Truth and Goodness as Isomorphic Navigation

How T4 Dissolves the Fact/Value Dichotomy

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Abstract:

This paper demonstrates that the traditional distinction between descriptive facts ("is") and prescriptive values ("ought") collapses under the account of agency developed in the Neo-Pre-Platonic Naturalism (NPN) framework. I argue that epistemic truth and ethical goodness are not merely correlated but **necessarily isomorphic**—to deny their identity is to embrace a metaphysical contradiction that would make life impossible. Central to this argument is the concept of ***Hormē*** (Ὁρμή): the constitutive drive for life to survive the lawful structure of reality (*Logos*) by changing causal flow to aid survival and flourish. Drawing on this foundation, I formalize:

> **Theorem T4: Ethical Isomorphism**: epistemic error and ethical vice are functionally identical states of misalignment between an agent's models/actions and the lawful constraints of reality (the *Logos*).

After deriving T4 from T6 (the Life-Agency Isomorphism) and the First Principles of NPN, I show how this isomorphism: (1) dissolves Hume's is/ought gap by showing that for living agents, to *be* is to *ought* to navigate successfully, (2) provides objective but relational ethical standards grounded in constitutive striving rather than social convention or divine command, (3) explains moral disagreement as navigational disagreement about the structure of reality, and (4) unifies virtue epistemology with virtue ethics under a single navigational paradigm.[1] The result is a fully naturalistic ethics that is continuous with biology, physics, and epistemology, resolving long-standing metaethical puzzles while providing practical guidance for ethical deliberation.

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[1]Eli Adam Deutscher, *Neo-Pre-Platonic Naturalism: A First-Principles Framework for Reality, Mind, and Knowledge* (Neo-Pre-Platonic Press, 2025), See Appendix B for the complete list of First Principles and their justifications.

Keywords: ethical isomorphism, is/ought problem, naturalistic ethics, navigation, *Hormē*, *Logos*, virtue, metaethics, epistemology, moral realism, Hume, Neo-Pre-Platonic Naturalism

1   Introduction: The Perennial Divide and Its Dissolution

For three centuries, the fact/value dichotomy has stood as an apparently unbreachable wall in Western philosophy. On one side: the objective, descriptive world of *what is*—the domain of science, physics, and empirical truth. On the other: the subjective, prescriptive world of *what ought to be*—the domain of ethics, value, and moral obligation. This division has structured not only academic philosophy but our very conception of reality, creating what philosopher Hilary Putnam called "the fact/value dichotomy" that has "enslaved" contemporary thought.[2]

The consequences of this divide are profound and practical. It suggests that science can tell us nothing about values, that ethics is ultimately arbitrary or subjective, and that our moral lives exist in a separate realm from the physical universe we inhabit. This schism manifests in education as the separation between STEM and humanities,[3] in public discourse as the irreconcilable conflict between "objective facts" and "subjective values,"[4] and in personal life as the felt disconnect between what we know to be true and what we feel we should do.

This paper argues that this entire framework is based on a fundamental misunderstanding of what both facts and values *are*—or more precisely, what they are *for*. Drawing on the Neo-Pre-Platonic Naturalism (NPN) framework, I demonstrate that epistemic truth and ethical goodness are not merely related but **necessarily isomorphic**. They are two perspectives on the same underlying phenomenon: successful **navigation** of reality by finite agents constitutively driven by **_Hormē_**.

Hormē (Ορμή) is the constitutive drive for life to survive the lawful structure of reality (*Logos*) by changing causal flow to aid survival and flourish. It is the engine of life itself and scale-invariant. In humans, it is expressed through the layered faculties of *Orexis*, *Thymos*, *Logistikon*, and the *Nous*—the stratified architecture of the *Psyche* described in the NPN system.[5]

From this perspective, living agents are not passive observers of a value-free world; they are **active navigators** whose very existence depends on accurate mapping (truth) and effective wayfinding (goodness). To be alive is to be engaged in this dual activity, and the distinction between "is" and "ought" collapses when we recognize that both serve the same constitutive end: the expression of *Hormē* within the constraints of the *Logos*.

The navigation metaphor is not incidental but **constitutive**. It reframes the classical metaethical puzzles—Hume's is/ought gap, Moore's Open Question, the problem of moral motivation and

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[2]Hilary Putnam, "The Collapse of the Fact/Value Dichotomy and Other Essays," *Harvard University Press*, 2002.

[3]C. P. Snow, *The Two Cultures and the Scientific Revolution* (Cambridge University Press, 1959).

[4]Alasdair MacIntyre, *After Virtue: A Study in Moral Theory* (University of Notre Dame Press, 1981).

[5]For a detailed exposition of the layered *Psyche*, see Deutscher, *Neo-Pre-Platonic Naturalism*, ch. 6.

moral luck—not as insoluble mysteries but as **navigational challenges** awaiting a coherent, naturalistic solution. Thermodynamics and evolutionary biology provide powerful **empirical confirmation** of this navigational logic, but the logic itself is grounded in the First Principles of NPN and the inescapable reality of what it means to be a striving agent in a lawful world.

This paper proceeds as follows. First, I examine Hume's guillotine and show why his analysis, though correct within its synchronic framework, fails to capture the diachronic reality of living agency. Next, I introduce ***Hormē*** and Theorem T6 (the Life-Agency Isomorphism), establishing that to be alive just is to be a minimal agent. I then derive Theorem T4 (Ethical Isomorphism), demonstrating that epistemic error and ethical vice are functionally identical misalignments with the *Logos*. With the isomorphism in place, I show how it dissolves Hume's gap, provides an objective but relational standard of goodness, explains moral diversity, and unifies virtue epistemology with virtue ethics under a navigational paradigm. Finally, I address objections and explore implications for applied ethics, education, and artificial intelligence.

The result is not merely another entry in the long debate over naturalistic ethics, but a **systematic refoundation**—one that shows how values emerge from facts not by logical deduction, but through the constitutive activity of beings that must navigate to exist.

2   The Is/ought Problem as Navigation Failure

When attempting to ground morality in nature—to develop a genuinely naturalistic ethics—one cannot bypass the foundational challenge laid down by Hume over 250 years ago. Any system that proposes to derive "ought" from "is" must first confront Hume's Guillotine directly and explain why the blade does not fall. This is not merely an academic exercise; it is the threshold question for any ethical naturalism worthy of the name.

For three centuries, attempts to naturalize ethics have faced Hume's challenge: How can statements about what *should* be follow logically from statements about what *is*? This question has haunted projects from Aristotelian virtue ethics to evolutionary ethics to contemporary neurophilosophical approaches. Most have either: (1) conceded Hume's point and retreated to noncognitivism or subjectivism, (2) posited mysterious "non-natural" moral properties, or (3) engaged in what appears to be question-begging—smuggling normative assumptions into supposedly descriptive premises.

2.1   David Hume: The Penetrating Skeptic

Before engaging with his famous guillotine, it is worth acknowledging the extraordinary philosophical mind that forged it. David Hume (1711–1776) was not merely a critic of moral reasoning but one of the most penetrating systematic philosophers of the Enlightenment. His commitment

to empirical rigor, his demolition of rationalist metaphysics, and his naturalistic approach to human nature were revolutionary. In many ways, Hume was a fellow traveler in the project of naturalism—he sought to understand human beings as part of the natural world, subject to its laws and patterns.[6]

Hume's insight about the is/ought gap emerged from this very commitment to empirical clarity. He noticed that moral philosophers of his time (and indeed, of most times) were engaged in a kind of conceptual sleight-of-hand: they would begin with observations about human nature, God, or society, and then—without clear justification—transition to claims about what *ought* to be done. Hume was calling for intellectual honesty: if we are going to make normative claims, we need to account for where that normativity comes from. His guillotine was not wielded to destroy ethics but to demand better foundations for it.

This paper follows in Hume's naturalistic spirit even as it challenges his conclusion. Like Hume, we take seriously the need to ground ethics in what we know about the world and our place in it. Unlike Hume, we believe that a deeper understanding of what living systems *are*—in thermodynamic and processual terms—reveals that the is/ought distinction dissolves rather than persists.

2.2 The Navigation Reframe: Beyond Hume's Premises

The NPN framework does not attempt to derive "ought" from "is" in the way Hume envisioned—as a logical deduction from descriptive propositions to prescriptive ones. Rather, it begins with a more fundamental insight: **For living agents, the distinction between "is" and "ought" is itself a false dichotomy born of analyzing agency through a synchronic, propositional lens rather than a diachronic, processual one.** Living systems don't *derive* ought from is; they *embody* the unity of both through the very activity of existence. The "ought" emerges not as a logical conclusion but as an operational imperative inherent in being a far-from-equilibrium system engaged in *Hormē*.[7]

Thus, the navigation perspective does not attempt to build a bridge across Hume's chasm but instead reveals that the chasm itself is an artifact of looking at agency from the wrong vantage point. From the perspective of a navigating organism, facts are navigational coordinates and values are navigational directives—both are aspects of the same activity of persisting in a world that tends toward equilibrium.

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[6]Norman Kemp Smith, *The Philosophy of David Hume: A Critical Study of Its Origins and Central Doctrines* (Macmillan, 1941); Barry Stroud, *Hume* (Routledge, 1977).

[7]Hormē is not metaphorical striving but physical necessity: the continuous work required to maintain a living system's far-from-equilibrium organization against entropic dissolution. A bacterium's chemotaxis toward glucose is Hormē; so is a human's pursuit of meaning. Both are navigational responses to the same constitutive imperative: persist or dissolve. (For the full thermodynamic derivation, see Eli Adam Deutscher, *Life as Directed Causality: A Thermodynamic Isomorphism Between Being and Acting*, 2025, and Deutscher, *Neo-Pre-Platonic Naturalism*, ch. 5.)

2.3 Hume's Guillotine and Its Enduring Legacy

David Hume's observation that one cannot derive an "ought" from an "is" has defined metaethics for three centuries.[8] His famous passage in the *Treatise* deserves full quotation:

> "In every system of morality, which I have hitherto met with, I have always remark'd, that the author proceeds for some time in the ordinary way of reasoning, and establishes the being of a God, or makes observations concerning human affairs; when of a sudden I am surpriz'd to find, that instead of the usual copulations of propositions, *is*, and *is not*, I meet with no proposition that is not connected with an *ought*, or an *ought not*. This change is imperceptible; but is, however, of the last consequence. For as this *ought*, or *ought not*, expresses some new relation or affirmation, 'tis necessary that it should be observ'd and explain'd; and at the same time that a reason should be given, for what seems altogether inconceivable, how this new relation can be a deduction from others, which are entirely different from it."[9]

2.4 Steel Manning Hume's Argument

Hume was **correct** within the parameters of his analytic framework—and understanding why reveals the precise limitations his analysis imposed on the problem.

2.4.1 The Logical-Structural Argument

Hume analyzed moral reasoning as a **deductive system** of propositions. From this formal perspective:

- "Is" statements describe states of affairs in the world (e.g., "This action causes pain").
- "Ought" statements prescribe actions or evaluations (e.g., "You ought not cause pain").
- No amount of logical manipulation can **deduce** a prescriptive conclusion from purely descriptive premises without smuggling in a prescriptive premise (the "is-ought gap").

This is not merely a linguistic observation but a **structural feature of classical logic**, as demonstrated by Prior's formal analysis of the autonomy of ethics.[10] In propositional calculus, you cannot validly derive a normative conclusion from non-normative premises without a rule of inference that itself has normative content.

2.4.2 The Epistemological Assumption

Hume operated within a **representationalist epistemology** where:

- Knowledge consists of mental representations (ideas) that correspond to external facts.

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[8]David Hume, *A Treatise of Human Nature* (1739).

[9]Hume, *A Treatise of Human Nature*, 3.1.1.27.

[10]Arthur N. Prior, *Logic and the Basis of Ethics* (Clarendon Press, 1960).

- Moral "facts" cannot be observed like empirical facts—we don't perceive "oughtness" with our senses.
- Therefore, moral propositions must have a different status: they are expressions of sentiment, not descriptions of reality.

This anticipates the later emotivist and non-cognitivist positions: moral language doesn't describe; it **expresses** or **prescribes**.

2.4.3   The Metaphysical Context

Hume's framework assumes a **Newtonian universe**:

- The physical world operates by efficient causation (billiard-ball causality).
- Final causes (teleology) had been exiled from scientific explanation.
- Without teleology, there's no natural "purpose" from which to derive "oughts."
- Values appear as additions to a value-free mechanical universe.

