from physics seems to imply? This fundamental question fractures the field into competing theories, each offering a distinct architecture for reality. The A-theory champions a privileged, moving present, giving rise to ontological models like Presentism and the Growing Block universe. The B-theory counters with a static, four-dimensional block universe, or Eternalism, in which the flow of time is a subjective illusion.

These ontological commitments, in turn, dictate competing solutions to the puzzle of how objects persist through change. A-theorists are naturally led to Endurantism, the view of wholly present, three-dimensional objects, while B-theorists are drawn to Perdurantism, the view of four-dimensional spacetime worms composed of temporal parts. The choice between these positions is not arbitrary but reflects a commitment to a larger, coherent metaphysical system, a choice often framed as a trade-off between fidelity to common-sense intuition and consistency with the findings of modern science.

Yet, the dialogue with physics has not yielded a final verdict. Instead, it has deepened the mystery. While Einstein's theory of relativity provides powerful support for the static, B-theoretic block universe by dismantling the notion of an absolute present, the standard interpretation of quantum mechanics seems to reintroduce a fundamental, A-theoretic "becoming" at the heart of the physical world. This unresolved tension within our best scientific theories means that science has not superseded metaphysics but has made the philosopher's task of interpretation and synthesis more critical than ever.

The stakes of these abstract debates are immense. Our conception of time's structure shapes our understanding of personal identity, the nature of causation, and the possibility of human freedom. Whether we are enduring souls, perduring spacetime worms, agents in an open future, or characters in a story already written depends on the answers to these fundamental questions. The inquiry into temporal metaphysics, therefore, is not a peripheral academic game; it is a central part of the enduring human endeavor to comprehend the fundamental nature of reality and our place within it. The questions remain open, the debates continue, and the architecture of reality remains a subject of profound and necessary investigation.

