Logical Ontological Bounds: On the Necessity of the Three Fundamental Laws of Logic

James (JD) Longmire

Northrop Grumman Fellow (unaffiliated research)

longmire.jd@gmail.com

Abstract

This paper defends the thesis that the three fundamental laws of logic —identity (A = A), non-contradiction ($\neg(A \wedge \neg A)$), and excluded middle ($A \vee \neg A$)— constitute ontological bounds on coherent being. Rather than mere epistemic conventions, these laws delineate what can exist and be intelligibly described. Their universality in all empirical observation and formal reasoning suggests they are necessary formal constraints embedded in the structure of intelligible reality. Drawing an analogy with the speed of light as a physical bound, this paper argues that the 3FLL play a structurally analogous role as logical limits on possibility, while acknowledging the distinct nature of their necessity. Objections regarding their epistemic status, anthropocentrism, and compatibility with quantum phenomena are addressed, establishing the 3FLL as indispensable features of any intelligible ontology.

Keywords: Laws of logic, ontological bounds, intelligibility, metaphysics of logic, speed of light analogy

1. Introduction

The three fundamental laws of logic—identity, non-contradiction, and excluded middle—have long been regarded as cornerstones of thought and discourse (Aristotle, 4th century BCE). While often treated as self-evident principles of reasoning, their status as ontological constraints on reality itself remains contentious. Do these laws merely reflect human cognitive structures, or do they constitute necessary features of any possible being?

This question has gained renewed urgency in contemporary philosophy of logic, where logical pluralism challenges the idea of unique logical truths (Beall and Restall, 2006), and deflationist approaches question whether logical laws have any substantial metaphysical import (Sider, 2011).[1] Against these trends, this paper argues that the 3FLL are not contingent epistemic conventions but necessary ontological bounds: they demarcate the space of what can coherently exist and be described.

The argument proceeds through five stages. First, I establish the empirical universality of the 3FLL across all scientific theories and observations. Second, I argue that attempts to treat these laws as mere conventions fail because they remain presupposed in any intelligible discourse, including attempts to reject them. Third, I develop the positive thesis that the 3FLL function as ontological bounds—formal constraints on what can coherently exist. Fourth, I defend this view through an analogy with physical limits like the speed of light, while acknowledging important disanalogies. Finally, I address objections concerning epistemic relativism, quantum mechanics, and the possibility of unintelligible realities.

[1] For recent discussions of logical deflationism, see Sider (2011) and Hirsch (2011). The debate concerns whether logical truths have substantial metaphysical content or merely reflect semantic conventions.

2. The Universality of the 3FLL

2.1 Empirical Universality

Across all scientific theories and empirical observations, no state of affairs violating the 3FLL has ever been recorded (Tennant, 2017). This universality extends beyond mere logical consistency in formal systems to encompass the structure of empirical reality itself. Even in domains where classical intuitions falter—such as quantum mechanics, general relativity, or non-standard mathematics—identity, non-contradiction, and excluded middle remain intact at the level of formalism and observation (Maudlin, 2019).

Consider quantum mechanics, often cited as challenging classical logic. Quantum superpositions, frequently misinterpreted as violations of non-contradiction, yield determinate outcomes upon measurement, preserving logical coherence (Birkhoff and Neumann, 1936). A particle in superposition is not simultaneously in contradictory states; rather, it exists in a well-defined quantum state that lacks classical analogues.[2] When we measure the particle's position, we obtain a definite result that satisfies the law of excluded middle—the particle is either at location A or not at location A, with no intermediate possibility.

Similarly, paraconsistent logics, while formally entertaining contradictions, do not describe actual physical states of affairs but alternative calculi for managing information (Priest, 1987). These logics serve as tools for reasoning about inconsistent information sets or limiting cases of classical reasoning, not as descriptions of contradictory reality.[3]

2.2 Formal Universality

The universality of the 3FLL extends to formal systems themselves. Even logics that appear to reject these laws typically preserve them at a deeper level. Intuitionistic logic, for instance, rejects the unrestricted law of excluded middle but maintains both identity

[2]The technical point here concerns the distinction between superposition and classical mixture. A quantum superposition $|\psi\rangle = \alpha|0\rangle + \beta|1\rangle$ is a well-defined quantum state, not a classical object in contradictory states.

