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COGNITIVE METAPHOR THEORY AND THE SHAPING OF THOUGHT IN SCIENCE AND POLITICS

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Abstract: *Metaphor has traditionally been considered a rhetorical or literary device used to embellish language. However, Cognitive Metaphor Theory (CMT), developed by George Lakoff and Mark Johnson in Metaphors We Live By (1980), reframed metaphor as a fundamental mechanism of human cognition. According to CMT, metaphors are not merely linguistic expressions but conceptual mappings that structure thought and experience. This article explores how metaphors shape reasoning and decision-making, particularly within scientific discourse and political communication. Drawing from linguistic, psychological, and social research, it demonstrates that metaphors influence not only how individuals conceptualize abstract domains but also how societies justify policies, interpret data, and construct ideologies. By examining examples from scientific modeling and political framing, the paper argues that metaphors serve as cognitive tools that both enable and constrain thought, shaping our understanding of reality itself.*

Keywords: *cognitive metaphor, conceptual metaphor theory, framing, political discourse, scientific reasoning*

For much of Western intellectual history, metaphor was regarded as an ornamental feature of language—a poetic flourish rather than a cognitive necessity. Aristotle viewed it as a stylistic tool, enhancing persuasion and aesthetic pleasure (Aristotle, trans. 1991). The advent of Cognitive Metaphor Theory (CMT), however, revolutionized this view. Lakoff and Johnson (1980) proposed that metaphors are not linguistic accidents but foundational to thought itself: "Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature" (p. 3).

This cognitive turn positioned metaphor as central to human understanding, influencing how people structure knowledge, reason about abstract concepts, and communicate ideas. Metaphors such as argument is war, time is money, and the mind is a machine reveal underlying conceptual mappings that guide behavior and reasoning (Lakoff & Johnson, 1980).

This paper applies CMT to two domains where metaphorical thinking plays a critical role: science and politics. Both rely on metaphors to make sense of complex systems, frame public discourse, and construct collective meaning. Yet metaphors can also mislead, simplify, or

manipulate. Understanding how metaphors function cognitively and socially is therefore essential for both critical thinking and epistemic awareness.

Cognitive Metaphor Theory (CMT) proposes that metaphors function through systematic connections between two conceptual domains: a source domain drawn from concrete, everyday experiences, and a target domain that represents more abstract ideas. For instance, in the metaphor time is money, the notion of economic exchange (the source domain) shapes how people conceptualize time (the target domain), evident in expressions like "spend time" or "save time." These relationships extend beyond language, influencing how individuals perceive, reason, and act (Lakoff, 1993).

The theory is rooted in the principle of embodied cognition, which asserts that abstract concepts emerge from bodily and sensory experiences. Metaphors such as up is good and down is bad stem from physical interactions with the environment and related sensorimotor patterns (Johnson, 1987). Through repeated experiences, people develop conceptual frameworks that support abstract reasoning. In this way, metaphor serves as a bridge between bodily experience and cognitive processes, merging perception with linguistic expression.

Moreover, metaphors function collectively, forming interconnected systems that generate coherent worldviews or frames. These frames structure how societies interpret reality by emphasizing certain aspects while concealing others (Lakoff, 2004). A well-known example is the metaphor the nation as a family, often used in political discourse. Depending on whether this "family" is imagined as nurturing or authoritarian, the metaphor promotes different moral values and policy perspectives. In this sense, metaphorical frames subtly direct public reasoning and define what is perceived as common sense or moral truth.

Metaphorical thinking plays a crucial role in scientific reasoning by helping to conceptualize abstract or unobservable phenomena. Metaphors operate as cognitive frameworks that enable scientists to formulate, test, and convey theoretical ideas (Gentner & Jeziorski, 1993). A classic example is the metaphor of the atom as a solar system, which allowed early physicists to imagine atomic structure by relating it to the familiar motion of planets around the sun. Although this model was later supplanted by quantum theory, it was instrumental in advancing early understandings of atomic behavior.

In a similar way, the genetic code metaphor in biology presents DNA as a kind of language or instruction set, shaping how researchers approach genetic processes and interpret data (Kay, 2000). In neuroscience, the brain as computer metaphor has influenced how cognition is studied, prioritizing notions of information processing and computational mechanisms (Dupuy, 2009).