#### Works cited

1. Time, metaphysics of - Routledge Encyclopedia of Philosophy, accessed September 2, 2025, <https://www.rep.routledge.com/articles/thematic/time-metaphysics-of/v-3>
2. Metaphysics - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Metaphysics>
3. Metaphysics | Definition, Problems, Theories, History, & Criticism | Britannica, accessed September 2, 2025, <https://www.britannica.com/topic/metaphysics>
4. A vs B Theory of Time in science? - The BioLogos Forum, accessed September 2, 2025, <https://discourse.biologos.org/t/a-vs-b-theory-of-time-in-science/51503>
5. Eternalism | Internet Encyclopedia of Philosophy, accessed September 2, 2025, <https://iep.utm.edu/eternalism/>
6. What's the point of making a distinction between A-theory and B-theory of time? : r/askphilosophy - Reddit, accessed September 2, 2025, <https://www.reddit.com/r/askphilosophy/comments/ur64rg/whats_the_point_of_making_a_distinction_between/>
7. Eternalism (philosophy of time) - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Eternalism_(philosophy_of_time)>
8. Commentary: Physical time within human time - PMC, accessed September 2, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC10284590/>
9. B-theory of time - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/B-theory_of_time>
10. Heraclitus v. Parmenides – Flux v. Stasis - Adam Smith Institute, accessed September 2, 2025, <https://www.adamsmith.org/blog/philosophy/heraclitus-v-parmenides-flux-v-stasis>
11. The Unreality of Time - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/The_Unreality_of_Time>
12. McTaggart's Paradox - Notre Dame Philosophical Reviews, accessed September 2, 2025, <https://ndpr.nd.edu/reviews/mctaggarts-paradox/>
13. A series and B series - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/A_series_and_B_series>
14. McTaggart's proof of the unreality of time, accessed September 2, 2025, <https://www3.nd.edu/~jspeaks/courses/2011-12/20229/handouts/4%20McTaggart.pdf>
15. TIL of the 'McTaggart Paradox': a logical argument that our perception of time is an illusion- because it fundamentally contradicts itself- but also necessary to view events as moving together from past to future. : r/todayilearned - Reddit, accessed September 2, 2025, <https://www.reddit.com/r/todayilearned/comments/1gt3d8z/til_of_the_mctaggart_paradox_a_logical_argument/>
16. Temporal Parts1 - Ted Sider, accessed September 2, 2025, <https://tedsider.org/papers/temporal_parts.pdf>
17. relative merits of presentism, eternalism and the growing block universe [closed], accessed September 2, 2025, <https://philosophy.stackexchange.com/questions/1683/relative-merits-of-presentism-eternalism-and-the-growing-block-universe>
18. Presentism and Causation – Open Future - Alan Rhoda, accessed September 2, 2025, <http://alanrhoda.net/wordpress/2006/04/presentism-and-causation/>
19. Presentism - Stanford Encyclopedia of Philosophy, accessed September 2, 2025, <https://plato.stanford.edu/entries/presentism/>
20. How To Understand The Debate Over Presentism And Eternalism - Digital Commons @ Wayne State, accessed September 2, 2025, <https://digitalcommons.wayne.edu/cgi/viewcontent.cgi?article=2801&context=oa_dissertations>
21. Is the 'Growing Block Theory of Time' the best or correct one in Philosophy of Time? : r/askphilosophy - Reddit, accessed September 2, 2025, <https://www.reddit.com/r/askphilosophy/comments/lwk2v5/is_the_growing_block_theory_of_time_the_best_or/>
22. Presentism and Eternalism: A Substantive Difference? - Maverick Philosopher - TypePad, accessed September 2, 2025, <https://maverickphilosopher.typepad.com/maverick_philosopher/2020/05/presentism-and-eternalism-a-substantive-difference.html>
23. Philosophical presentism - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Philosophical_presentism>
24. Causation and presentism - Alexander Pruss's Blog, accessed September 2, 2025, <http://alexanderpruss.blogspot.com/2009/06/causation-and-presentism.html>
25. Time, metaphysics of - Routledge Encyclopedia of Philosophy, accessed September 2, 2025, <https://www.rep.routledge.com/articles/thematic/time-metaphysics-of/v-2>
26. Being and Becoming in Modern Physics (Stanford Encyclopedia of ..., accessed September 2, 2025, <https://plato.stanford.edu/entries/spacetime-bebecome/>
27. Free Will, the 'Block Universe', and Eternalism - Philosophical Investigations, accessed September 2, 2025, <http://www.philosophical-investigations.org/2022/11/free-will-block-universe-and-eternalism.html>
28. What is presentism & eternalism & the growing and the shrinking block theories? - Reddit, accessed September 2, 2025, <https://www.reddit.com/r/askphilosophy/comments/16oadxz/what_is_presentism_eternalism_the_growing_and_the/>
29. Growing block universe - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Growing_block_universe>
30. Endurantism - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Endurantism>
31. Two Accounts of a Change in Properties: Perdurantism and Endurantism - Sapere Aude, accessed September 2, 2025, <https://sapereaude.voices.wooster.edu/2018/10/16/two-accounts-of-a-change-in-properties-perdurantism-and-endurantism/>
32. Temporal parts - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Temporal_parts>
33. Temporal Parts - Stanford Encyclopedia of Philosophy, accessed September 2, 2025, <https://plato.stanford.edu/entries/temporal-parts/>
34. Redalyc.IS ENDURANTISM REALLY MORE PLAUSIBLE THAN PERDURANTISM FROM A COMMON-SENSE PERSPECTIVE?, accessed September 2, 2025, <https://www.redalyc.org/pdf/2090/209054628004.pdf>
35. ENDURANTISM, PERDURANTISM AND SPECIAL RELATIVITY - departments.bloomu.edu, accessed September 2, 2025, <http://departments.bloomu.edu/philosophy/pages/content/hales/articlepdf/endurantism.pdf>
36. Perdurantism - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Perdurantism>
37. Heraclitus - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Heraclitus>
38. HERACLITUS AND PARMENIDES - University at Albany, accessed September 2, 2025, <https://www.albany.edu/~rn774/fall96/philos3.html>