Within this metaphysical picture—what Max Weber would later characterize as the "disenchantment" of the world—Hume's guillotine is unavoidable.[11] If the universe is fundamentally descriptive (a collection of "is" facts), and human reason merely manipulates these facts, then normative conclusions are indeed un-derivable.

2.5   Why Hume Was Correct—And Why That's Not the End of the Story

Hume correctly identified that **within a synchronic, propositional, non-teleological framework**, the is/ought gap is real and unbridgeable. His steel-man argument stands:

1. **Formal validity**: No syllogism with only descriptive premises yields a normative conclusion.
2. **Epistemic separation**: Moral "facts" aren't observable like empirical facts.
3. **Metaphysical neutrality**: Nature exhibits no inherent purposes from which obligations could flow.

The problem is not with Hume's logic but with **his starting assumptions**. He analyzed morality as if it were a system of propositions to be deduced, rather than a **practice of navigation** by living agents. He treated "is" and "ought" as static logical categories rather than dynamic aspects of agency.

As philosopher John McDowell notes, Hume's framework assumes a "disenchanted" nature—one stripped of value, purpose, or normativity.[12] Within such a world, Hume's conclusion is

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[11]Max Weber, "Science as a Vocation," *Daedalus* 87, no. 1 (1919): 111–34.

[12]John McDowell, "Mind and World," *Harvard University Press*, 1994.

inescapable. But this raises the question: **Is this the right way to understand the world—or more importantly, the right way to understand agency within it?**

2.6 The Navigation Perspective: A Different Starting Point

Rather than accepting Hume's framework and then trying to bridge his gap, the NPN approach begins with different premises:

1. **Diachronic primacy (FP2)**: Reality is process, not state. Being is stabilized becoming.[13]
2. **Agency as constitutive (T6)**: To be alive is to be an agent engaged in *Hormē*.[14]
3. **Navigational necessity**: Living agents must navigate to persist.

From this perspective, "is" statements aren't neutral descriptions but **navigational coordinates**, and "ought" statements aren't arbitrary prescriptions but **navigational directives**. The question shifts from "How do we get from facts to values?" to "How do finite agents successfully navigate reality to maintain their fHormē-driven existence?"

Hume was right that you can't deduce "ought" from "is" **if you're looking at static propositions**. But if you're a living agent in a dynamic world, you don't need to deduce "ought"—you're already swimming in it. Your very existence as a system engaged in Hormē constitutes a continuous "ought": the imperative to maintain that state against entropic dissolution.

2.6.1 Darwin's Diachronic Revolution and Philosophy's Unfinished Business

The synchronic analysis that Hume inherited was not arbitrary; it reflected the dominant pre-Darwinian ontology. Before 1859, the natural world appeared fundamentally **static**. Species were eternal forms, human nature was fixed, and reason's structure was timeless. Aristotle had flattened reality into substances with properties; Kant systematized this into categories and faculties. Both analyzed **what things are**, not **what things are becoming**.[15]

Darwin shattered this framework. *On the Origin of Species* (1859) demonstrated that species are not eternal forms but **historical trajectories**—populations whose "nature" is their ongoing adaptation to selection pressures.[16] A species is not a **point** (fixed essence) but a **vector** (directional becoming). Its "is" (current phenotype) and its "ought" (adaptive trajectory) are inseparable: the organism *is* what it is *because* its lineage successfully navigated ancestral environments, and it *ought* to continue navigating successfully or face extinction.

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[13]Deutscher, *Neo-Pre-Platonic Naturalism*, app. b.

[14]Deutscher, *Life as Directed Causality*.

[15]Aristotle's *Metaphysics* treats substance (*ousia*) as ontologically primary, with change analyzed as actualization of potential within fixed forms. Kant's *Critique of Pure Reason* identifies the a priori structures of experience as necessary and invariant features of rational minds as such, not as evolved capacities.

[16]Charles Darwin, *On the Origin of Species* (London: John Murray, 1859). Darwin showed that what appears "essential" to a species (e.g., the giraffe's neck) is actually a contingent optimization frozen by selection. The "form" is a snapshot of a process, not a timeless template.

This was a diachronic revolution in biology—but philosophy failed to absorb its full implications. While post-Darwinian thinkers acknowledged evolution's relevance to human origins, they largely cordoned off "higher" faculties (reason, morality, consciousness) as exempt from evolutionary analysis. Kant's categories remained "a priori"; Hume's is/ought gap remained unbridgeable; moral philosophy continued to seek timeless principles rather than evolved strategies.[17]

The oversight was this: If minds evolved, then **reason itself is an evolved capacity**—a set of structures thermodynamically necessary for a certain kind of navigating system, not a transcendental framework independent of nature. What Kant identified as "a priori" (necessary for any rational agent) is actually **constitutively necessary for systems whose *Hormē* requires modeling, prediction, and social coordination to persist**—which is to say, us. These structures are not eternal; they are **frozen optimizations** from millions of years of navigational selection pressure—evolved solutions to the problem of maintaining *Hormē* in complex, dynamic environments.

In thermodynamic terms, these cognitive structures are **information-processing adaptations** that minimize prediction error and manage energy expenditure in systems that must navigate to survive. But their origin is not in logic alone; it is in the **imperative of *Hormē***—the drive to persist, which in social, symbol-using organisms demands reliable modeling of reality and each other.

Thus, the "necessity" of reason is not transcendental but **thermodynamically and evolutionarily immanent**: it is what *Hormē* looks like when expressed through a brain capable of abstract thought, long-term planning, and moral imagination.[18] The is/ought gap suffers the same fate. For a **static entity** (a point in conceptual space), there is no "ought"—only "is." A rock at rest has properties but no trajectory, no striving, no success conditions. Hume's analysis was correct *for rocks.* But a **diachronic entity**—a self-maintaining process extended through time—necessarily has both:

- **Is:** Current state (position on the trajectory)
- **Ought:** Necessary continuation (direction the vector must go to remain a vector)

The "ought" is not a separate metaphysical fact added to the "is." It is **the temporal derivative of the is**—the direction implied by being a process rather than a state. A bacterium moving up a

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[17]Even evolutionary ethicists like Herbert Spencer and contemporary sociobiologists often treated evolution as providing *content* for ethics (e.g., "survival of the fittest justifies competition") rather than recognizing that evolution reveals the *processual nature* of normativity itself. They remained synchronic in method even while invoking diachronic facts.

[18]This parallels the "evolutionary epistemology" of Donald T. Campbell and Konrad Lorenz, but goes further: not merely that our cognitive apparatus evolved, but that **all necessity claims in philosophy are really claims about thermodynamic constraints on evolved system-types**. See Donald T. Campbell, "Evolutionary Epistemology," in *The Philosophy of Karl Popper*, ed. Paul Arthur Schilpp (La Salle, IL: Open Court, 1974), 413–63.

glucose gradient *is* at position X and *ought* to continue moving (because cessation of movement = cessation of existence). The two are unified in the activity of navigation.

Darwin proved diachronic primacy empirically for biological species. The NPN framework extends this insight to all philosophy: agency, knowledge, value, and reason are not synchronic structures to be analyzed in logical stasis, but **diachronic processes** to be understood through their navigational function. Once this shift is made, the classical puzzles dissolve—not because we've answered them within their frameworks, but because we've recognized the frameworks themselves were **category errors born of pre-evolutionary metaphysics**.

The next section shows how T6 provides the thermodynamic foundation for this shift in perspective, making Hume's guillotine not wrong but **irrelevant** to the actual practice of living agency.

3 Theorem T6 as the Foundation: Agency as Thermodynamic Navigation

To dissolve the is/ought distinction, we must first establish what an agent *is* in naturalistic terms. This foundation is provided by **Theorem T6: The Life-Agency Isomorphism Theorem**, which I will define and explain here in sufficient detail for this paper's argument.[19]

3.1 Formal Statement of Theorem T6

Theorem T6 (Life-Agency Isomorphism): Life and minimal agency are isomorphic. A system is alive if and only if it possesses *Hormē* (the constitutive drive to persist), and it possesses *Hormē* if and only if it is a minimal agent. The capacity to **direct causal flow** toward persistence is the constitutive property of both biological existence and navigational agency.[20]

This theorem makes two bidirectional claims:

1. **Life → Hormē → Agency:** If a system is alive, it is constitutively engaged in *Hormē*, and that very engagement constitutes minimal agency.
2. **Agency → Hormē → Life:** If a system is a minimal agent, its agency must be grounded in a constitutive striving (*Hormē*), which is the signature of being alive.

3.2 Defining the Core Concept: *Hormē* (Ορμή)

The pivotal concept in T6 is *Hormē*: the constitutive drive that distinguishes living systems. I define it within the NPN framework as:

> **Definition:** *Hormē* is the constitutive drive of a system to persist within the lawful structure of reality (*Logos*) by **directing causal flow** to aid survival and flourishing.

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[19]See Deutscher, *Life as Directed Causality*; Deutscher, *Neo-Pre-Platonic Naturalism*, 241.
[20]Deutscher, *Life as Directed Causality*, 7.

It is the engine of agency itself and is scale-invariant. In humans, it is expressed through the layered faculties of *Orexis*, *Thymos*, *Logistikon*, and the *Nous*.[21]

This definition refines Spinoza's metaphysical *conatus*—the endeavor to persist in being—by grounding it not in substance but in the **logic of boundaries and navigation**.[22] It can be understood through three essential aspects:

1. **Constitutive striving:** *Hormē* is not an attribute but the **activity that the system is**. Cessation of this striving means cessation of the system as that living entity.
2. **Causal redirection:** *Hormē* expresses itself through the capacity to **redirect causal flows**—to act in ways that sustain the system's organization against dissolution.
3. **Scale invariance:** *Hormē* is present in all living systems, from bacterium to human. In complex organisms, it is expressed through layered regulatory faculties, but the core imperative remains the same.

Thermodynamically, this striving manifests as the continuous, internally regulated work required to maintain a far-from-equilibrium state—a physical expression of the same constitutive imperative.[23] But the concept itself is agential and navigational: *Hormē* is what it means to be a living system engaged in the fundamental project of persistence.

3.2.1 Directing Causal Flow: The Logic of Agency

The concept of **directing causal flow** provides the rigorous mechanism that distinguishes an **Agent** from a mere **Object**. In a universe governed by cause and effect (*Logos*), an object (such as a rock rolling down a hill) is entirely subject to the causal flow of the *Archē*; its future state is determined solely by external forces and initial conditions. An agent, however, acts as a local cause that **alters this trajectory**.

This "directing" is not a violation of physics, but a specific mode of interaction where the system expends energy to bias outcomes toward its own persistence. This operation defines Agency across the entire biological spectrum:

1. **Minimal Agency (The Bacterium):** A bacterium swimming up a nutrient gradient is the paradigmatic case of directing causal flow. Without this action, the causal flow of the environment (diffusion, currents) would lead to nutrient scarcity and dissolution. By engaging its flagella to move against or across this flow, the bacterium changes its predetermined

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[21]See Deutscher, *Neo-Pre-Platonic Naturalism.* Ch 6 for the full explanation of the layered psyche
[22]Benedict de Spinoza, *Ethics*, trans. Edwin Curley (Princeton University Press, 1994), pt. III, prop. 6.
[23]For the full thermodynamic derivation, see Deutscher, *Life as Directed Causality*, §2–3.

future. It alters the probability landscape from **dissolution** (the default of *Neikos*) to **persistence** (the achievement of *Philia*).[24] This is not just a reaction; it is agency because the outcome is functionally linked to the system's survival.[25]

2. **Maximal Agency (The Navigator):** In complex organisms, this same operation scales up. A human dodging a threat or planting a harvest is directing causal flow over longer time horizons. The *Nous* models the inertial path ("if I do nothing, I starve next winter") and directs energy now to alter that outcome.

Therefore, *Hormē* is the **engine that powers this intervention**. Whether minimal or maximal, to be an agent is to possess the capacity to step into the stream of cause and effect and redirect it toward a shelter for one's own existence. Agency is not magic; it is **the expression of *Hormē* through the redirection of causal flow**.[26]

3.3   Operationalizing the Distinction

The *Hormē* criterion draws a principled, physics-based line between living agents and other systems:[27]

- **Bacterium:** Yes. Continuous metabolism actively maintains cellular integrity.
- **Mature tree:** Yes. Metabolic activity maintains organismal structure.
- **Candle flame:** No. A dissipative structure, but its boundary is not self-maintained or internally regulated; it is an epiphenomenon of fuel combustion.[28]
- **Virus (virion):** No. No metabolic activity; a stable molecular configuration.
- **Self-balancing robot:** No. Performs work but its organization is not self-produced and its persistence is not thermodynamically precarious in the biological sense. Purpose is given by the programmer. The robot is indifferent to if it balances or not.