Such metaphors extend beyond description—they actively guide scientific inquiry by determining which questions and explanations appear meaningful or valid.

While metaphors clarify complex ideas through intuitive comparisons, they also risk narrowing thought. When taken too literally, a metaphor can solidify into an unquestioned model of reality. For example, the brain–computer analogy has been criticized for overlooking the embodied, affective, and social aspects of human cognition (Varela, Thompson, & Rosch, 1991). Likewise, the genetic program metaphor tends to suggest biological determinism, obscuring the flexible and interactive nature of genetic expression (Oyama, 2000).

Consequently, scientific metaphors act as double-edged instruments—they foster discovery and communication but can also restrict interpretation. Maintaining awareness of their metaphorical character promotes intellectual flexibility and openness to new scientific paradigms.

Metaphors play a fundamental role in politics by shaping frames—the mental and rhetorical structures that organize public understanding of issues and evoke specific moral values and emotions (Lakoff, 2004). Expressions such as tax relief or war on drugs embed ideological assumptions: the word relief implies that taxation is an undesirable burden, while the notion of war suggests the presence of an enemy and legitimizes aggressive, punitive responses. Through continuous repetition, such metaphors become ingrained in collective thought, subtly influencing public opinion without the need for direct persuasion.

Lakoff (1996) outlines two primary metaphorical frameworks that underpin American political ideologies: the Strict Father and Nurturant Parent models. The Strict Father metaphor emphasizes order, discipline, and individual responsibility, aligning with conservative moral values, whereas the Nurturant Parent metaphor prioritizes empathy, equality, and communal care, reflecting liberal ideals. These conceptual models operate largely at an unconscious level, shaping how citizens interpret political issues and make moral judgments. Debates surrounding social welfare, immigration, and similar topics often rely on these familial metaphors to construct narratives of protection, duty, and compassion.

Political discourse consistently employs metaphor to activate shared cognitive schemas. For instance, when leaders refer to the economy as a "machine" that must be "repaired" or as a "garden" that needs to be "cultivated," they invoke different conceptual frameworks—one rooted in technical management and the other in organic growth and stewardship. In this way, metaphors act as mental shortcuts, helping audiences grasp complexity while simultaneously embedding value-laden perspectives.

Empirical research in cognitive linguistics and neuroscience reinforces this understanding. Studies show that metaphorical framing can influence reasoning by triggering embodied cognitive simulations (Thibodeau & Boroditsky, 2011). Describing crime as a beast leads people to favor punitive, enforcement-based solutions, whereas depicting it as a virus encourages preventive and reform-oriented policies. Such evidence demonstrates that metaphor is far more than a rhetorical device—it is a powerful cognitive mechanism that shapes perception, reasoning, and ultimately, democratic decision-making.

Both scientific and political metaphors rely on analogical projection—mapping structure from a concrete source onto an abstract target. In each case, metaphors highlight certain relations and obscure others. In science, this process aids model-building; in politics, it shapes moral framing. Despite different purposes, the underlying cognitive mechanism—conceptual mapping—remains the same.

Metaphors carry epistemic and ethical weight because they implicitly define what is real, relevant, and rational. When a metaphor dominates discourse, it naturalizes specific worldviews. For instance, the market as organism metaphor ("the economy must grow") frames economic expansion as biologically necessary, marginalizing alternative values like sustainability or equity (Charteris-Black, 2011). In science, the conquest of nature metaphor historically legitimized exploitative research paradigms aligned with industrial and colonial power (Merchant, 1980). Recognizing these metaphorical underpinnings allows for critical reflection on the politics of knowledge.

In conclusion, Cognitive Metaphor Theory reveals that metaphor is not a peripheral linguistic device but a core component of human cognition. Through embodied mappings, metaphors shape how individuals and societies conceptualize abstract domains such as time, morality, science, and politics. In scientific contexts, metaphors enable discovery and communication, while in political discourse, they frame ideologies and moral reasoning. Yet metaphors also limit perception, channeling thought along particular pathways and obscuring alternatives.

The study of metaphor, therefore, is not only a linguistic or philosophical pursuit but a form of cognitive and cultural critique. Recognizing the metaphors we live by is a step toward understanding—and potentially reshaping—the conceptual frameworks that govern our collective life.

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