39. A Journey Through Western Metaphysics: Key Philosophers and Their Theories, accessed September 2, 2025, <https://philosophy.institute/metaphysics/journey-western-metaphysics-key-philosophers-theories/>
40. There are basically three theories of time: 1) realist, 2) relational and 3) idealist. - University of Oregon, accessed September 2, 2025, <https://pages.uoregon.edu/jschombe/cosmo/lectures/lec09.html>
41. Time for Aristotle: Physics IV. 10-14 | Oxford Academic, accessed September 2, 2025, <https://academic.oup.com/book/27528>
42. Time for Aristotle | Reviews | Notre Dame Philosophical Reviews ..., accessed September 2, 2025, <https://ndpr.nd.edu/reviews/time-for-aristotle/>
43. ARISTOTLE ON TIME - Assets - Cambridge University Press, accessed September 2, 2025, <https://assets.cambridge.org/97811076/78781/frontmatter/9781107678781_frontmatter.pdf>
44. ndpr.nd.edu, accessed September 2, 2025, <https://ndpr.nd.edu/reviews/time-for-aristotle/#:~:text=Aristotle%20is%20committed%20to%20the,believes%20that%20time%20is%20continuous.>
45. The City of God, Understanding Time and History - School of Mary, accessed September 2, 2025, <https://schoolofmary.org/2024/07/22/the-city-of-god-understanding-time-and-history/>
46. St. Augustine's Relativistic Theory of Time | Church Life Journal ..., accessed September 2, 2025, <https://churchlifejournal.nd.edu/articles/augustines-push-against-the-limits-of-time/>
47. St. Augustine on Time - International Journal of Humanities and Social Science, accessed September 2, 2025, <https://www.ijhssnet.com/journals/Vol_6_No_6_June_2016/4.pdf>
48. Augustine on Time: Human Time, Divine Eternity, and Why the Former is Really the Latter, accessed September 2, 2025, <https://www.csueastbay.edu/philosophy/reflections/2009/contents/mark-selz.html>
49. Saint Augustine of Hippo: A Theologian for Our Time - Magis Center, accessed September 2, 2025, <https://www.magiscenter.com/blog/saint-augustine-of-hippo-a-theologian-for-our-time>
50. St. Augustine's Conception of Time, accessed September 2, 2025, <https://grattoncourses.files.wordpress.com/2013/08/augustine-on-time.pdf>
51. Time - Cambridge University Press & Assessment, accessed September 2, 2025, <https://www.cambridge.org/core/elements/time/2C7E966C9E92E0231A6D70A20C3D01FE>
52. J. M. E. McTaggart - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/J._M._E._McTaggart>
53. (PDF) Understanding McTaggart's Paradox - ResearchGate, accessed September 2, 2025, <https://www.researchgate.net/publication/233381726_Understanding_McTaggart's_Paradox>
54. What are some philosophical implications of relativity? - Philosophy Stack Exchange, accessed September 2, 2025, <https://philosophy.stackexchange.com/questions/30271/what-are-some-philosophical-implications-of-relativity>
55. www.amnh.org, accessed September 2, 2025, <https://www.amnh.org/exhibitions/einstein/time/a-matter-of-time#:~:text=Time%20seems%20to%20follow%20a,on%20your%20frame%20of%20reference.>
56. Einstein: Time Is Relative (to Your Frame of Reference) | AMNH, accessed September 2, 2025, <https://www.amnh.org/exhibitions/einstein/time/a-matter-of-time>
57. Sabine Hossenfelder: Backreaction: The Block Universe, accessed September 2, 2025, <http://backreaction.blogspot.com/2008/05/block-universe.html>
58. The Hole Argument - Stanford Encyclopedia of Philosophy, accessed September 2, 2025, <https://seop.illc.uva.nl/entries/spacetime-holearg/>
59. Theory of relativity - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Theory_of_relativity>
60. Relativity of Simultaneity and Eternalism: In Defense of the Block Universe - Elizabethtown College Faculty Blogs, accessed September 2, 2025, <https://facultysites.etown.edu/silbermd/files/2011/11/RoSandBlockworld.pdf>
61. "The Metaphysics of Time Within Physics" by Mohamed Ahmed - AUC Knowledge Fountain - The American University in Cairo, accessed September 2, 2025, <https://fount.aucegypt.edu/etds/2441/>
62. Quantum Physics Prefers the Present: A Temporal Ontology Grounded in Measurement, accessed September 2, 2025, <https://sciety.org/articles/activity/10.31234/osf.io/6ac3h_v2>
63. Philosophy of space and time - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Philosophy_of_space_and_time>
64. Personal Identity | Internet Encyclopedia of Philosophy, accessed September 2, 2025, <https://iep.utm.edu/person-i/>
65. Does endurantism or perdurantism somehow defend the body theory to personal identity ? : r/askphilosophy - Reddit, accessed September 2, 2025, <https://www.reddit.com/r/askphilosophy/comments/tgleld/does_endurantism_or_perdurantism_somehow_defend/>
66. Does perdurantism contradict personal identity over time : r/askphilosophy - Reddit, accessed September 2, 2025, <https://www.reddit.com/r/askphilosophy/comments/10821sb/does_perdurantism_contradict_personal_identity/>
67. More on Presentism and Causality – Open Future - Alan Rhoda, accessed September 2, 2025, <http://alanrhoda.net/wordpress/2006/04/more-on-presentism-and-causality/>
68. Eternalism and Free Will : r/Metaphysics - Reddit, accessed September 2, 2025, <https://www.reddit.com/r/Metaphysics/comments/1gafmo6/eternalism_and_free_will/>
69. Is the B-theory of time compatible with libertarian free will? - Philosophy Stack Exchange, accessed September 2, 2025, <https://philosophy.stackexchange.com/questions/30260/is-the-b-theory-of-time-compatible-with-libertarian-free-will>
70. Compatibilism - Stanford Encyclopedia of Philosophy, accessed September 2, 2025, <https://plato.stanford.edu/entries/compatibilism/>
71. Compatibilism - Wikipedia, accessed September 2, 2025, <https://en.wikipedia.org/wiki/Compatibilism>
72. Compatibilism: Philosophy's Favorite Answer to the Free Will Debate, accessed September 2, 2025, <https://philosophybreak.com/articles/compatibilism-philosophys-favorite-answer-to-the-free-will-debate/>
73. Compatibilist free Will and Eternalism ( Block universe) : r/freewill - Reddit, accessed September 2, 2025, <https://www.reddit.com/r/freewill/comments/1i67296/compatibilist_free_will_and_eternalism_block/>