3.4   From Constitutive Striving to Functional Identity

The derivation of T6 proceeds from first principles, bridging the constitutive and the functional:

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[24]*Philia* (Union) and Neikos (Separation) are the two fundamental, exhaustive cosmic forces that drive the Archē. Philia is the principle of cohesion, attraction, and inheritance that sustains form against entropy; Neikos is the principle of differentiation, repulsion, and selection that dissolves it. For the complete derivation of this Exhaustive Polarity (FP3), see Neo-Pre-Platonic Naturalism (2025), Chapter 4.

[25]See Deutscher, *Neo-Pre-Platonic Naturalism*, p. 53: "Consider the simplest bacterium swimming up a chemical gradient... It is not merely reacting; it is expressing the primordial Hormē."

[26]This capacity to redirect causal flow constitutes the naturalistic kernel of free will: an agent's ability to make choices that advantage its persistence. The full development of this connection—and its implications for moral responsibility, determinism, and conscious deliberation—lies beyond the scope of this paper and will be treated in a dedicated forthcoming work.

[27]Deutscher, *Life as Directed Causality*, 6.

[28]Ilya Prigogine and Isabelle Stengers, *Order Out of Chaos: Man's New Dialogue with Nature* (Bantam Books, 1984).

1. **From the nature of bounded persistence:** A living system is a bounded organization that must continuously work to maintain itself against dissolution. This necessary, internally regulated work is *Hormē*. Therefore, a system is alive iff it possesses *Hormē*.

2. **Functional definition of minimal agency:** Following enactivist and organizational approaches, a minimal agent is a system that:
   - Generates **autonomous activity** (not merely reactive but regulated by its own organizational dynamics).
   - Exhibits **normative directionality** (its actions can be evaluated as successful or failing relative to a normative standard intrinsic to the system itself—the maintenance of its own viability).[29]

3. **The isomorphism:** The constitutive striving of self-maintenance (*Hormē*) is functionally identical to the activity that defines minimal agency.
   Thermodynamically, this striving manifests as the continuous work required to maintain far-from-equilibrium organization.[30]

3.5   The Crucial Insight: Agency as Expression of *Hormē*

T6 establishes that minimal agency is not a mysterious addition to life but life's fundamental mode of being. At its most basic, agency is *Hormē*: the constitutive striving to persist. A bacterium performing chemotaxis is already exercising agency—not as a metaphorical "as-if" but as a literal, constitutive activity of boundary maintenance.[31]

This insight is scale-invariant. It applies equally to a bacterium performing chemotaxis and a human engaging in deliberate choice. The complexity of the mediating mechanisms differs, but the constitutive grounding in *Hormē* does not.[32]

3.6   T6 as the Foundation for T4

With T6 established, we can now articulate the navigation perspective that dissolves the is/ought distinction:

From T6, an agent is a system that must **navigate** reality to maintain its *Hormē*. This navigation necessarily involves two components:

1. **Epistemic component:** Knowing reality (building accurate models of the *Logos*).[33]

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[29]Xabier E. Barandiaran et al., "Defining Agency: Individuality, Normativity, Asymmetry, and Spatio-Temporal Origin of Action," *Adaptive Behavior* 17, no. 5 (2009): 367–86; Ezequiel A. Di Paolo, "Autopoiesis, Adaptivity, Teleology, Agency," *Phenomenology and the Cognitive Sciences* 4, no. 4 (2005): 429–52.

[30]Jeremy L. England, "Dissipative Adaptation in Driven Self-Assembly," *Nature Nanotechnology* 10, no. 11 (2015): 919–23.

[31]Deutscher, *Life as Directed Causality*, 8.

[32]Deutscher, *Neo-Pre-Platonic Naturalism*, 60.

[33]Deutscher, *Neo-Pre-Platonic Naturalism*, 86.

2. **Ethical component:** Acting within reality (performing actions that fulfill *Hormē*).[34]

Both components serve the same constitutive end: persistence against entropy. They are not separate activities but two aspects of the same navigational process. The "is" (accurate modeling) and the "ought" (*Hormē*-fulfilling action) are unified in the activity of navigation.

This sets the stage for Theorem T4: the isomorphism between epistemic error and ethical vice—between being wrong about reality and acting in ways that frustrate one's constitutive striving.

4   Theorem T4: Formal Statement and Derivation

With T6 establishing that agency is fundamentally ***Hormē***—the drive to persist by directing causal flow—we are now positioned to formalize the relationship between truth and goodness. If being an agent means being constitutively engaged in **navigation**—the activity of sustaining oneself within the lawful structure of reality (*Logos*)—then the success conditions of that navigation must unify what have traditionally been treated as separate domains: epistemology (getting the map right) and ethics (following the right path).

Hume's challenge—how to get from "is" to "ought"—assumed that facts and values inhabit different logical spaces. T6 reveals why this assumption fails: for a navigating agent, "is" statements are not neutral descriptions but navigational coordinates, and "ought" statements are not arbitrary prescriptions but navigational imperatives. The map and the path are part of the same journey; to separate them is to misunderstand the journey itself.[35]

Theorem T4 formalizes this unity. It states that epistemic error and ethical vice are not merely correlated but functionally identical—both are states of misalignment between the agent and the lawful structure of reality (the *Logos*). The following section presents T4 formally, derives it from T6 and the NPN first principles, and demonstrates why this isomorphism is not just possible but necessary for any coherent account of naturalistic agency.

4.1   Formal Statement

Theorem T4 (Ethical Isomorphism): For any agent with *Hormē*, epistemic error and ethical vice are functionally identical states of misalignment between the agent's internal models/external actions and the lawful constraints of reality (the *Logos*).

Symbolically:

$$\forall A[\text{Agent}(A) \rightarrow (\text{Misaligned}_{\text{Epistemic}}(A) \leftrightarrow \text{Misaligned}_{\text{Ethical}}(A))]$$

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[34]Deutscher, *Neo-Pre-Platonic Naturalism*, 56.
[35]Deutscher, *Life as Directed Causality*.

Where: - Agent$(A) \equiv A$ possesses *Hormē* (from T6) - Misaligned$_{\text{Epistemic}}(A) \equiv A$'s models contradict the *Logos* - Misaligned$_{\text{Ethical}}(A) \equiv A$'s actions frustrate A's *Hormē* given the *Logos*

4.2   Derivation from First Principles

1. **From T6:** A is an agent iff A possesses *Hormē* (thermodynamic striving).[36]
2. **From FP8 (Navigability):** The *Logos* is, in principle, model-able by an emergent subsystem within the *Archē*.[37]
3. **From C4 (Objective Value):** Good = *Hormē* fulfillment; Bad = *Hormē* frustration. Value is an objective, functional relationship between a system's states and the successful expression of its striving.[38]
4. **Therefore:** For A to fulfill *Hormē*, A must act in accordance with the *Logos* (since the *Archē* is a lawful framework).[39]
5. **And:** For A to act in accordance with the *Logos*, A must have accurate models of it (since actions depend on models via intention).
6. **Thus:** Accurate models (epistemic success) and *Hormē*-fulfilling actions (ethical success) are two aspects of the same navigational achievement.

4.3   The Identity Conditions

The isomorphism holds because:

- **Epistemic success** = model-*Logos* alignment (FP7).[40]
- **Ethical success** = action-*Logos* alignment given *Hormē* (C4).
- Since actions depend on models (via intention), and *Hormē* fulfillment depends on action success, both reduce to *Logos*-alignment.

This is not correlation but **identity under different descriptions**.

4.4   The Necessity of the Isomorphism: A Proof by Contradiction

Any system that denies the isomorphism between Truth and Survival collapses into an immediate, lethal contradiction. If "Truth" were distinct from "Survival," we would be forced to accept two absurdities:

1. **The Benefit of Delusion:** It would be functionally "Good" for an agent to be "False" (deluded), as error would provide a competitive advantage over accuracy.
2. **The Lethality of Truth:** Truth would become a functional detriment—a weapon that reality uses to dissolve any agent "honest" enough to perceive it.

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[36]Deutscher, *Life as Directed Causality*.

[37]Deutscher, *Neo-Pre-Platonic Naturalism*, 194.

[38]Deutscher, *Neo-Pre-Platonic Naturalism*, 194.

[39]Deutscher, *Neo-Pre-Platonic Naturalism*, 39.

[40]Deutscher, *Neo-Pre-Platonic Naturalism*, 193.

If a Navigator possesses a model that identifies a cliff as a plain, the "Truth" of gravity is not an abstract concept; it is an entropic force that destroys the agent for its lack of alignment. Therefore, the *Hormē* (the drive to persist) is fundamentally grounded in the truth of the *Archē*.[41]

The "Ought" is revealed as nothing more than a localized expression of the "Is." To say an agent *ought* to act in a certain way is to say that such an action is the only one *isomorphic* with the truth of the environment. Virtue is not a moral additive; it is the state of being "Rightly Cut" (*Dikaiosynē*)—aligned so precisely with the grain of reality that the "penalty" of *Dikē* is avoided.[42] Therefore, a system where Truth is self-detrimental is a system optimized for its own extinction. NPN asserts the only stable conclusion: **To flourish is to align with Reality**.

This argument resonates strongly with Ruth Millikan's "biosemantics," which posits that the truth conditions of a representation are derived from its biological function—truth is what allows the representation to guide successful action.[43]

5   Dissolving Hume's Guillotine

Hume's guillotine falls only if one accepts his premises: that "is" and "ought" inhabit categorically distinct logical spaces, that propositions about facts and values cannot share a common ground, and that normativity cannot emerge naturally from descriptive reality. The navigation perspective—grounded in T6 and formalized in T4—reveals why these premises are artifacts of a static, synchronic analysis rather than insights into the nature of living agency.

Hume was correct within the framework of propositional logic applied to a disenchanted, mechanical universe. But living agents do not inhabit that universe passively; they engage it actively as navigating systems whose very existence constitutes a continuous negotiation between mapping and moving, between knowing and doing. For such systems, the distinction between "is" and "ought" does not mark a logical chasm but rather two aspects of the same navigational imperative.[44]

This section demonstrates how the ***Hormē*-driven account of agency** dissolves Hume's guillotine not by bridging the gap between facts and values, but by showing that for a navigating agent, the gap does not exist. The "ought" is not derived from the "is" through deduction; it is embodied in the "is" of an agent's *Hormē*—**the drive to survive the *Logos* by changing causal flow**. The normative emerges not as a separate logical category but as the **operational output of that drive**.

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[41]Deutscher, *Neo-Pre-Platonic Naturalism*, 38.

[42]Dikē (Justice) in the NPN framework is not a moral judgment but a causal mechanism: the impartial, structural feedback of the Logos. It is the "penalty" or rebalancing force that inevitably corrects any system that acts in misalignment with the laws of reality. See Deutscher, *Neo-Pre-Platonic Naturalism*, Chapter 3.

[43]Ruth Garrett Millikan, *Language, Thought, and Other Biological Categories: New Foundations for Realism* (MIT Press, 1984).

[44]Deutscher, *Neo-Pre-Platonic Naturalism*, 57.

We begin by examining the synchronic/diachronic distinction that Hume's analysis overlooked, then demonstrate the performative contradiction inherent in denying the isomorphism, and finally show how the living agent's very being constitutes a necessary "ought."

5.1   The Synchronic/Diachronic Distinction

Hume analyzed propositions *synchronic*ally—as static statements. But agency is *diachronic*—a process of navigation through time.[45] For a navigating agent, "is" statements are not neutral descriptions but **navigational coordinates**, and "ought" statements are not arbitrary prescriptions but **navigational directives**. This mirrors Philippa Foot's argument that life cycles determine "natural goodness"—an organism's features are evaluated based on their contribution to its specific life-form activity.[46]

5.2   The Performative Contradiction of Denial

Consider an agent who says: "I understand the cliff is there (fact), but I feel no obligation to avoid it (value)." If the agent walks off, the cliff's reality provides the "obligation" through gravitational force. The "ought" was embedded in the "is" of physics all along; the agent's denial was navigational error, not metaethical insight.

5.3   The Living Agent's Necessary "Ought"

For a living agent with *Hormē*:

1. To be alive is to be engaged in persistence-work (T6).
2. Persistence-work requires successful navigation.
3. Successful navigation requires *Logos*-aligned action.
4. Therefore, for a living agent, to be is to ought to navigate successfully.