[3]Priest's dialetheism represents the most sophisticated attempt to defend true contradictions, but even Priest restricts contradictions to specific domains (like semantic paradoxes) rather than claiming they pervade all reality.

and non-contradiction (Dummett, 2000). Moreover, intuitionistic logic can be embedded within classical logic via double-negation translation, suggesting that classical principles remain operative even in apparently non-classical contexts.

The firmness and indispensability of the principle of non-contradiction in particular has been extensively analyzed in recent scholarship (Massie, 2022; Wedin, 2004), confirming its foundational status across different domains of inquiry. Aristotle's original arguments in Metaphysics Γ remain influential precisely because they demonstrate that any coherent discourse—including attempts to reject non-contradiction—must presuppose the principle's validity.

2.3 The Challenge of Logical Pluralism

Contemporary logical pluralism poses a significant challenge to claims about the universality of the 3FLL (Beall and Restall, 2006; Field, 2009). Pluralists argue that there are multiple equally legitimate logical systems, each capturing different aspects of logical consequence. If this is correct, then claims about the unique status of classical logic and its fundamental laws become problematic.

However, even robust logical pluralism faces the constraint that any proposed logical system must be intelligible and applicable (Priest, 2006). This constraint itself presupposes the 3FLL. Consider attempts to develop logics that genuinely reject identity: such systems quickly become unintelligible because we cannot distinguish between different symbols or maintain consistent interpretations (Williamson, 2013).[4] The pragmatic constraints on logical theory construction thus point back to the indispensability of the 3FLL.

[4]The technical challenge concerns maintaining reference and interpretation without identity. If we cannot distinguish symbol tokens or maintain consistent interpretations, the resulting system becomes practically and theoretically useless.

3. Beyond Epistemic Convention

3.1 The Conventionalist Challenge

The claim that the 3FLL are merely conventions imposed by human thought has a distinguished philosophical pedigree, traceable to figures like Poincaré, Carnap, and Quine (Coffa, 1991). On this view, logical laws are stipulations we adopt for convenience, pragmatic utility, or social coordination, but they carry no metaphysical implications about the structure of reality.

This conventionalist position, however, overlooks the peculiar indispensability of the 3FLL to any intelligible discourse whatsoever. Attempts to imagine or describe a reality in which A $\neq$ A, or where A and $\neg$A simultaneously obtain, collapse into unintelligibility (Putnam, 1981). The ability to generate contradictory symbols does not equate to conceiving a coherent contradictory state. When we write "the cat is both alive and dead," we have produced a grammatical sentence, but not a coherent proposition about reality.[5]

3.2 The Self-Refutation Argument

Consider what would be involved in genuinely rejecting the law of non-contradiction. Such rejection would have to maintain that contradictions can be true—that for some proposition p, both p and $\neg p$ can simultaneously hold. But this claim itself must obey the law of non-contradiction to be intelligible. If the claim that "contradictions can be true" were itself both true and false, we would have no determinate content to evaluate (Aristotle, 4th century BCE).

This generates what we might call the *performative paradox of logical rejection*: any coherent attempt to reject the 3FLL must presuppose their validity in the very act of rejection. The rejection is either intelligible (in which case it presupposes the 3FLL) or unintelligible (in which case it fails to constitute a genuine rejection).

[5]This point was already recognized by Aristotle in Metaphysics Γ 4, where he argues that anyone who claims to reject the law of non-contradiction must still employ meaningful language, which presupposes the law's validity.

3.3 Psychologism and Cognitive Constraints

A more sophisticated version of conventionalism, psychologism, locates the necessity of the 3FLL in facts about human cognitive architecture rather than in social convention (Mill, 1843). On this view, we cannot think contradictory thoughts because of how our minds are structured, not because reality itself excludes contradictions.

