Philosophy 3304 Intro to Logic
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Rules of the Categorical Syllogism[1]

I. Rules of the Categorical Syllogism

There are several simple rules for how to make a valid categorical syllogism. These rules will tell us how to put premises together in good form to make a good argument. Remember, however, that validity does not guarantee truth; the truth of the premises and their relevance to the subject must be examined also.

A. RULE #1: The middle term must be distributed in at least one premise.

Example:

1. All persons with long hair are radicals.
2. Ed is a person with long hair.
3. Therefore, Ed is a radical.

What is the major term? _____.
What is the minor term? _____.
What is the middle term? _____.
What is the major premise? _____.
What is the minor premise? _____.

Since the middle term, _____, is distributed in the major premise, although undistributed in the minor premise, this syllogism does not commit the fallacy of the undistributed middle. The two terms of the conclusion are related to each other through the middle term in the premises. Remember that both premises share the middle term, so the conclusion tells us how those two premises relate to each other with respect to the middle term. If the middle term does not refer to all in its category at least once, there might not be any relation at all between the two premises. If all the members of the class are not related to some or all of the members of one of the other classes referred to by the premises, then it is possible that the major and minor classes may be related to different members of the class named by the middle term and consequently, may not be related to each other at all.

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[1] NB: This material is taken from several logic texts authored by N. Geisler, H. Kahane, and others. I make no claim to originality in this material.

The major premise of this syllogism asserts that all the members of the class named by the middle term "Persons with long hair" (distributed subject in an A proposition) are contained in the class named by the predicate "radicals."

The minor premise asserts that all members of the class of which Ed is the only member are contained in the class of persons with long hair.

Since all the members of the class of persons with long hair are contained within the class of radicals, Ed must also be a member of the class of radicals.

Fallacy: Undistributed middle

1. All radicals are people with long hair.
2. Ed is a person with long hair.
3. Therefore, Ed is a radical.

In this syllogism, the middle term, "people with long hair," is undistributed in both premises, since in both it is the predicate of an A proposition. Both the major and the minor terms are related to the middle term in the premises, but neither the major nor the minor class is related to the entire class referred to by the middle term, so their relationship to each other is not known. The first premise does not rule out the possibility that the class of people with long hair contains members who are not radicals, and the second premise would permit Ed to be such a person. But what about this revision?

1. All radicals are people with long hair.
2. Ed is a radical.
3. Therefore, Ed has long hair.

Of the following, which contains the distributed middle and which does not?

1. All sharks are fish.
2. All salmon are fish.
3. Therefore, all salmon are sharks.

1. All fish are sharks.
2. A salmon is a fish.
3. Therefore, a salmon is a shark.

1. All angels are immortal.

2. All men are immortal.
3. Therefore, all saints are angels.

1. All angels are immortal.
2. All saints are angels.
3. Therefore, all saints are immortal.

B. RULE #2: If a term is distributed in the conclusion, then it must be distributed in the premise in which the term occurs.

1. Explanation:

Breaking this rule involves committing what is known overall as the the fallacy of the illicit process which can have two aspects, namely, the fallacy of the illicit major or the fallacy of the illicit minor, depending on which term is not distributed in the premises. When a term is distributed in the conclusion, it refers to the whole class, and generalizations about a whole class cannot be made from statements that refer to only part of the class, since it is possible that something that is true of part of the class may not be true of the entire class specified in the conclusion. Thus, whatever term is distributed in a conclusion must also be distributed in its premise.

If we try to make a term refer to all of its class in the conclusion when it referred only to a part in the premises, then we are putting more in the conclusion than we had to begin with. You can't put a half-gallon of water in a jug, and then expect to pour out a whole gallon! The conclusion must never talk about more of the group than does the premise.

2. Examples:

a. The fallacy of the illicit major (or illicit process of the major term)

1. All lawyers are logicians.
2. No engineers are lawyers.
3. Therefore, no engineers are logicians.

What is the major term? _____.
Is the major term distributed in the conclusion? _____?
Which is the major premise? _____?

Is the major term distributed in the major premise_____?

So you have a syllogism in which the major term is distributed in the conclusion but not in the premise, hence fallacy of the illicit major!

In the conclusion, "No engineers are logicians," both terms are distributed, each referring to all members of its class (an E proposition). The minor term "engineers" is also distributed in the minor premise (subject of an E proposition). However, the major term "logicians" is not distributed in the major premise (predicate of an A proposition). Since the major term is distributed in the conclusion, but is undistributed in the major premise, it is called the fallacy of the illicit major. What about these?