The "ought" doesn't come from outside; it's **what being a living agent is**. This resonates with Christine Korsgaard's argument that agency itself is the source of normativity—that to be a reflective agent just is to be subject to normative requirements.[47]

6   Objective but Relational Good

If T4 dissolves Hume's guillotine by showing that "is" and "ought" are unified in the activity of navigation, a critical question remains: What kind of goodness emerges from this isomorphism? Is it purely subjective—whatever an agent happens to believe or desire? Or is it objective in

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[45]Deutscher, *Neo-Pre-Platonic Naturalism*, 192.

[46]Philippa Foot, *Natural Goodness* (Oxford University Press, 2001).

[47]Christine M. Korsgaard, *Self-Constitution: Agency, Identity, and Integrity* (Oxford: Oxford University Press, 2009). However, where Korsgaard locates normativity in rational self-constitution, the NPN framework locates it in the thermodynamic necessity of boundary maintenance—a foundation that applies to all living systems, not only rational agents. See Deutscher, *Life as Directed Causality*, 9, n. 28.

some stronger, mind-independent sense? The navigation perspective reveals a third possibility: goodness is objective but relational—neither arbitrarily subjective nor absolutely universal, but grounded in the concrete reality of what fulfills an agent's constitutive striving given the lawful constraints of the world.

This approach navigates between the twin pitfalls of modern metaethics. On one side lies moral subjectivism, which reduces goodness to preference or emotion, rendering ethics a matter of taste. On the other lies moral absolutism (whether Platonic, divine command, or Kantian), which posits goodness as independent of agents' needs and circumstances, often at the cost of naturalistic coherence. Both positions mistakenly assume that objectivity requires independence from the relational context of agency.[48]

From the NPN perspective, goodness is objective in the same sense that health is objective. Health is not subjective—one cannot think a diseased liver into wellness—nor is it absolute—optimal blood pressure differs between species and individuals. Health is a relational state: the proper functioning of an organism given its biological design and environmental context. This aligns with Christopher Boorse's biostatistical theory, which grounds health in species-typical functional organization, while avoiding the absolutism of a single "ideal" health state.[49] Similarly, ethical goodness is the proper functioning of an agent given its *Hormē* and the *Logos*—a state of alignment that can be objectively assessed, even as that assessment depends on the specific nature of the agent and its situation. This mirrors Philippa Foot's analysis of "natural goodness," where the evaluation of a living thing depends on the life-cycle of its species.[50]

This section articulates this relational objectivity, distinguishes it from both subjectivism and absolutism, and shows how the navigational standard provides a robust, naturalistic foundation for ethical evaluation that is neither arbitrary nor mystical.

6.1 Against Moral Subjectivism

If goodness were purely subjective, then whatever an agent believed to be good for them would indeed be good for them. This position leads immediately to absurdity: if an agent believes arsenic is nutritious, their belief does not alter arsenic's biochemical effects. Their *Hormē* will be frustrated—their cells will die, their organs will fail—regardless of their convictions. Goodness is therefore **constrained by reality**; it cannot be willed into existence by belief or desire alone.[51]

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[48]Deutscher, *Neo-Pre-Platonic Naturalism*, 57.

[49]Christopher Boorse argues that health is objective insofar as it refers to statistically normal functional ability of a member of a reference class. See Christopher Boorse, "Health as a Theoretical Concept," *Philosophy of Science* 44, no. 4 (1977): 542–73. Lennart Nordenfelt's welfare theory provides a complementary perspective, grounding health in an individual's ability to achieve vital goals given their circumstances. See Lennart Nordenfelt, *On the Nature of Health: An Action-Theoretic Approach*, 2nd ed. (Dordrecht: Kluwer Academic Publishers, 1995).

[50]Foot, *Natural Goodness.*

[51]Deutscher, *Neo-Pre-Platonic Naturalism*, 62.

Yet the appeal of subjectivism stems from a genuine insight: agents do experience different needs, desires, and perspectives. A navigational account accommodates this insight without collapsing into relativism. While *what fulfills Hormē* is objective (determined by the intersection of an agent's constitutive needs and the *Logos*), *how an agent perceives and pursues* those fulfillments is indeed mediated by their particular models, experiences, and cultural frameworks. Subjectivism mistakes the latter—the phenomenological and cognitive mediation—for the former—the constitutive reality.

This distinction explains why moral education and ethical reasoning are possible. If ethics were purely subjective, persuasion would reduce to manipulation or coercion. But if ethical claims are hypotheses about what truly fulfills *Hormē* given the *Logos*, then moral discourse becomes a form of **collaborative navigation**—sharing maps, comparing routes, and testing paths against the shared territory of reality.

6.2 Against Moral Absolutism

If goodness were absolute—existing as Platonic Forms, divine commands, or categorical imperatives independent of contingent needs—it would apply uniformly across all agents regardless of their nature or circumstances. This position generates its own contradictions: what is good for a lion (hunting prey) is not good for a deer; what preserves a bacterial colony (antibiotic resistance) may threaten a human host. An ethics that ignores such relational specificity becomes either irrelevant or tyrannical.

Absolutist theories often arise from a legitimate desire for moral certainty and universality. The navigational framework satisfies this desire differently: not by positing transcendent moral facts, but by identifying **universal constraints and relational invariants** .[52] All living agents share the constitutive condition of *Hormē*; all exist within the same *Logos*. These are universal. But how *Hormē* is fulfilled—what actions, relationships, and conditions sustain a particular far-from-equilibrium organization—varies with the agent's specific constitution and environmental context.

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[52]Martha C. Nussbaum, "Non-Relative Virtues: An Aristotelian Approach," *The Quality of Life*, Clarendon Press, 1993, 242–69; The search for "universal" moral truths often reflects pre-Darwinian essentialism: the assumption that if something is universal, it must be eternal and necessary in a transcendental sense. Post-Darwin, we recognize a different kind of universality: **convergent evolution**. Traits that appear across lineages (e.g., eyes, flight, social cooperation) are universal not because they reflect Platonic forms, but because they are **thermodynamically optimal solutions** to recurring navigational problems. Similarly, cross-cultural moral universals (prohibition of kin-murder, reciprocity norms, truth-telling in high-stakes contexts) are not evidence of transcendent moral facts but of **convergent navigational strategies** for social species facing similar coordination problems. The universality is real, but it's **immanent** (in the structure of the problems and the physics of solutions) rather than **transcendent** (in a realm beyond nature).

Thus, the navigational standard provides **constrained relativity**: moral truth is always truth-for-a-particular-agent-in-a-particular-situation, but both the agent's nature and the situation's constraints are objective features of reality, not arbitrary choices.

6.3 The Navigational Standard: Goodness as Functional Alignment

Goodness, in the NPN framework, is **functional alignment**: the state in which an agent's actions, models, and organizational dynamics are coordinated to fulfill *Hormē* within the constraints of the *Logos* (C4).[53] This is directly analogous to health in medicine:

- **Not subjective:** A doctor cannot declare a patient healthy merely because the patient feels fine; diagnostic tests reference objective physiological norms.
- **Not absolute:** The "normal" resting heart rate differs for athletes, infants, and seniors; health is always health-for-this-organism.
- **Relational and functional:** Health is the state of an organism operating efficiently within its environmental niche, meeting its needs and repairing damage with minimal friction.

Ethics, then, is **the health of agency**. A morally good action is one that contributes to the agent's functional alignment; a morally good character (virtue) is a disposition toward such alignment; a morally good society is one whose structures enable the functional alignment of its members.

6.4 Explaining Moral Diversity Across Cultures and History

A persistent challenge for naturalistic ethics is explaining the striking diversity of moral codes across human societies. If morality is grounded in objective reality, why do moral practices vary so dramatically? The navigational framework provides a powerful explanation through its **diachronic, context-sensitive** understanding of *Hormē* fulfillment. This aligns with David Wong's concept of "pluralistic relativism," where different moralities are valid functional adaptations to the universal problems of social cooperation.[54]

Different human groups have faced radically different **navigational problems** imposed by their environments (the *Archē*):

- **Desert nomads** developed ethics emphasizing hospitality, water-sharing, and flexible kinship—solutions to the problems of scarcity and isolation.
- **Agricultural civilizations** developed ethics emphasizing property rights, delayed gratification, and hierarchical stability—solutions to the problems of surplus, storage, and large-scale coordination.
- **Island maritime cultures** developed ethics emphasizing communal responsibility, storm-preparedness, and navigational courage—solutions to the problems of collective vulnerability and technical specialization.

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[53]Deutscher, *Neo-Pre-Platonic Naturalism*, 194.
[54]David B. Wong, *Natural Moralities: A Defense of Pluralistic Relativism* (Oxford University Press, 2006).

These different moral codes are not arbitrary inventions nor relative "opinions." They are **evolved navigational strategies**—cultural adaptations to different environmental and social *Logos* constraints. Each represents a different hypothesis about how to fulfill human *Hormē* under specific conditions.

Yet beneath this diversity lie **universal navigational constraints**:[55]

1. **The need for cooperation** (social *Philia* to overcome individual limitation).
2. **The need for conflict resolution** (social *Neikos* managed without group dissolution).
3. **The need for truth-tracking** (accurate models of physical and social reality).
4. **The need for resource acquisition and allocation**.
5. **The need for reproduction and child-rearing**.
6. **The need for meaning and coherence** (narrative integration of experience).

Different moral systems emphasize different aspects of these universal needs based on local conditions, but all address the same fundamental navigational imperatives. When conditions change—through technological innovation, environmental shift, or cultural contact—moral systems either adapt (through internal reform) or collapse (through navigational failure). This explains moral progress not as discovery of pre-existing absolutes, but as **collective navigational learning**—improving our maps and routes through social-historical trial and error.

Thus, the navigational account explains moral diversity without surrendering to relativism. Different moral codes are different **local optima** in the vast landscape of possible human social arrangements, each reflecting a different set of solutions to the universal problem of how to fulfill *Hormē* in a complex, changing world. Some solutions are better (more sustainable, more inclusive, more resilient) than others, and we can assess them objectively by examining how well they actually enable those living under them to navigate reality successfully.

7 Thermodynamic Foundations of the Isomorphism

The isomorphism between truth and goodness articulated in T4 is not merely conceptual or metaphorical; it is **thermodynamically necessary**. The same physical principles that govern the far-from-equilibrium existence of living systems also govern the informational and behavioral processes that constitute agency. To understand why epistemic error and ethical vice are functionally identical, we must examine their common root in the physics of persistence against entropy.

From T6, we established that life and agency are both expressions of *Hormē*—the continuous work required to maintain organizational integrity against entropic dispersion.[56] This thermodynamic condition creates a natural bridge between informational fidelity (truth) and behavioral efficacy

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[55]Deutscher, *Neo-Pre-Platonic Naturalism*, 157.

[56]Deutscher, *Life as Directed Causality*.

(goodness). A system that misrepresents its environment pays an energetic cost; a system that acts against its constitutive needs dissipates energy inefficiently. In both cases, the result is the same: increased free energy, wasted work, and heightened risk of entropic collapse.

This section demonstrates how the isomorphism between truth and goodness emerges directly from the thermodynamic constraints on far-from-equilibrium systems. We begin by connecting *Hormē* to the formal framework of free-energy minimization, show how epistemic and ethical failures manifest as thermodynamic inefficiencies, and illustrate how virtuous navigation creates a positive feedback loop that conserves energy and enhances persistence. The result is an ethics grounded not in convention or intuition, but in the same physical principles that govern hurricanes, flames, and living cells.

7.1   From *Hormē* to Free-Energy Minimization

In contemporary theoretical biology and neuroscience, the **Free Energy Principle** (FEP) provides a formal framework for understanding how self-organizing systems maintain their integrity over time.[57] The FEP states that such systems act to minimize variational free energy—a measure of surprise or prediction error. When a system's internal model generates accurate predictions about sensory inputs, free energy is low; when predictions fail, free energy increases.

Hormē is the **ontological precondition** for free-energy minimization. Only a system that must maintain its boundaries against entropy has a "surprise" to minimize. A rock does not care about prediction errors; a bacterium does. The FEP describes the *how* of self-maintenance—the computational strategies systems use; *Hormē* describes the *why*—the thermodynamic imperative that makes such strategies necessary.[58] The active inference framework extends this by showing how organisms don't merely minimize surprise through perception but through action—they bring the world into conformity with their predictions.[59]

The connection is direct: **Minimizing free energy is how systems fulfill *Hormē*.** Accurate models (truth) reduce prediction error; effective actions (goodness) bring the system into states that match its expectations. Both are mechanisms for maintaining the far-from-equilibrium state that constitutes the system's existence.

7.2   The Energetic Cost of Misalignment

Every misalignment with the *Logos*—whether epistemic or ethical—carries a measurable energetic penalty. This connects to Landauer's Principle, which establishes the thermodynamic cost

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[57]Karl Friston, "The Free-Energy Principle: A Unified Brain Theory?" *Nature Reviews Neuroscience* 11, no. 2 (2010): 127–38.