This psychologistic approach faces several difficulties. First, it conflates the question of psychological possibility with logical possibility. Even if humans cannot think genuine contradictions, this would not establish that contradictions are logically impossible—only that we are cognitively limited (Frege, 1884). Second, the psychologistic account must explain why our cognitive limitations track logical truths so systematically. If the 3FLL were merely artifacts of human psychology, their universal applicability across physical and mathematical domains would be a remarkable coincidence.

3.4 The Argument from Indispensability

Because all claims about reality—whether empirical or speculative—presuppose the 3FLL to be intelligible, it is more reasonable to regard these laws as structural features of reality itself, rather than contingent products of human cognition or convention. This metaphysical status of logical principles has been defended in recent work that argues for treating the law of non-contradiction as a fundamental metaphysical principle rather than merely a logical convention (Tahko, 2009).

The indispensability argument can be formalized as follows:

1. Any meaningful claim about reality presupposes the 3FLL for its intelligibility.
2. This presupposition is unavoidable—even attempts to reject the 3FLL must employ them.
3. Such universal and unavoidable presupposition indicates necessity, not mere convention.
4. Therefore, the 3FLL are necessary features of any intelligible reality.

This argument parallels but extends beyond Quine's indispensability argument for mathematical objects (Quine, 1951). While Quine argued that we should believe in mathematical entities because they are indispensable to our best scientific theories, the argument here contends that the 3FLL are indispensable to intelligible discourse as such.

4. The 3FLL as Ontological Bounds

4.1 Defining Ontological Bounds

Given their universality and indispensability, the 3FLL qualify as *ontological bounds*: they demarcate the boundary of what can exist and be coherently instantiated. They are not empirical discoveries but necessary formal conditions for any possible being to be intelligible (Williamson, 2013).

An ontological bound differs from both empirical constraints and logical possibilities. Empirical constraints, like conservation laws in physics, describe how entities behave within reality but do not determine what can exist. Logical possibilities, in the narrow sense, include anything that does not generate formal contradiction within a given system. Ontological bounds, by contrast, specify the conditions under which anything can coherently count as existing at all.[6]

4.2 The Formal Structure

Formally, we can characterize ontological bounds as follows:

Definition: A principle P constitutes an ontological bound if and only if:

1. P is necessarily presupposed by any coherent discourse about existence
2. Violating P renders putative entities unintelligible rather than false
3. P applies universally across all domains of possible entities

The 3FLL satisfy these conditions:

[6]This tripartite distinction—empirical constraints, logical possibilities, ontological bounds—requires further development but captures an important structural difference in types of constraints on reality.

Identity ($\mathbf{A = A}$): Without identity, we cannot distinguish one entity from another or maintain reference across time. Any putative entity that lacked self-identity would not be determinately anything at all.

Non-contradiction ($\mathbf{\neg(A \wedge \neg A)}$): Without non-contradiction, entities could have any property whatsoever, making determinate predication impossible. If something could be both F and non-F, the concepts F and non-F would lose all content.

Excluded Middle ($\mathbf{A \vee \neg A}$): Without excluded middle, there would be gaps in the logical space of possibilities, creating indeterminate zones where entities neither exist nor fail to exist in any specifiable way.[7]

4.3 Concrete Applications

Consider concrete examples of how the 3FLL function as ontological bounds:

Mathematical Objects: Even highly abstract mathematical entities like transfinite numbers or impossible geometries must satisfy the 3FLL to be coherent objects of mathematical study. A "number" that was not identical to itself, or a "triangle" that both had and lacked three sides, would not be a coherent mathematical object.

Physical Entities: Physical objects, from elementary particles to galactic clusters, must maintain identity through time (persistence conditions), exhibit determinate properties (non-contradiction), and either possess or lack any given physical property (excluded middle). These constraints are not additional facts about physical entities but conditions for their being determinate entities at all.

Abstract Entities: Propositions, properties, and other abstract entities must similarly satisfy the 3FLL. A proposition that was not identical to itself would not be a determinate proposition; a property that both applied and failed to apply to the same object in the same respect would not be a coherent property.

