

## Chapter 4

# Aristotle's "Logical Worldview": Understanding Logic Through Philosophy

**Creighton Rosental**  
Mercer University, USA

### ABSTRACT

*The author presents the idea of a "logical worldview" – an approach to understanding logic by examining philosophical positions in metaphysics, epistemology, and theories of cognition and perception, and exploring how philosophical and logical positions combine to form a complete logical system. Aristotle's logical worldview is examined in some detail, and the logical systems of Francis Bacon and George Boole are examined by exploring how a new logic results when certain Aristotelian philosophical positions are abandoned. The logical worldview approach is also shown to help explain certain puzzles with Aristotle's logic, such as existential import, the form of the syllogism, and Aristotle's "missing" moods and figures from the list of valid moods.*

### INTRODUCTION

Aristotelian logic was the dominant approach to logic for more than 2,000 years until the second half of the twentieth century, when it was nearly completely absent from contemporary logic courses for undergraduates, though it appears to be making a limited comeback in logic textbooks (see, for example, Baronett, 2015; Howard-Snyder, Howard-Snyder, and Wasserman, 2013). To the extent that Aristotelian logic is considered in the logic classroom, it is currently in an attenuated form, utilized as a method of reasoning (syllogistic), as an art of arguing well (dialectic), or as a limited or incomplete version of contemporary mathematical logic. As often as not, Aristotelian logic is simply ignored and left out of the contemporary curriculum altogether, presumably because it is considered obsolete, inadequate, incorrect, and/or irrelevant by modern philosophers.

In this chapter, the author argues that Aristotelian logic, as taught in the classroom, has been misconstrued, as have its successors, particularly the propositional and predicate logic that has come to replace Aristotelian logic. The next section surveys several common approaches to understanding Aristotelian logic by contemporary logicians and some deficiencies of these approaches.

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Aristotelian logic is not only a viable approach to teaching and learning logic, but in many ways it is a more natural and useful way of reasoning for students than mathematical logic. Considering Aristotelian logic as a “logical worldview” can yield this outcome. A logical worldview, an expression coined by the author, is the view that logic is not independent from other philosophical positions, such as those in metaphysics, ontology, epistemology, theory of mind, and theory of language, but rather is closely bound to them. A logical worldview examines how these philosophical positions both affect the form of the logic and are affected by logic. The main portion of the chapter introduces an example of a logical worldview in the form of Aristotle’s logic.

The chapter further explores how the notion of an Aristotelian logical worldview helps resolve difficulties in understanding various puzzles and “errors” associated with Aristotelian logic. It also provides a context for replacing Aristotelian logic with other approaches and investigating ways in which Aristotle’s logical worldview differs from that of other logics, such as those of Francis Bacon, George Boole, and contemporary mathematical logic.

## **BACKGROUND**

One common presentation of Aristotle’s logic in contemporary undergraduate logic classes is as a syllogistic logic. The typical approach is to identify the propositional forms recognized by Aristotle (in a subject-predicate form [“S is P”] with universal or particular quantity and affirmative or negative quality); present the square of opposition; and introduce the form of the syllogism (as having two premises, one conclusion, and three terms) and some valid moods. More in-depth, but less common, presentations of syllogistic may also provide techniques for determining invalid moods (e.g., counterexamples) and reductions to prove validity in other figures besides the first.

The syllogistic provides students with a method for generating (and perhaps identifying) valid forms of argument, but it leaves out far more of Aristotle’s work in logic than it includes. This approach includes a small portion from Aristotle’s *Prior Analytics* and *On Interpretation* but completely ignores the remainder of *Organon* (viz. *Categories*, *Topics*, *Posterior Analytics*, and *Sophistical Refutations*). Even within the syllogistic, the proper way in which the content of terms and propositions is to be determined is almost never presented, so students are led to conclude that any terms and propositions could be introduced into syllogisms as long as the argument form is valid; in other words, Aristotle’s syllogistic is presented as a purely formal logic about a limited set of valid inferences. Thus, for example, from Carroll (1958) we get examples of formally valid syllogisms such as:

*All cats understand French;  
Some chickens are cats.  
Therefore, some chickens understand French. (p. 58)*

As a formal logic, the syllogistic may be interesting, and as a reasoning method perhaps have a limited utility, but as a presentation of Aristotle’s logical perspective it raises more problems than it answers. How the syllogism fits with the rest of the *Organon* is left unexplained (and perhaps unexplainable) under this view, and the following Aristotelian positions are at least puzzling and sometimes considered to be errors:

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