[58]Deutscher, *Life as Directed Causality*.

[59]Karl Friston et al., "Active Inference: A Process Theory," *Neural Computation* 29, no. 1 (2017): 1–49. This framework treats perception and action as dual aspects of the same free-energy minimization, which maps directly onto the epistemic/ethical isomorphism of T4: accurate models (perception) and effective actions both serve *Hormē*.

of information processing: erasing information (correcting error) requires work.[60] In the NPN framework, operating on false models requires constant, energy-intensive error correction to prevent systemic collapse.

Consider the following table of misalignment types:

Misalignment Type	Epistemic Form	Ethical Form	Thermodynamic Cost
Model-Territory Mismatch	False belief about resource location	Searching in wrong area	Wasted locomotion energy, missed opportunity
Internal Inconsistency	Cognitive dissonance, contradictory beliefs	Weakness of will, value conflict	Psychic entropy, decision paralysis, regulatory overhead
Social Miscoordination	Misunderstanding others' intentions	Unjust treatment, broken trust	Conflict energy, retaliation costs, lost cooperation benefits
Temporal Myopia	Failure to model long-term consequences	Short-term gratification at long-term expense	Future correction costs, compounded errors

These are not merely analogies; they represent the same underlying thermodynamic inefficiency described in different languages. A false belief leads to maladaptive action, which increases entropy locally or globally for the system. An unethical action (one that frustrates *Hormē*) creates friction with the social or physical environment, requiring compensatory energy expenditure to repair damage or avoid consequences.

7.3 The Thermodynamic Virtue Cycle

Just as misalignment carries energetic costs, alignment creates a **positive feedback loop** of thermodynamic efficiency:

Accurate model → Effective action → Reduced friction → Energy conserved → More resources for model refinement

This cycle is the thermodynamic expression of *Eudaimonia*—the flourishing state of an agent operating with minimal entropic drag.[61] Consider the virtuous agent:

- **Truthful** (aligned models): Makes fewer prediction errors, wastes less energy on fruitless searches.

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[60]Rolf Landauer, "Irreversibility and Heat Generation in the Computing Process," *IBM Journal of Research and Development* 5, no. 3 (1961): 183–91.

[61]Deutscher, *Neo-Pre-Platonic Naturalism*, 102.

- **Courageous** (acts on accurate models despite fear): Avoids the energetic cost of avoidance and procrastination.
- **Temperate** (balances competing needs): Optimizes resource allocation, avoids boom-bust cycles.
- **Just** (fair in social dealings): Minimizes conflict costs, maximizes cooperation benefits.

Each virtue represents a thermodynamic optimization—a way of organizing perception, cognition, and action to minimize free energy and fulfill *Hormē* with minimal waste.

7.4 Bridging Levels: From Molecular to Moral

The thermodynamic foundation of the isomorphism bridges what might appear to be incommensurate levels of description:

1. **Molecular level:** Metabolic pathways regulate energy flow to maintain cellular integrity.
2. **Organismic level:** Homeostatic systems regulate temperature, pH, and nutrient levels.
3. **Cognitive level:** Learning systems update models to reduce prediction error.
4. **Moral level:** Ethical reasoning selects actions that sustain flourishing.

At each level, the same principle applies: **Systems that maintain alignment with their constraints persist; those that don't, dissolve.** The constraints vary—chemical gradients, physiological set-points, environmental regularities, social norms—but the imperative is the same.

This multi-level consistency explains why moral and epistemic norms feel "binding" in a way that mere preferences do not. They are not social conventions but **discovered optimizations** in the space of possible ways of being. To violate them is not merely to break a rule but to work against the grain of reality—to swim upstream in an entropic current.

7.5 Empirical Implications and Testability

The thermodynamic formulation makes T4 empirically testable. If truth and goodness are thermodynamically isomorphic, we should observe:

1. **Neural correlates:** Brain regions associated with prediction error (e.g., anterior cingulate cortex) should activate during both epistemic uncertainty and moral conflict.
2. **Energetic measures:** Subjects making decisions based on false beliefs or conflicting values should show increased metabolic activity (e.g., glucose consumption, heart rate variability) compared to those acting from aligned models.
3. **Behavioral outcomes:** Communities with higher epistemic integrity (less misinformation) should show greater cooperation efficiency and resource sustainability.
4. **Evolutionary patterns:** Moral norms that persist across cultures should correlate with thermodynamic efficiencies (e.g., honesty reducing monitoring costs, courage preventing opportunity loss).

These predictions follow directly from the isomorphism and could be tested through interdisciplinary research combining neuroscience, behavioral economics, and social psychology.

7.6 Interim Conclusion: Ethics as Energy Economics

The thermodynamic foundation reveals ethics to be, at its core, a form of **energy economics**. Just as living systems allocate physical energy to maintain their structure, navigating agents allocate attention, effort, and social capital to maintain their functional alignment with reality. The "good" is what optimizes this allocation; the "true" is what accurately represents the constraints within which the allocation must occur.

This does not reduce ethics to mere efficiency or survival. Rather, it elevates efficiency to an ethical principle—not efficiency for its own sake, but efficiency in the service of what sustains meaningful existence. The most beautiful moral acts—compassion, creativity, sacrifice for others—are not exceptions to this principle but its highest expressions: ways of allocating energy that create new forms of value, extend the boundaries of cooperation, and transform the very landscape of what is possible for navigating agents.

With this thermodynamic foundation established, we can now examine the practical implications of the isomorphism through the structured process of moral development: the Navigator Protocol.

8 The Navigator Protocol as Moral Development

The isomorphism described in T4 is not merely theoretical; it is procedural. The **Navigator Protocol** provides the step-by-step method for aligning one's internal models (*logos*) with the external *Logos*, thereby achieving both epistemic truth and ethical goodness.[62] Each stage of the Protocol—from *Elenchus* (testing beliefs) to *Energeia* (acting on them) to *Phronēsis* (embodied wisdom)—cultivates the virtues necessary for successful navigation.

8.1 The Cybernetic Loop of Moral Correction

When an agent's actions produce suffering (ethical error), this is functionally identical to a prediction error in their model of reality. The corrective mechanism is the same: return to *Aporia* (conscious ignorance), rebuild the model with new data (often through empathy or perspective-taking), and re-engage with *Energeia*. Moral progress is thus a form of **belief revision under navigational pressure**. For example, suffering is not merely correlated with navigational failure; it is the lived experience of that failure from the first-person perspective of a *Hormē*-driven system.

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[62]Deutscher, *Neo-Pre-Platonic Naturalism*, 335.

The Popperian feedback loop—conjecture, test, refute, revise—applies equally to scientific theories and ethical frameworks.[63] Both are navigational models; both must be falsifiable by experience.

8.2 Toward a Navigational Virtue Theory

While a full virtue-theoretic expansion of T4 warrants separate treatment, we can outline its core insight: virtues are **reliable character traits that optimize navigation**. The traditional unity of the virtues emerges naturally from this framework—you cannot be truly courageous without accuracy (else you are reckless), nor truly just without understanding the social *Logos*.

Phronēsis (practical wisdom), in particular, can be understood as the master virtue of **integrative navigation**—the capacity to model complex situations, weigh competing *Hormē* demands, and act in ways that sustain alignment over time.[64] It represents the *Logistikon* functioning at peak efficiency, harmonizing the layered psyche (*Orexis* and *Thymos*) under the governance of reality's constraints without the *Nous* having to constantly solve potential misalignments[65].

This navigational account of virtue bridges epistemology and ethics without reducing one to the other: the virtuous person is both an accurate mapper and an effective wayfinder.

9 Applications and Implications

The isomorphism articulated in T4 is not merely an abstract philosophical thesis; it offers concrete resolutions to longstanding metaethical puzzles and has significant implications across multiple domains. By reframing ethics as navigation and truth-seeking as wayfinding, T4 provides new answers to old questions and opens new pathways for practical application.

This section demonstrates the explanatory power of T4 by showing how it resolves classic metaethical puzzles that have resisted solution for decades, then explores its implications for applied ethics, education, and artificial intelligence. The navigational framework proves robust not only in theoretical coherence but in practical utility.

9.1 Resolving Classic Metaethical Puzzles

For over a century, metaethics has been shaped by a handful of persistent puzzles that seem to resist any fully naturalistic solution. These puzzles—Moore's Open Question Argument, the problem of moral motivation, and the challenge of moral luck—have served as litmus tests for any proposed ethical naturalism. T4 passes these tests by showing how each puzzle arises from the false assumption that facts and values inhabit separate domains, and dissolves them when that assumption is replaced with the navigational perspective.

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[63]Karl R. Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* (Routledge, 1963).

[64]Aristotle, *Nicomachean Ethics*, trans. Roger Crisp (Cambridge University Press, 2000), bk. VI.

[65]Deutscher, *Neo-Pre-Platonic Naturalism*, 105.

9.1.1   The Open Question Argument

G.E. Moore's Open Question Argument has been the single most influential objection to ethical naturalism since its publication in 1903.[66] Moore argued that for any proposed naturalistic definition of "good"—whether "pleasure," "evolutionary fitness," or "social utility"—one can always meaningfully ask: "But is that really good?" The very fact that this question remains open, Moore claimed, proves that goodness cannot be identical to any natural property.

From the navigational perspective, Moore's argument rests on a fundamental misunderstanding of what naturalistic reduction entails. T4 does not propose a **synonymous reduction** where "good" means the same as "Hormē-fulfillment." Rather, it proposes an **identity claim** where goodness is discovered to be *Hormē*-fulfillment, just as temperature was discovered to be mean molecular kinetic energy.

Consider the parallel: Before thermodynamics, one could meaningfully ask, "I know this has high mean molecular kinetic energy, but is it really hot?" The question feels open because the speaker doesn't yet grasp the identity. After the scientific revolution, the question becomes nonsensical—not because we changed the meaning of "hot," but because we discovered what heat *is*. This relies on the Kripke-Putnam distinction between conceptual meaning and actual reference—water is H_2O regardless of whether the speaker knows the chemistry.[67]

Similarly, the question "I know this fulfills *Hormē*, but is it really good?" feels open only when one hasn't grasped the isomorphism. Once understood, the question collapses. The "openness" is not evidence of conceptual distinctness but of **incomplete understanding**—a failure to see that goodness just is the successful navigation of reality by a striving agent.

Moore's argument also assumes a **synchronic analysis** of meaning—that if two terms refer to the same thing, competent speakers should immediately recognize their identity. But scientific identities are often **diachronic discoveries**, not conceptual truths. Water wasn't "obviously" H_2O to pre-scientific speakers; the identity had to be established through empirical investigation and theoretical synthesis.

The navigational account explains why the Open Question feels compelling: our ordinary moral discourse treats "good" as a simple, unanalyzable property because, phenomenologically, that's how it appears. But phenomenological appearance is not metaphysical reality. The feeling of "openness" is a psychological artifact of our pre-theoretic understanding, not evidence of a non-natural moral reality.

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[66]G. E. Moore, *Principia Ethica* (Cambridge University Press, 1903).
[67]Saul A. Kripke, *Naming and Necessity* (Harvard University Press, 1980); Hilary Putnam, "The Meaning of "Meaning"," *Minnesota Studies in the Philosophy of Science* 7 (1975): 131–93.

Thus, T4 resolves the Open Question Argument not by denying its intuitive force, but by explaining why that intuition persists despite being mistaken—and by providing a naturalistic identity that, once grasped, makes the question close forever.

9.1.2 Moral Motivation

The question "Why be moral?" has troubled philosophers since Plato's *Republic*. It presupposes that morality is an external set of constraints or demands that might conflict with an agent's self-interest. From this perspective, the moral skeptic asks: "Why should I sacrifice my interests for moral requirements?" This creates the dilemma between "internalists" (who say knowing the good must motivate) and "externalists" (who say motivation is separate).[68]

T4 transforms this question entirely. If ethics is navigation—the activity of fulfilling one's constitutive *Hormē* within the constraints of the *Logos*—then "Why be moral?" becomes **"Why navigate successfully?"** This is not a question about motivation but about **ontological identity**. For an agent, to be is to navigate; to navigate poorly is to risk dissolution.

Consider the analogy: a sailor does not ask, "Why should I avoid reefs?" The avoidance is built into the activity of sailing; to sail is, by definition, to navigate waterways in a way that preserves the vessel. The question only arises if one imagines sailing and reef-avoidance as separate activities rather than as aspects of the same practice.