[7]Some philosophers, particularly intuitionists, reject unrestricted excluded middle while maintaining constructive versions. However, even intuitionistic logic requires determinate verification conditions, which presuppose logical structure.

4.4 Ontological vs. Epistemological Necessity

The ontological status of the 3FLL must be distinguished from their epistemological status. While we might have epistemic access to these principles through reason, experience, or convention, their necessity stems from their role in constituting the possibility of determinate existence, not from our ways of knowing them.

This position aligns with recent work on metaphysical grounding, which examines how logical principles serve as foundational structures for reality itself (Correia and Schnieder, 2012; Fine, 2012). Just as physical laws ground the behavior of physical entities, logical laws ground the possibility of determinate entities existing at all.

The grounding relation here is constitutive rather than causal: the 3FLL do not causally produce determinate entities but rather constitute the formal conditions under which anything can be a determinate entity. Violating these conditions does not result in different kinds of entities but in the absence of determinate entities altogether.

5. Analogy with the Speed of Light

5.1 The Structure of Physical Bounds

The speed of light, c, provides a useful analogy for understanding how the 3FLL function as ontological bounds. In Einstein's special relativity, c is not merely the fastest speed that light happens to travel, but a fundamental constant that defines the causal structure of spacetime itself (Einstein, 1905). Nothing can travel faster than c, not because of physical limitations on acceleration, but because velocities greater than c are inconsistent with the geometric structure of spacetime.

This suggests a general pattern for how fundamental bounds operate:

1. **Universality**: The bound applies across all relevant domains without exception
2. **Constitutive Role**: The bound partially defines the structure within which entities operate
3. **Impossibility of Violation**: Apparent violations indicate conceptual confusion

rather than empirical discoveries

4. **Foundational Status**: The bound is presupposed by, rather than derived from, more specific laws

5.2 Comparing Physical and Logical Bounds

Feature	**Speed of Light** c	**3FLL**
Domain	Physical motion & causality	Coherent being
Type of bound	Dynamical, measurable	Structural, formal
Universality	Empirically observed	Universally presupposed
Violation consequences	Causal paradoxes	Unintelligibility
Epistemological status	A posteriori discovery	A priori constraint
Modal status	Nomologically necessary	Logically necessary
Falsifiable?	Yes, in principle	No, presupposed by falsifiability

5.3 Strength and Limitations of the Analogy

The analogy illuminates several important features of logical bounds:

Structural Role: Just as c defines the causal structure of spacetime, the 3FLL define the logical structure of intelligible being. Both sets of principles are constitutive of their respective domains rather than merely descriptive of them.

Impossibility of Genuine Violation: Apparent violations of c (like tachyons) point to conceptual confusions rather than empirical possibilities. Similarly, apparent violations of the 3FLL (like true contradictions) indicate conceptual rather than ontological possibilities.

Foundational Status: Both c and the 3FLL are presupposed by more specific laws in their domains. Physical laws presuppose the causal structure defined by c; em-

pirical claims presuppose the logical structure defined by the 3FLL.

However, the analogy also has important limitations:

Epistemological Differences: While c was discovered empirically and could in principle be falsified by observation, the 3FLL are known a priori and are presupposed by the very possibility of falsification.

Modal Differences: The speed of light is nomologically necessary—necessary given the laws of nature—while the 3FLL appear to be logically necessary—necessary in all possible worlds.[8]

Explanatory Direction: The speed of light constrains physical processes, while the 3FLL constrain the possibility of determinate existence itself.

5.4 Implications for Ontological Bounds

Despite these disanalogies, the comparison with physical bounds helps clarify the nature of ontological bounds. Like physical bounds, ontological bounds:

- Define the structural features of their domain
- Cannot be violated without conceptual confusion
- Are presupposed by more specific principles
- Apply universally within their scope

Unlike physical bounds, ontological bounds:

- Are known a priori rather than empirically
- Apply to the possibility of existence rather than actual existence
- Are logically rather than nomologically necessary
- Define intelligibility rather than physical possibility

[8]The modal status of physical laws is itself controversial. Some argue that laws of nature are metaphysically necessary, while others maintain they are contingent features of particular possible worlds.