1. All Hindus are vegetarians. A
2. No Jehovah's Witness is a Hindu. E
3. Therefore, no Jehovah's Witness is a vegetarian. E

1. All horses are animals. A
2. Some dogs are not horses. O
3. Some dogs are not animals. O

b. The fallacy of the illicit minor (or illicit process of the minor term)

1. All lawyers are well-paid people. A
2. All lawyers are logicians. A
3. Therefore, all logicians are well-paid people. A

What is the minor term? _____.
Is the minor term distributed in the conclusion? _____?
Which is the minor premise? _____?
Is the minor term distributed in the minor premise_____?

In the conclusion of this syllogism, the minor term "logicians" (subject of the conclusion) is distributed, but the same term is undistributed as the predicate of a Type A proposition in the minor premise. Thus, we have the process of the illicit minor. Try these:

1. All murder is sin. A
2. All sin is lawbreaking. A
3. All lawbreaking is murder. A

1. All tigers are mammals. A
2. All mammals are animals. A
3. All animals are tigers. A

C. RULE #3: NO CONCLUSION FOLLOWS FROM TWO NEGATIVE PREMISES.

1. Explanation

Negative premises simply affirm the exclusion of the members of one class from another class. Thus, two negative premises exclude the possibility of any relation between them. If nothing from one group has anything in common with anything from another group, there is nothing you can say about the two groups in common. "Nothing comes from nothing, nothing ever could." When this is attempted, however, it is often called the fallacy of exclusive premises.

2. Examples:

a. No Sundays are good days to study logic.
b. No Sundays are weekdays.
c. Therefore, all weekdays are good days to study logic.

Here, the major premise excludes all Sundays from the class of good days to study logic, and the minor premise excludes all Sundays from weekdays. But these exclusions do not in any way specifically relate the members of the class of weekdays to the class of weekdays to study logic. In the conclusion, the way members of the S class (weekdays) and the members of the P class (good days to study logic) are related whether by partial or total inclusion or exclusion, is not specified in the premises. Therefore, the premises do not support the conclusion that all S is P! Now try this one:

a. No fish are mammals.
b. Some dogs are not fish.
c. Therefore, some dogs are not mammals.

D. RULE #4: NO NEGATIVE CONCLUSION DERIVES FROM TWO AFFIRMATIVE PREMISES.

1. Explanation:

In Rule #3, we said that you can't get any conclusion from two negative premises. Here, this is turned around to say that from two affirmative premises, you can't get a negative conclusion. In other words, if nothing comes from nothing, then from something must always come something. There is just no way to sneak a negative into the conclusion if it wasn't there in the premises.

2. Examples:

a. All gorillas are primates.
b. All primates are mammals.
c. Therefore, some mammals are not gorillas.

a. All members of the Trinity are fully God.
b. But, some members of the Trinity take orders from God the Father.
c. Therefore, not all members of the Trinity are full equal with God the Father.

a. All triangles are three angled polygons.
b. All three angled polygons are three sided polygons.
c. Therefore, some three-sided polygons are not triangles.

E. RULE #5: AFFIRMATIVE CONCLUSIONS DO NOT DERIVE FROM A SYLLOGISM WITH A NEGATIVE PREMISE.

Examples:

1. Some men are not good athletes.
2. All baseball players are good athletes.
3. Therefore, some baseball players are men.

1. All crows are birds.
2. Some wolves are not crows.
3. Therefore, some wolves are birds.

F. RULE #6: THERE MUST ONLY BE THREE TERMS.

Sometimes an ambiguous fourth term sneaks into a syllogism by means of an equivocation (when a term has one meaning the first time it appears but a different meaning the next time it is used) or

by slipping the middle term into the conclusion where it never belongs.

1. All inspired writings are included in the Bible.
2. Handel was inspired when he composed the Messiah.
3. Therefore, Handel's Messiah should be included in the Bible.

1. All the books of the Bible are inspired.
2. Some of the books of the Bible were written by Paul.
3. Therefore, some of the books of the Bible are inspired.

G. OTHER MISCELLANEOUS RULES:

1. IF ONE OF THE PREMISES IS NEGATIVE, THE CONCLUSION MUST BE NEGATIVE. (See rule #5)

2. IF THE TWO PREMISES ARE AFFIRMATIVE, THE CONCLUSION MUST BE AFFIRMATIVE (See rule #4)

3. IF ONE OF THE PREMISES IS PARTICULAR, THEN THE CONCLUSION MUST BE PARTICULAR

4. IF BOTH PREMISES ARE UNIVERSAL, THEN THE CONCLUSION MUST BE UNIVERSAL (IT CANNOT BE PARTICULAR)