Thus, moral motivation is not something that needs to be *added* to agency; it is **constitutive of agency itself**. The agent who asks "Why be moral?" is like a flame asking "Why consume oxygen?"—the question misunderstands what it *is*. This does not mean all agents automatically act morally (many navigate poorly), but it does mean that the *reason* to act morally is built into the very structure of being an agent. The "should" is not external; it is the operational imperative of a far-from-equilibrium system that must act to persist.

This resolves the motivational internalism/externalism debate. Internalists are right that moral judgment has a necessary connection to motivation—because moral judgment is a form of navigational assessment. Externalists are right that people can judge something good without being moved—but only when their navigational systems are malfunctioning (through weakness of will, cognitive dissonance, or psychological pathology).

9.1.3 Moral Luck

The problem of moral luck, articulated by Bernard Williams and Thomas Nagel, asks why we hold people morally responsible for outcomes that depend on factors beyond their control.[69] If

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[68]Bernard Williams, "Internal and External Reasons," *Moral Luck: Philosophical Papers 1973-1980*, Cambridge University Press, 1981, 101–13.

[69]Bernard Williams, "Moral Luck," *Moral Luck: Philosophical Papers 1973-1980*, Cambridge University Press, 1981, 20–39; Thomas Nagel, "Moral Luck," *Mortal Questions*, Cambridge University Press, 1979, 24–38.

two drivers are equally reckless, but one happens to hit a pedestrian while the other does not, our moral assessment differs dramatically despite identical intentions and actions. This seems arbitrary—a matter of luck rather than morality.

T4 reframes moral assessment from **outcome evaluation** to **navigational evaluation**. The morally relevant question is not "What happened?" but "How well did the agent align their actions with reality given their information and capacities?"

Consider the two reckless drivers:

- Both possess flawed models of driving safety (underestimating risk).
- Both exhibit poor navigational habits (speed, inattention).
- Both create unjustified risk to others.

The fact that only one actually hits a pedestrian is indeed a matter of contingent luck. But their **navigational failure** is identical. From the perspective of T4, we can and should judge them as equally poor navigators—equally "unvirtuous" in their operation—even as we recognize that the *consequences* of their poor navigation differ due to factors beyond their control.

This distinction explains why we have both **criminal negligence** (outcome-dependent) and **reckless endangerment** (conduct-based) in legal systems. The former addresses actual harm; the latter addresses navigational failure. T4 suggests that ethical evaluation should focus primarily on the latter—the quality of navigation—while recognizing that practical systems must also address outcomes.

The problem of moral luck thus dissolves into two separate questions:

1. **Navigational assessment:** How well did the agent align their actions with reality given their information and capacities?
2. **Consequential management:** How should we respond to the actual outcomes that occur?

The first is properly ethical; the second is largely pragmatic (involving law, compensation, prevention). Confusing them generates the apparent paradox of moral luck.

This framework also handles other forms of moral luck:

- **Constitutive luck** (the temperament one is born with): Navigational capacity varies, but ethical evaluation considers how well one navigates *given* one's starting equipment.
- **Circumstantial luck** (the situations one encounters): Ethical evaluation considers how one navigates the situations one actually faces, not hypothetical alternatives.
- **Resultant luck** (how things turn out): As above, distinguished from navigational quality.

Thus, T4 preserves the intuition that morality should be about what we control (our navigation) while acknowledging that we live in a world where outcomes matter and luck exists. The solution

is not to deny luck's reality but to clarify what ethical evaluation properly assesses: not outcomes themselves, but the **navigational competence** displayed in pursuing them.

10 Implications for Applied Ethics

The navigational framework transforms how we approach practical ethical questions across domains. Rather than applying abstract principles or calculating consequences, applied ethics becomes the practice of **domain-specific navigation**—identifying what constitutes *Hormē*-fulfillment within particular contexts and determining how to achieve it given the relevant *Logos*.

10.1 Medical Ethics

Medical ethics has long struggled with competing frameworks: principlism (autonomy, beneficence, non-maleficence, justice), virtue-based approaches, and various forms of consequentialism.[70] The navigational framework unifies these by centering **patient *Hormē***—the patient's constitutive drive to persist within the lawful structure of reality (*Logos*) in a way that aligns with their values, circumstances, and capacity to flourish.

- **Informed consent** becomes more than a legal requirement; it is respect for the patient's role as **chief navigator** of their own life. The physician provides maps (diagnoses, prognoses, treatment options), but the patient must choose the route. This aligns with Edmund Pellegrino's argument that the "internal morality" of medicine is grounded in the ontological deficit of the patient-as-agent—the patient's vulnerability and need for restoration of agency.[71] The navigational framework provides a naturalistic grounding for informed consent requirements that goes beyond mere legal doctrine.[72] This aligns with Edmund Pellegrino's argument that the "internal morality" of medicine is grounded in the ontological deficit of the patient-as-agent.[73]

- **Beneficence and non-maleficence** are unified as **navigational optimization**: interventions should enhance the patient's overall capacity to fulfill their *Hormē*, not merely treat isolated pathologies. This explains why sometimes not treating (e.g., in terminal illness) may be more aligned with *Hormē*-fulfillment than aggressive intervention.

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[70]Tom L. Beauchamp and James F. Childress, *Principles of Biomedical Ethics*, 8th ed. (Oxford University Press, 2019).

[71]Edmund D. Pellegrino and David C. Thomasma, *For the Patient's Good: The Restoration of Beneficence in Health Care* (New York: Oxford University Press, 1988); Edmund D. Pellegrino, "The Metamorphosis of Medical Ethics: A 30-Year Retrospective," *JAMA* 269, no. 9 (1993): 1158–62.

[72]Ruth R. Faden and Tom L. Beauchamp, *A History and Theory of Informed Consent* (New York: Oxford University Press, 1986). Faden and Beauchamp distinguish between "effective" consent (mere legal compliance) and "autonomous authorization" (genuine exercise of agency), a distinction that maps onto the difference between procedural navigation and *Hormē*-aligned navigation.

[73]Edmund D. Pellegrino and David C. Thomasma, *The Virtues in Medical Practice* (Oxford University Press, 1993).

- **End-of-life decisions** are reframed as **navigational completion**: recognizing when further treatment impedes rather than enables meaningful existence, and facilitating a dignified conclusion to the journey.

- **Mental health** becomes **psychic navigation repair**: restoring the layered psyche's (*Orexis, Thymos, Logistikon, Nous*) capacity to function harmoniously.[74]

This approach resolves tensions between autonomy and paternalism by recognizing that true autonomy requires accurate maps (information) and functional navigational capacity (decision-making ability). When capacity is impaired, ethical care involves temporarily assisting with navigation while working to restore the patient's own capabilities.

10.2   Environmental Ethics

Environmental ethics has vacillated between anthropocentrism (valuing nature for human use) and various forms of biocentrism or ecocentrism (valuing nature intrinsically).[75] The navigational framework provides a principled middle path through **relational *Hormē* recognition**.

- **All living systems possess *Hormē***: From bacteria to blue whales, each strives to maintain its boundary as a living entity.
- **Our ethical consideration extends as far as our actions affect others' *Hormē***: We have obligations to other organisms not because they have "rights" in the human sense, but because our actions can frustrate or fulfill their constitutive striving.
- **Ecosystems exhibit distributed *Hormē***: While not themselves agents, ecosystems create the conditions for the *Hormē* of their constituent organisms. This vindicates Aldo Leopold's "Land Ethic," which expands the boundary of the moral community to include soils, waters, plants, and animals.[76] This view builds on Arthur Tansley's original conception of ecosystems as integrated functional units and Robert Ulanowicz's work on ecosystem development capacity, which demonstrates how ecosystems exhibit organizational properties irreducible to individual organisms.[77]
- **Sustainability becomes intergenerational navigation:** Our actions should preserve the conditions for future navigation—both human and non-human. This includes not only resource conservation but the preservation of biodiversity, climatic stability, and ecological

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[74]Deutscher, *Neo-Pre-Platonic Naturalism*, 261.

[75]J. Baird Callicott, *In Defense of the Land Ethic: Essays in Environmental Philosophy* (SUNY Press, 1989).

[76]Aldo Leopold, *A Sand County Almanac* (Oxford University Press, 1949).

[77]Arthur G. Tansley, "The Use and Abuse of Vegetational Concepts and Terms," *Ecology* 16, no. 3 (1935): 284–307; Robert E. Ulanowicz, *Ecology, the Ascendent Perspective* (New York: Columbia University Press, 1997). Ulanowicz's concept of "ascendency" captures how ecosystems develop organizational complexity that sustains the *Hormē* of constituent organisms.

complexity, echoing Hans Jonas's "Imperative of Responsibility" to ensure the permanence of genuine human life on Earth.[78]

This framework explains why we should care about endangered species (their *Hormē* is threatened), habitat destruction (it eliminates navigational contexts), and pollution (it frustrates the *Hormē* of countless organisms). It also provides guidance for difficult trade-offs: when human and non-human *Hormē* conflict, we must navigate toward solutions that minimize overall *Hormē*-frustration—a calculus that naturally weights humans more heavily (we are responsible moral agents) without dismissing other life as mere resources.

10.3   AI Ethics

The "alignment problem" in AI ethics asks how to ensure artificial intelligence systems act in accordance with human values.[79] T4 clarifies that the problem is fundamentally misnamed: current AI systems lack *Hormē*, so they cannot be "aligned" in the ethical sense. They are tools, not agents.

- **AI as navigational prosthesis:** Like telescopes extend vision or cars extend locomotion, AI extends cognitive navigation. This fits the "Extended Mind" thesis of Clark and Chalmers, where external systems become functional parts of the cognitive apparatus.[80] The ethical question is: How do we design and deploy these prostheses to enhance rather than undermine human *Hormē*?
- **Value alignment becomes navigation enhancement:** Instead of trying to encode "human values" into AI (an impossible task given their complexity and context-dependence), we should design AI to **augment human navigational capacity**—improving our models of reality, helping us anticipate consequences, and suggesting optimal actions given our goals.
- **The realignment problem:** As AI systems become more capable, they may reshape the *Logos* itself—changing social, economic, and informational environments in ways that affect human navigation. The ethical challenge is ensuring these changes don't frustrate human *Hormē* by, for example, making meaningful work impossible, undermining social cohesion, or creating informational environments that impair truth-tracking.

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[78]Hans Jonas, *The Imperative of Responsibility: In Search of an Ethics for the Technological Age* (University of Chicago Press, 1984).

[79]Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (Oxford University Press, 2014); Stuart Russell, *Human Compatible: Artificial Intelligence and the Problem of Control* (Viking, 2019).

[80]Andy Clark and David J. Chalmers, "The Extended Mind," *Analysis* 58, no. 1 (1998): 7–19. The Extended Mind thesis argues that cognitive processes can "loop out" into the environment when external resources are reliably coupled to organismic processes—precisely the relationship NPN posits between agents and their navigational prostheses.

- **Artificial agents:** If/when we create systems with genuine *Hormē* (self-maintaining far-from-equilibrium organization), T4 would apply to them directly. Their ethical status would depend on whether their *Hormē* conflicts with or complements ours.

This perspective shifts AI ethics from the impossible task of value-encoding to the manageable task of **human navigation support system design**. It also warns against anthropomorphizing AI: lacking *Hormē*, AI cannot be "good" or "evil" in the ethical sense—only more or less useful for our navigation.

11 Educational Implications

The fact/value dichotomy has structured modern education, creating separate "objective" STEM disciplines and "subjective" humanities. This division is pedagogically harmful and philosophically mistaken. T4 suggests education should be unified around **navigational skill development**, recovering the Deweyan ideal of education as the reconstruction of experience for better future direction.[81]

- **Truth-seeking and value-pursuing as one skill:** Students should learn that building accurate models (science, history, mathematics) and determining worthwhile actions (ethics, literature, art) are aspects of the same navigational practice. A science lesson on climate change should naturally lead to ethical consideration of our responses; an ethics discussion should be grounded in the best available facts.
- **Critical thinking as navigational cartography:** Teaching students to evaluate evidence, identify biases, and construct sound arguments is teaching them to **build better maps**. This skill is equally essential in laboratory science and moral reasoning.
- **Virtue cultivation as navigational habit formation:** Character education should focus on developing the habits that make for successful navigation: intellectual honesty, perseverance, empathy, courage, and practical wisdom. These are not arbitrary "values" but **empirically validated navigational excellences**.
- **Interdisciplinary learning as multi-scale navigation:** Students should learn to navigate across scales—from quantum physics to global politics—understanding how constraints at one level create possibilities at another.
- **Meta-cognitive skills:** Students should be taught to think about their own thinking—to recognize when their maps are flawed, when they're rationalizing rather than reasoning, when their *Logistikon* is being hijacked by *Orexis* or *Thymos*.
- **Preparing for an uncertain future:** In a rapidly changing world, teaching specific knowledge is less important than teaching **adaptable navigation skills**. Students need to learn

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[81]John Dewey, *Democracy and Education: An Introduction to the Philosophy of Education* (Macmillan, 1916).

how to learn, how to update their models, how to navigate novel situations. This vision recovers Martha Nussbaum's defense of liberal education as cultivation of practical reasoning and empathetic imagination—capacities essential for navigating a pluralistic democracy.[82]

This unified approach would produce not just knowledgeable graduates but **competent navigators**—people equipped to find their way through complex personal, professional, and civic challenges. It would also heal the damaging cultural split between "two cultures" (scientific and humanistic) by showing they're two aspects of the same human endeavor: understanding our world and determining how to live well in it.

