

Logic Notes #8

Aristotelian Logic: First Figure Categorical Syllogisms

a. Self-Evident Syllogisms—The Dictum De Omni & Nullo

examples

<u>Barbara</u>	<u>Celarent</u>
All mammals have backbones. All dogs are mammals. So, all dogs have backbones.	No mammals have gills. All dogs are mammals. So, no dogs have gills.

the vowels in the names indicate the proposition types (see below)

two self-evident rules—Barbara & Celarent

the *dictum de omni et nullo*—What can be said (or denied) of a certain kind of thing can be said (or denied) of all the subkinds of that kind
(e.g., what can be said of all mammals can be said of all dogs)

the self-evident forms

<u>Name</u>	<u>Schema</u>	<u>Example</u>
Barbara	Amb	All wars that inflict more harm than good are unjust.
	<u>Adm</u> □ Adb	All nuclear wars inflict more harm than good. So, all nuclear wars are unjust.
Celarent	Emb	No military action whose harmful effects cannot be controlled is morally permissible.
	<u>Adm</u> □ Edb	All military uses of biological weapons are military actions whose harmful effects cannot be controlled. So, no military uses of biological weapons are morally permissible.

what is essential to these forms?

b. Formal Features Of Syllogisms

definitions

syllogism—“a discourse in which, certain things being stated, something other than what is stated follows of necessity from their being so”—Aristotle

categorical syllogism—a syllogism whose premises and conclusions are categorical propositions

necessary (formal) structure of a categorical syllogism

when can two propositions lead to a third?

(1) proper general structure

if two propositions have a common term, they *may* form basis for asserting a proposition containing the terms they do not share

e.g., given that all M are P and all S are M, one can conclude that all S are P (*dictum de omni*)

or, given that no M are P and all S are M, one can conclude that no S are P (*dictum de nullo*)

but given that all P are M and all S are M one may not conclude anything about the relation between P and S

so, a categorical syllogism contains ...

three categorical propositions

two premises

a conclusion

exactly three terms, each occurring in two distinct propositions

major term—the predicate of the conclusion

minor term—the subject of the conclusion

(NB: (1) taken together, these terms are called end terms

(2) this gives us a way of naming the premises

the major premise contains the major term

the minor premise contains the minor term)

middle term—the term shared by the two premises but absent from the conclusion

(NB: some authors call any argument having this structure a syllogism; Aristotle calls them syllogisms only if they are also valid)

(2) proper mood & figure—forms of the categorical syllogism can be distinguished on the basis of ...

figure—the relation between the middle term and the end terms

the middle term may be

broader than the minor, narrower than the major	subject of the major, predicate of the minor ¹	mp <u>sm</u> sp	Figure 1
broader than both major & minor terms	predicate of both major & minor	pm <u>sm</u> sp	Figure 2
broader than neither	subject of both major & minor	mp <u>ms</u> sp	Figure 3

mood—the logical form of the three propositions, listed in this order:

major premise, minor premise, conclusion

e.g., AAA, EIO

not all forms (figure + mood) are valid

which premises lead to a conclusion?

there are 4×4 premise pairs in each of the 3 figures (total: 36 pairs)

some (14 pairs) lead to conclusions; the rest do not

¹ Contrast this with the “fourth figure”

broader than the major, narrower than the minor	predicate of the major, subject of the minor	pm <u>ms</u> sp	Figure 4
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the mind does not naturally think this way—such arguments really convoluted versions of syllogisms in the other three figures.

c. Other Valid First Figure Forms

forms which have weakened minor premises and therefore also weakened conclusions

<u>Name</u>	<u>Schema</u>	<u>Example</u>
Darii	Amp	All wars that inflict more harm than good are unjust.
	<u>Ism</u>	Some wars in defense of a good cause inflict more harm than good.
	Isp	So, some wars in defense of a good cause are unjust.
Ferio	Emp	No military actions that intentionally kill the innocent are just.
	<u>Ism</u>	Some US military actions in WWII intentionally kill[ed] the innocent.
	Osp	So, some US military actions in WWII were not just.

d. Trivially Valid First Figure Forms

forms in which a particular conclusion is drawn when a universal conclusion would be possible

<u>From</u>	<u>Trivial Schema</u>	<u>Example</u>
Barbara	Amp	All wars that inflict more harm than good are unjust.
	<u>Asm</u>	All nuclear wars inflict more harm than good.
	Isp	So, some nuclear wars are unjust.
Celarent	Emp	No military action whose harmful effects cannot be controlled is morally permissible.
	<u>Asm</u>	All military uses of biological weapons are military actions whose harmful effects cannot be controlled.
	Osp	So, some military uses of biological weapons are not morally permissible.

e. Analysis of the First Figure

First Figure syllogisms can be seen as:

asserting a rule

the major premise,
rules are always universal statements;
and applying it to

Rule

Universal

a case

the minor premise,
cases are always affirmative; yielding

Case

Affirmative

a result

the conclusion
results can be in any form

Result

Any

that is why the conclusion is always
negative

First Figure syllogisms can be seen as applying a rule (the major premise;
always a universal statement) to a case (the minor premise; always
affirmative)

the conclusion can be in any of the four propositional forms