6. Objections and Responses

6.1 Epistemic Relativism

Objection: The 3FLL reflect human cognitive constraints, not reality itself. Different cognitive systems might operate with different logical principles, undermining claims about universal necessity.

Response: This objection conflates psychological and logical possibility. While different cognitive systems might process information differently, this does not establish that alternative logical systems are coherently possible. No coherent account of reality that violates the 3FLL has been or could be constructed, regardless of cognitive architecture.

Moreover, the objection is self-undermining. To claim that different logical systems are possible, one must presuppose the 3FLL to distinguish between different systems and maintain coherent reference to them. The very possibility of epistemic relativism presupposes the universal validity of the principles it seeks to relativize.

Recent work in cognitive science and artificial intelligence has examined whether alternative forms of reasoning might be implemented in non-human systems (Johnson-Laird, 2006; Marcus, 2001). However, these investigations consistently reveal that any system capable of determinate reasoning must implement something functionally equivalent to the 3FLL, even if the surface implementation differs.

6.2 Contradictory States and Dialetheism

Objection: Contradictory states can be imagined and perhaps even exist. The Buddhist notion of the tetralemma, dialethic approaches to semantic paradoxes, and quantum mechanics all suggest that contradictions might be real (Priest, 2006; Siderits, 2003).

Response: This objection confuses several distinct issues. First, the ability to generate contradictory descriptions does not establish the possibility of contradictory states. When we say "the cat is both alive and dead," we have produced a grammatical sentence, but not a coherent description of a possible state of affairs.

Second, apparently contradictory descriptions often reflect conceptual confusion or the misapplication of concepts outside their proper domain. The Buddhist tetralemma, for instance, may be better understood as pointing to the limitations of conceptual thought rather than affirming genuine contradictions (Garfield, 1995).

Third, dialethic solutions to semantic paradoxes, while formally sophisticated, remain controversial precisely because they require accepting the reality of contradictions (Beall, 2009). The theoretical costs of dialetheism—including the loss of fundamental logical principles like explosion—suggest that alternative approaches to paradoxes should be preferred where possible.

Fourth, quantum mechanics does not genuinely involve contradictions. Quantum superposition describes well-defined physical states that lack classical analogues, not states that satisfy contradictory classical descriptions. Recent analysis of von Neumann's original work confirms that quantum logic preserves fundamental logical coherence while accommodating the non-classical features of quantum mechanics (Rédei, 2001).

6.3 Logical Pluralism and Alternative Logics

Objection: The existence of alternative logical systems—intuitionistic, relevance, many-valued, and others—demonstrates that the 3FLL are not universally necessary (Beall and Restall, 2006; Shapiro, 2014).

Response: Logical pluralism, properly understood, does not threaten the ontological status of the 3FLL. Most alternative logics either preserve the 3FLL at a deeper level or restrict their application rather than rejecting them entirely.

Intuitionistic logic, for example, rejects the unrestricted law of excluded middle but maintains constructive versions of all three laws. The intuitionistic rejection of excluded middle reflects epistemological constraints on provability, not metaphysical claims about the structure of reality (Dummett, 2000).

Relevance logics modify the behavior of conditionals and conjunction but typically preserve identity and maintain restricted versions of non-contradiction and excluded middle (Anderson and Belnap, 1975). Many-valued logics introduce additional truth-values

but maintain bivalent evaluation at the metalevel.

More fundamentally, the coherent development and application of any logical system presupposes the 3FLL. We must be able to distinguish different logical systems (identity), avoid contradictory applications (non-contradiction), and determine whether particular inferences are valid within each system (excluded middle). The possibility of logical pluralism thus confirms rather than undermines the universal necessity of the 3FLL.

6.4 Unintelligible Realities

Objection: Reality might extend beyond the bounds of human intelligibility. There could be aspects of reality that violate the 3FLL but remain inaccessible to human comprehension (McGinn, 1989; Nagel, 1974).