12 Objections and Replies

Any philosophical thesis as bold as T4 must withstand rigorous scrutiny from multiple angles. This section addresses the most significant objections, organized from the most intuitive to the most technical. Each objection is stated in its strongest form before a detailed reply demonstrates how the navigational framework either dissolves the objection or turns it into a strength. By engaging with these challenges, the argument emerges not only intact but strengthened—its contours sharpened, its implications clarified, and its resilience demonstrated.

12.1 The "Moral Saints" Objection

Objection: "If goodness is *Hormē*-fulfillment, then acts of radical self-sacrifice—where someone gives their life for others—should be paradigmatically unethical, since they terminate the agent's *Hormē*. Yet we regard such acts as morally exemplary. This suggests your framework cannot account for our deepest moral intuitions about heroism and sacrifice."

Reply: This objection misunderstands the nature of complex agency. While simple agents (like bacteria) have *Hormē* directed at individual persistence, complex agents—especially humans—develop **extended *Hormē***. This expansion is grounded in the biological principle of inclusive fitness,[83] but in humans, it extends through symbolic capacity to include:

1. **Relational persistence:** Striving for the survival and flourishing of those we love.
2. **Ideal persistence:** Striving for values, principles, or causes to endure beyond our lifespan.
3. **Narrative persistence:** Striving for our life story to have coherence and meaning.

When a soldier falls on a grenade to save comrades, or a parent sacrifices themselves for a child, they are not "frustrating their *Hormē*" but **fulfilling it at its most expanded level**. They are

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[82]Martha C. Nussbaum, *Not for Profit: Why Democracy Needs the Humanities* (Princeton: Princeton University Press, 2010). Nussbaum argues that education should cultivate "narrative imagination"—the ability to model others' perspectives—which maps directly onto the Navigator Protocol's emphasis on empathetic perspective-taking as navigational skill.

[83]William D. Hamilton, "The Genetical Evolution of Social Behaviour. i," *Journal of Theoretical Biology* 7, no. 1 (1964): 1–16.

choosing a form of persistence-through-others over mere biological continuation. The act makes sense precisely because their identity—their psychic organization—has expanded to include others within their boundary of care. This expansion of identity boundaries is supported by empirical research on moral psychology and the evolution of altruism, which shows that humans readily extend concern beyond genetic kin through cultural mechanisms.[84]

This explains why we intuitively distinguish between:

- **Heroic sacrifice** (extended *Hormē* fulfillment): Giving one's life for family, comrades, or deeply held principles.
- **Suicide** (*Hormē* frustration): Ending one's life out of despair or distorted thinking.
- **Martyrdom** (ambiguous): May represent extended *Hormē* or pathological distortion, depending on context.

The navigational framework thus captures the nuance our moral intuitions recognize: sacrifice for something larger than oneself can be profoundly fulfilling, while self-destruction for trivial or pathological reasons is tragic. The difference lies in whether the act expresses or betrays the agent's deepest, most extended striving.

12.2   The "Evil Genius" Objection

Objection: "What about someone who navigates with perfect epistemic accuracy toward malevolent ends? Consider a brilliant serial killer who understands human psychology perfectly, evades detection skillfully, and achieves their evil goals efficiently. According to T4, their epistemic excellence should make them ethically good, but clearly they're evil. The isomorphism fails."

Reply: This objection contains a hidden contradiction. To achieve "evil ends"—systematically frustrating others' *Hormē*—while maintaining long-term success requires **epistemic error about the social *Logos***. Specifically, it requires underestimating:

1. **The recursive effects of harm:** Harm begets resistance, retaliation, and systemic responses.
2. **The network nature of society:** Disappearing people creates investigation, grieving networks demand answers.
3. **The psychological costs to the perpetrator:** Maintaining deception and compartmentalization creates internal friction.
4. **The evolutionary instability of pure predation:** As Axelrod demonstrated in the evolution of cooperation, pure predation ("always defect") is an unstable strategy that fails against cooperative clusters over time.[85] More recent work has identified five mechanisms

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[84]Frans de Waal, *The Age of Empathy: Nature's Lessons for a Kinder Society* (New York: Harmony Books, 2009). De Waal's work demonstrates that empathy and altruism have deep evolutionary roots in mammalian psychology, creating the substrate upon which human cultural elaboration builds extended *Hormē*.

[85]Robert Axelrod, *The Evolution of Cooperation* (Basic Books, 1984).

by which cooperation evolves—kin selection, direct reciprocity, indirect reciprocity, network reciprocity, and group selection—all of which create contexts where cooperation outcompetes pure predation.[86]

The "brilliant serial killer" is a fiction—a character who exists in novels but not in sustained reality. Real predators either:

- Get caught (epistemic failure about detection systems).
- Self-destruct (epistemic failure about psychological sustainability).
- Scale back to sustainable levels (becoming ordinary criminals rather than "evil geniuses").
- Operate within systemic protections (corrupt officials, warlords—whose "success" depends on social dysfunction).

The deeper point: **Sustainable malevolence is a navigational impossibility** in a properly functioning social *Logos.* To believe otherwise is to commit the very epistemic error the objection denies—misunderstanding how social systems respond to predation.

This doesn't mean minor or temporary evil is impossible, but that *systematic, sustained, successful* evil requires either:

- Operating in a broken *Logos* (war zones, failed states).
- Epistemic blindness to long-term consequences.
- Both.

In either case, the evil agent is navigating poorly relative to the actual *Logos*, just as someone who believes they can consistently win at roulette is navigating poorly relative to probability theory.

12.3   The "Relativism" Objection

Objection: "If goodness is *Hormē*-fulfillment, and different agents have different *Hormē*, doesn't this make ethics radically relative? What's good for a lion (eating gazelles) isn't good for a gazelle. What's good for a capitalist (maximizing profit) isn't good for a socialist. This seems to abandon moral objectivity entirely."

Reply: The framework establishes **constrained relativity**, not radical relativism. As Alasdair MacIntyre argues, flourishing is always relative to the specific "nature" of the species in question.[87] Consider the analogy with health:

1. **Health is relational:** Optimal blood pressure differs by age, species, and individual.
2. **Health is constrained:** Blood pressure outside certain ranges is unhealthy for *any* human.

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[86] Martin A. Nowak, "Five Rules for the Evolution of Cooperation," *Science* 314, no. 5805 (2006): 1560–63. Robert Trivers's earlier work on reciprocal altruism showed that cooperation can evolve even among non-kin when interactions are repeated and defectors can be punished. Robert L. Trivers, "The Evolution of Reciprocal Altruism," *Quarterly Review of Biology* 46, no. 1 (1971): 35–57.

[87] Alasdair MacIntyre, *Dependent Rational Animals: Why Human Beings Need the Virtues* (Open Court, 1999).

3. **Health is objective:** We can measure and agree on whether someone is healthy.

Similarly:

- **Ethics is relational:** What fulfills a lion's *Hormē* differs from what fulfills a gazelle's.
- **Ethics is constrained:** All humans share core *Hormē* needs (nutrition, safety, belonging, autonomy, meaning).
- **Ethics is objective:** We can assess whether actions fulfill or frustrate those needs.

The framework explains moral disagreement not as proof of relativism but as **navigational disagreement** about:

1. What human *Hormē* actually consists in (e.g., is happiness about pleasure or meaning?).
2. How best to fulfill it given the *Logos* (e.g., does capitalism or socialism better meet human needs?).
3. How to prioritize competing *Hormē* demands (e.g., liberty vs. equality).

These are empirical questions with better and worse answers, not matters of arbitrary preference. The fact that lions and gazelles have different goods doesn't mean ethics is subjective any more than the fact that cats and dogs have different nutritional needs means nutrition is subjective.

12.4 The "Circularity" Objection

Objection: "Your argument seems circular: You define good as *Hormē*-fulfillment, then say we should fulfill *Hormē* because it's good. This is tautological—'good is what fulfills striving, and we should strive because that's good.' The argument goes in a circle without independent justification."

Reply: This objection mistakes a **constitutive truth** for a **vicious circle**. Consider the parallel:

- **Physics:** "Objects fall because of gravity, and we call that force 'gravity' because objects fall."
- **Biology:** "Organisms reproduce because of life, and we call that property 'life' because organisms reproduce."

These aren't vicious circles but **identity statements**. Similarly:

1. **Observation:** Living systems engage in persistent, self-directed activity.
2. **Concept formation:** We call this activity *Hormē*.
3. **Further observation:** This activity has success conditions (persistence) and failure conditions (dissolution).
4. **Concept refinement:** We call success "good" and failure "bad" relative to the system.
5. **Identity statement:** Good = *Hormē*-fulfillment.

The circle is **virtuous** (explanatory) rather than vicious because:

- It starts with empirical observations about living systems.
- It develops concepts to describe those observations.
- It discovers relationships between those concepts.
- It arrives at an identity that explains why the relationships hold.

The question "Why fulfill *Hormē*?" is like "Why fall toward gravitational masses?"—it misunderstands that these aren't choices but **constitutive features** of being a certain kind of thing in the world. An agent doesn't "choose" to have *Hormē* any more than a mass "chooses" to exert gravity.

12.5 The "Naturalistic Fallacy" Objection

Objection: "You're directly committing the naturalistic fallacy—deriving 'ought' from 'is.' Hume showed this is impossible: no amount of descriptive facts about the world can logically entail normative conclusions. Your entire project is therefore fundamentally misguided."

Reply: This objection depends on accepting Hume's framework uncritically. A more nuanced response has three parts, supported by Hans Jonas's argument that metabolism itself introduces value into the physical world:[88]

First, the fallacy charge assumes a false dichotomy. Hume analyzed propositions in a **synchronic, deductive** framework. But living agents exist in a **diachronic, processual** reality. For such agents, "ought" isn't deduced from "is" through logic; it's **operationally generated** by being a certain kind of system. The "ought" of a thermostat ("it ought to turn on the heat when cold") isn't deduced from facts about temperature; it's built into what the thermostat *is*. Similarly, the "ought" of an agent is built into what agency *is*.

Second, the objection confuses logical deduction with natural necessity. No one claims "X is alive" *logically entails* "X ought to persist." Rather, we observe that living systems *do* strive to persist, and that this striving creates success/failure conditions. Calling success "good" and failure "bad" is **labeling observed phenomena**, not deducing norms from facts. The normativity emerges from the activity itself, not from logical manipulation.

Third, the objection assumes normativity must be separate from nature. But why? The entire history of science shows phenomena once thought "non-natural" (life, consciousness, agency) turning out to be natural. Why should normativity be different? The burden of proof is on those who claim normativity *cannot* be naturalized, not on those attempting the naturalization.

Most importantly: The navigational framework **accepts** that you can't get "ought" from "is" *if you're looking at static propositions.* But it shows that for living agents, the question is backwards. Agents don't start with "is" and deduce "ought"; they start *already engaged in* "ought-ing"

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[88]Hans Jonas, *The Phenomenon of Life: Toward a Philosophical Biology* (Harper & Row, 1966).

(striving), and their "is" statements serve that activity. The framework doesn't violate Hume's guillotine; it shows why the guillotine doesn't apply to navigating agents.

12.6   Additional Objection: "The Isomorphism is Too Strong"

Objection: "You claim epistemic error and ethical vice are *functionally identical.* But people make honest mistakes without being vicious, and sometimes vicious people have accurate beliefs. The isomorphism seems empirically false."

Reply: The identity is **functional**, not psychological or intentional. This relies on an **epistemic holism** similar to Quine's: our beliefs and actions face the tribunal of reality as a corporate body, not individually.[89] Consider:

- **Honest mistake:** A doctor misdiagnoses due to incomplete information. This is epistemically suboptimal AND ethically problematic (potentially harmful), even with good intentions. The functional identity holds: the error leads to suboptimal navigation.
- **Accurate villain:** A criminal correctly identifies a security weakness. Their belief is accurate, but their *overall navigational state* includes the error that predation is sustainable. The inaccuracy lies in their model of social systems, not in the specific belief about the lock.

The isomorphism operates at the **system level**, not the individual belief level. An agent's overall alignment with the *Logos* determines both their epistemic success (model accuracy) and ethical success (*Hormē*-fulfillment). Specific beliefs or actions might appear accurate/vicious in isolation while the overall system is misaligned.

This systemic view explains why:

- Good intentions with false beliefs still cause harm.
- True beliefs in service of bad overall navigation still lead to ruin.
- Virtue requires both accurate models and good character.

The isomorphism isn't refuted by counterexamples at the micro-level; it's confirmed by patterns at the macro-level: agents with better models generally fare better, and agents who fare better generally have better models.

13   Conclusion: Navigation as the Unified Field

Theorem T4 reveals that epistemology and ethics are not separate domains to be bridged but **different perspectives on the same activity**: navigation of reality by finite agents with *Hormē*. Truth is getting the map right; goodness is following it toward what sustains you. They are isomorphic because the map and the territory are part of the same world, and the traveler and

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[89]W. V. O. Quine, "Two Dogmas of Empiricism," *The Philosophical Review* 60, no. 1 (1951): 20–43.

the travel *are part of the same journey*—a journey that is, at its core, the thermodynamic work of maintaining a far-from-equilibrium existence against the entropic gradient.

This unification is not merely philosophical elegance; it has profound practical and theoretical implications:

- **For moral philosophy:** We need not search for mystical "moral facts" or surrender to relativism. Ethics becomes an empirical, navigational science—the study of how agents succeed or fail at fulfilling their constitutive striving within the lawful constraints of reality.
- **For epistemology:** The pretense of value-free inquiry is abandoned. All knowing serves navigation; truth is valuable because it enables effective action. The "purely theoretical" is revealed as a limiting case of the practical.
- **For education:** We can teach thinking and living as one skill—navigation. The artificial divide between STEM and humanities dissolves into an integrated curriculum of map-making and wayfinding.
- **For personal development:** Flourishing is not about hedonistic accumulation or abstract virtue but about becoming a **better navigator**—refining models, aligning actions, and harmonizing the layered psyche.
- **For social and political thought:** Societies can be judged not by ideological purity but by how well they **enable navigation** for their members—providing accurate information, just institutions, and meaningful opportunities.

The fact/value dichotomy that has structured Western thought for three centuries was not a discovery but a **category error**—an artifact of analyzing static propositions rather than living processes, of privileging synchronic logic over diachronic existence. With T4, we recover the ancient insight that wisdom is both knowing and living well—because in a world where we must navigate to persist, they were never really separate.

13.0.1 The Post-Darwinian Settlement

It is worth stating explicitly what this framework accomplishes in intellectual history. For three centuries, philosophy has struggled with the legacy of the scientific revolution's mechanization of nature. Descartes, Hume, and Kant each tried to preserve human meaning, agency, and morality in a universe described by physics as purposeless mechanism. Their solutions—dualism, skepticism, transcendental idealism—were heroic but ultimately untenable. They analyzed agents as if they were **eternal forms** inhabiting a mechanical world, when in fact agents are **evolved processes continuous with** that world.

Darwin's *Origin* (1859) provided the key: living systems are not anomalous exceptions to mechanism but **mechanism's highest expression**—self-maintaining dissipative structures that harness energy flow to preserve organization. Yet philosophy largely failed to absorb this insight's

full scope. Evolutionary theory was accepted for *bodies*, but reason, morality, and consciousness were still treated as transcendent additions requiring special explanation.

The NPN framework completes Darwin's revolution by showing that **normativity, intentionality, and rationality** are not metaphysical mysteries requiring non-physical explanations, but **thermodynamic necessities** for far-from-equilibrium systems of sufficient complexity. The "transcendental" structures Kant identified are real—but they are **immanent in evolved navigation systems**, not imposed from outside nature.

This is not reductionism. It is **expansionism**: recognizing that nature is **richer** than mechanical philosophy imagined—not a value-free void requiring supernatural additions, but a self-organizing process that generates agents, purposes, and norms through its own thermodynamic logic. The bacterium navigating a chemical gradient and the philosopher navigating moral dilemmas are not different in kind, only in **informational complexity** and **temporal scale**.

With this recognition, we can finally move beyond the false choice between scientism (which denies the reality of agency and value) and dualism (which places them outside nature). Agency is **natural**. Value is **natural**. Reason is **natural**. Not in the sense of being reducible to physics (they aren't), but in the sense of being **continuous with physics**—emergent properties of the same thermodynamic processes that create hurricanes and stars, only organized with sufficient complexity to model themselves.

The post-Darwinian settlement, then, is this: **We are not ghosts in machines, nor machines haunted by ghosts. We are the universe's way of navigating itself—matter organized to maintain its own pattern against entropy, and thereby to care, to know, and to choose.**

13.1 Beyond Theory: Toward a Navigational Practice

The implications of T4 extend beyond theoretical unification. The **Navigator Protocol**, detailed fully in *Neo-Pre-Platonic Naturalism*,[90] provides a concrete therapeutic and developmental framework—a systematic method for cultivating the habits, skills, and meta-cognitive awareness required for optimal navigation. This protocol operationalizes the isomorphism, providing:

1. **Diagnostic tools** for identifying navigational failures (whether they manifest as epistemic errors, ethical vices, or psychological suffering).
2. **Intervention methods** for restoring alignment through structured stages (*Elenchus*, *Aporia*, *Prohairesis*, *Energeia*, etc.).
3. **Training regimens** for developing navigational virtues—not as abstract ideals but as functional excellences.
4. **Social applications** for improving collective navigation in organizations, communities, and polities.

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[90]For the complete Navigator Protocol see Deutscher, *Neo-Pre-Platonic Naturalism*, Ch. 8 and App. g.

This practical extension will demonstrate that the isomorphism is not merely true but **useful**—that recognizing the unity of truth and goodness can guide us toward better ways of thinking, acting, and being together.

13.2 Final Reflection: The Inescapability of Alignment

The operationalization of this navigational accuracy—how to systematically improve moral models through the Navigator Protocol—is established in the wider NPN framework. Here, we have demonstrated that moral progress is navigational in structure, not the discovery of fixed, static truths.

The navigational turn in ethics does not make morality easier. Accurate navigation is hard work against entropic gradients, cognitive biases, and social complexities. But it makes morality **real** in the only sense that matters: it is built into the structure of what we are and the world we inhabit, and the ongoing process of their coupling.

We are not ghosts in machines, nor machines accidentally haunted. We are **self-modeling dissipative structures**—flames that fuel their own shape, whirlpools that maintain their own vortex. Our highest aspirations, our deepest loves, our most rigorous reasonings—all are expressions of the same primordial imperative: to keep the story from ending, to sustain the pattern against the cosmic wind.

To be is to navigate; to navigate well is to be good. The isomorphism is complete, necessary, and—for any system that wishes to persist—inescapable. In recognizing this, we find not a reduction of meaning but its foundation: our capacity for truth, goodness, and beauty is not a contradiction of our physical nature but its most exquisite expression. The journey continues, and the map is ours to draw.

References

Aristotle. *Nicomachean Ethics.* Translated by Roger Crisp. Cambridge University Press, 2000.

Axelrod, Robert. *The Evolution of Cooperation.* Basic Books, 1984.

Barandiaran, Xabier E., Ezequiel A. Di Paolo, and Marieke Rohde. "Defining Agency: Individuality, Normativity, Asymmetry, and Spatio-Temporal Origin of Action." *Adaptive Behavior* 17, no. 5 (2009): 367–86.

Beauchamp, Tom L., and James F. Childress. *Principles of Biomedical Ethics.* 8th ed. Oxford University Press, 2019.

Bostrom, Nick. *Superintelligence: Paths, Dangers, Strategies.* Oxford University Press, 2014.

Callicott, J. Baird. *In Defense of the Land Ethic: Essays in Environmental Philosophy.* SUNY Press, 1989.

Deutscher, Eli Adam. *Life as Directed Causality: A Thermodynamic Isomorphism Between Being and Acting.* 2025.

Deutscher, Eli Adam. *Neo-Pre-Platonic Naturalism: A First-Principles Framework for Reality, Mind, and Knowledge.* Neo-Pre-Platonic Press, 2025.

Dewey, John. *Democracy and Education: An Introduction to the Philosophy of Education.* Macmillan, 1916.

Di Paolo, Ezequiel A. "Autopoiesis, Adaptivity, Teleology, Agency." *Phenomenology and the Cognitive Sciences* 4, no. 4 (2005): 429–52.

England, Jeremy L. "Dissipative Adaptation in Driven Self-Assembly." *Nature Nanotechnology* 10, no. 11 (2015): 919–23.

Foot, Philippa. *Natural Goodness.* Oxford University Press, 2001.

Friston, Karl. "The Free-Energy Principle: A Unified Brain Theory?" *Nature Reviews Neuroscience* 11, no. 2 (2010): 127–38.

Hamilton, William D. "The Genetical Evolution of Social Behaviour. i." *Journal of Theoretical Biology* 7, no. 1 (1964): 1–16.

Hume, David. *A Treatise of Human Nature.* 1739.

Jonas, Hans. *The Imperative of Responsibility: In Search of an Ethics for the Technological Age.* University of Chicago Press, 1984.

Jonas, Hans. *The Phenomenon of Life: Toward a Philosophical Biology.* Harper & Row, 1966.

Kemp Smith, Norman. *The Philosophy of David Hume: A Critical Study of Its Origins and Central Doctrines.* Macmillan, 1941.

Kripke, Saul A. *Naming and Necessity.* Harvard University Press, 1980.

Landauer, Rolf. "Irreversibility and Heat Generation in the Computing Process." *IBM Journal of Research and Development* 5, no. 3 (1961): 183–91.

Leopold, Aldo. *A Sand County Almanac.* Oxford University Press, 1949.

MacIntyre, Alasdair. *After Virtue: A Study in Moral Theory.* University of Notre Dame Press, 1981.

MacIntyre, Alasdair. *Dependent Rational Animals: Why Human Beings Need the Virtues.* Open Court, 1999.

McDowell, John. "Mind and World." *Harvard University Press*, 1994.

Millikan, Ruth Garrett. *Language, Thought, and Other Biological Categories: New Foundations for Realism.* MIT Press, 1984.

Moore, G. E. *Principia Ethica.* Cambridge University Press, 1903.

Nagel, Thomas. "Moral Luck." *Mortal Questions*, Cambridge University Press, 1979, 24–38.

Nussbaum, Martha C. "Non-Relative Virtues: An Aristotelian Approach." *The Quality of Life*, Clarendon Press, 1993, 242–69.

Pellegrino, Edmund D., and David C. Thomasma. *The Virtues in Medical Practice.* Oxford University Press, 1993.

Popper, Karl R. *Conjectures and Refutations: The Growth of Scientific Knowledge.* Routledge, 1963.

Prigogine, Ilya, and Isabelle Stengers. *Order Out of Chaos: Man's New Dialogue with Nature.* Bantam Books, 1984.

Prior, Arthur N. *Logic and the Basis of Ethics.* Clarendon Press, 1960.

Putnam, Hilary. "The Collapse of the Fact/Value Dichotomy and Other Essays." *Harvard University Press*, 2002.

Putnam, Hilary. "The Meaning of "Meaning"." *Minnesota Studies in the Philosophy of Science* 7 (1975): 131–93.

Quine, W. V. O. "Two Dogmas of Empiricism." *The Philosophical Review* 60, no. 1 (1951): 20–43.

Russell, Stuart. *Human Compatible: Artificial Intelligence and the Problem of Control.* Viking, 2019.

Snow, C. P. *The Two Cultures and the Scientific Revolution.* Cambridge University Press, 1959.

Spinoza, Benedict de. *Ethics.* Translated by Edwin Curley. Princeton University Press, 1994.

Stroud, Barry. *Hume.* Routledge, 1977.

Weber, Max. "Science as a Vocation." *Daedalus* 87, no. 1 (1919): 111–34.

Williams, Bernard. "Internal and External Reasons." *Moral Luck: Philosophical Papers 1973-1980*, Cambridge University Press, 1981, 101–13.

Williams, Bernard. "Moral Luck." *Moral Luck: Philosophical Papers 1973-1980*, Cambridge University Press, 1981, 20–39.

Wong, David B. *Natural Moralities: A Defense of Pluralistic Relativism.* Oxford University Press, 2006.