Response: This objection raises profound questions about the relationship between reality and intelligibility. In one sense, the objection may be correct: reality might include aspects that exceed human cognitive capacity. However, this concession does not threaten the argument for the 3FLL as ontological bounds for several reasons.

First, by definition, unintelligible realities lie outside the scope of meaningful discourse and thus outside the domain where the 3FLL are claimed to apply. The thesis defended here is that the 3FLL bound *intelligible* being, not being as such.

Second, the notion of reality that violates logical principles may itself be incoherent. To claim that there are realities beyond logic, one must employ logical principles in formulating and defending the claim. The apparent coherence of the claim may result from its high level of abstraction rather than its genuine possibility.

Third, even if we grant the possibility of trans-logical realities, this would not undermine the necessity of the 3FLL within the domain of intelligible being. Analogously, the possible existence of non-spatial entities would not threaten geometric principles within the spatial domain.

6.5 Historical and Cultural Variation

Objection: Different cultures and historical periods have employed different logical principles, suggesting that the 3FLL are culturally relative rather than universally necessary (Lloyd, 1990; Nisbett, 2003).

Response: While there is indeed variation in reasoning practices across cultures and historical periods, this variation typically concerns application conditions, emphasis, and pragmatic factors rather than fundamental logical principles. Anthropological studies that claim to identify cultures with different logical systems often conflate logical principles with broader patterns of reasoning or worldview (Hollis and Lukes, 1982).

For example, some studies suggest that East Asian reasoning emphasizes dialectical thinking and tolerance for contradiction more than Western reasoning (Peng and Nisbett, 1999). However, closer examination reveals that apparent contradictions are typically resolved through contextual distinction, temporal qualification, or level-relative analysis—techniques that presuppose rather than violate the 3FLL.

Moreover, the very possibility of cross-cultural comparison and translation presupposes shared logical principles. If different cultures genuinely employed incompatible logical systems, mutual understanding and comparative study would be impossible (Davidson, 1984).

7. Conclusion

The three fundamental laws of logic constitute universal constraints on what can coherently exist and be described. They function as logical ontological bounds, analogous in structural role—though not in kind—to physical bounds like the speed of light on motion and causality. Their universality and indispensability to intelligibility justify treating them as necessary features of any coherent ontology, regardless of ultimate metaphysical grounding.

This conclusion has significant implications for contemporary debates in philosophy of logic and metaphysics. Against logical pluralism, it suggests that the 3FLL have

a privileged status that transcends particular formal systems. Against conventionalism, it argues that these principles are discovered rather than stipulated features of intelligible reality. Against relativism, it maintains that logical necessity is objective and mind-independent.

The argument developed here also opens new avenues for research. If the 3FLL are genuinely ontological bounds, this raises questions about their relationship to other metaphysical principles, their role in grounding specific ontological categories, and their implications for the nature of existence itself. Future work might explore how ontological bounds interact with physical laws, mathematical structures, and metaphysical theories of grounding and dependence.

Perhaps most importantly, recognizing the 3FLL as ontological bounds provides a foundation for defending logical realism without lapsing into Platonism. The laws of logic are neither abstract objects in a timeless realm nor arbitrary human constructions, but structural features of intelligible being itself. They are as fundamental to reality as the distinction between existence and non-existence—indeed, they partially constitute what this distinction means.

In an era of increasing skepticism about logical and metaphysical necessity, this defense of the 3FLL as ontological bounds offers a path toward renewed confidence in the objective structure of intelligible reality. While much about the nature of existence remains mysterious, the fundamental logical structure within which all such mysteries must be formulated appears both necessary and discoverable through philosophical reflection.

References

Anderson, Alan Ross and Nuel D. Belnap (1975). *Entailment: The Logic of Relevance and Necessity*. Princeton University Press.

Aristotle (4th century BCE). *Metaphysics*. Book (Gamma). Various editions.

Beall, J. C. (2009). *Spandrels of Truth*. Oxford University Press.

Beall, J. C. and Greg Restall (2006). *Logical Pluralism*. Oxford University Press.

Birkhoff, Garrett and John von Neumann (1936). "The logic of quantum mechanics". In: *Annals of Mathematics* 37.4, pp. 823–843. DOI: 10.2307/1968621.

Coffa, J. Alberto (1991). *The Semantic Tradition from Kant to Carnap*. Cambridge University Press.

Correia, Fabrice and Benjamin Schnieder, eds. (2012). *Metaphysical Grounding: Understanding the Structure of Reality*. Cambridge University Press.

Davidson, Donald (1984). *Inquiries into Truth and Interpretation*. Oxford University Press.

Dummett, Michael (2000). *Elements of Intuitionism*. 2nd. Oxford University Press.

Einstein, Albert (1905). "On the electrodynamics of moving bodies". In: *Annalen der Physik* 17.10, pp. 891–921.

Field, Hartry (2009). "Pluralism in logic". In: *The Review of Symbolic Logic* 2.2, pp. 342–359.

Fine, Kit (2012). "Guide to ground". In: *Metaphysical Grounding*. Ed. by Fabrice Correia and Benjamin Schnieder. Cambridge University Press, pp. 37–80.

Frege, Gottlob (1884). *The Foundations of Arithmetic*. Trans. by J. L. Austin. Original work published 1884. Northwestern University Press.

Garfield, Jay L. (1995). *The Fundamental Wisdom of the Middle Way*. Oxford University Press.

Hirsch, Eli (2011). *Quantifier Variance and Realism*. Oxford University Press.

Hollis, Martin and Steven Lukes, eds. (1982). *Rationality and Relativism*. MIT Press.

Johnson-Laird, Philip N. (2006). *How We Reason*. Oxford University Press.

Lloyd, G. E. R. (1990). *Demystifying Mentalities*. Cambridge University Press.

Marcus, Gary F. (2001). *The Algebraic Mind*. MIT Press.

Massie, P. (2022). "Contradiction, being, and meaning in Aristotle's Metaphysics Gamma". In: *Journal of Ancient Philosophy* 16.1, pp. 27–50.

Maudlin, Tim (2019). *Philosophy of Physics: Quantum Theory*. Princeton University Press.

McGinn, Colin (1989). "Can we solve the mind-body problem?" In: *Mind* 98.391, pp. 349–366.

Mill, John Stuart (1843). *A System of Logic*. John W. Parker.

Nagel, Thomas (1974). "What is it like to be a bat?" In: *The Philosophical Review* 83.4, pp. 435–450.

Nisbett, Richard E. (2003). *The Geography of Thought*. Free Press.

Peng, Kaiping and Richard E. Nisbett (1999). "Culture, dialectics, and reasoning about contradiction". In: *American Psychologist* 54.9, pp. 741–754.

Priest, Graham (1987). *In Contradiction: A Study of the Transconsistent*. Oxford University Press.

— (2006). *Doubt Truth to be a Liar*. Oxford University Press.

Putnam, Hilary (1981). *Reason, Truth and History*. Cambridge University Press.

Quine, W. V. O. (1951). "Two dogmas of empiricism". In: *The Philosophical Review* 60.1, pp. 20–43.

Rédei, Miklós (2001). "Von Neumann's concept of quantum logic and quantum probability". In: *John von Neumann and the Foundations of Quantum Physics*. Ed. by Miklós Rédei and Michael Stöltzner. Springer, pp. 153–172.

Shapiro, Stewart (2014). *Varieties of Logic*. Oxford University Press.

Sider, Theodore (2011). *Writing the Book of the World*. Oxford University Press.

Siderits, Mark (2003). *Personal Identity and Buddhist Philosophy*. Ashgate.

Tahko, Tuomas E. (2009). "The law of non-contradiction as a metaphysical principle". In: *The Australasian Journal of Logic* 7, pp. 32–47.

Tennant, Neil (2017). *Core Logic*. Oxford University Press.

Wedin, Michael V. (2004). "Aristotle on the firmness of the principle of non-contradiction". In: *Phronesis* 49.3, pp. 225–265.

Williamson, Timothy (2013). *Modal Logic as Metaphysics*. Oxford University Press.