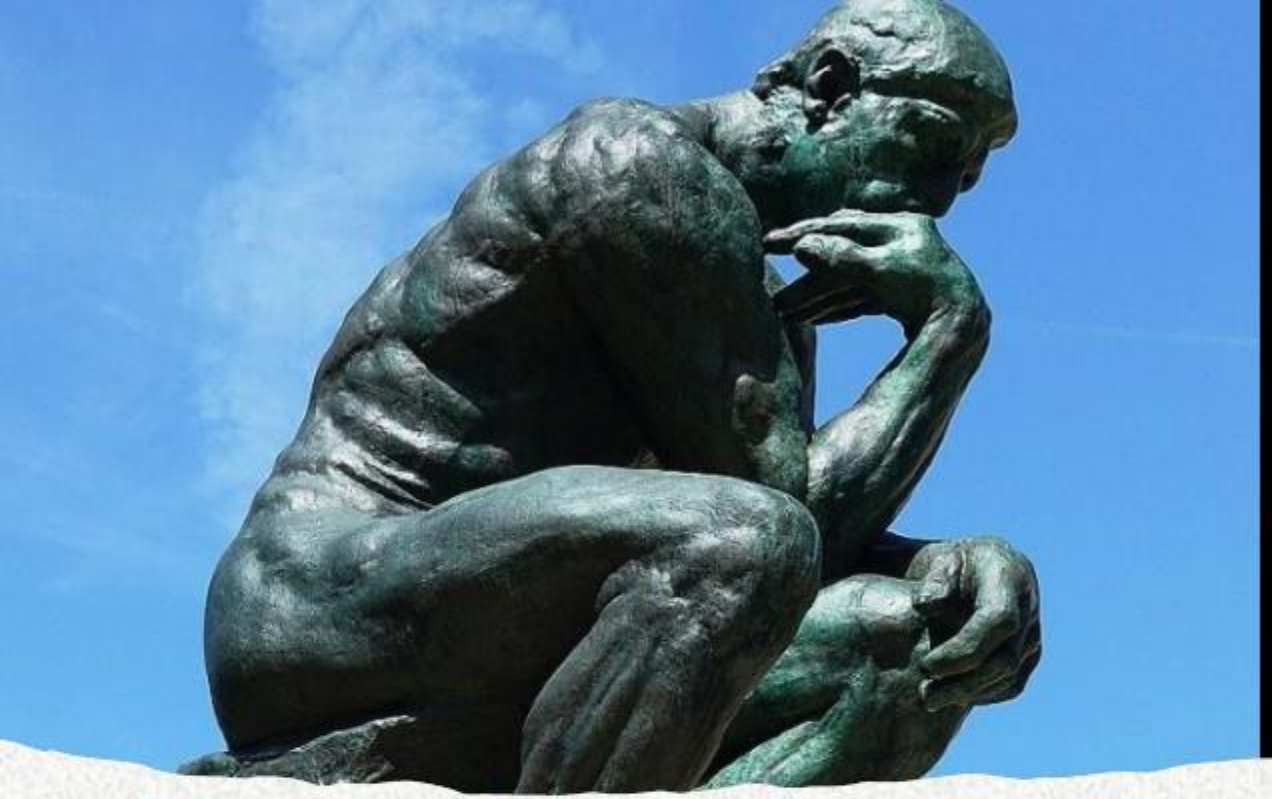

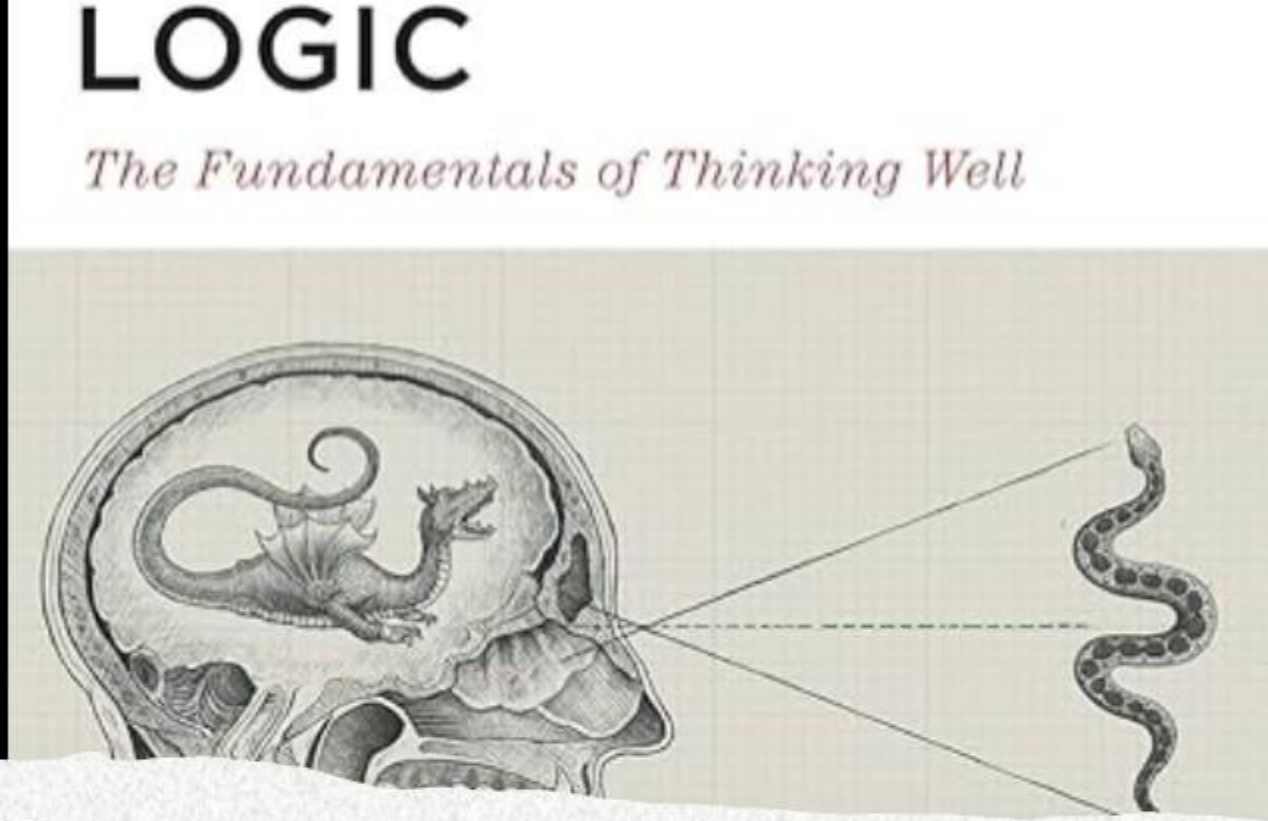

Come Let Us Reason Together: Learning To Love God With All Thy Mind

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Distributed Terms & Testing Syllogisms By Rules

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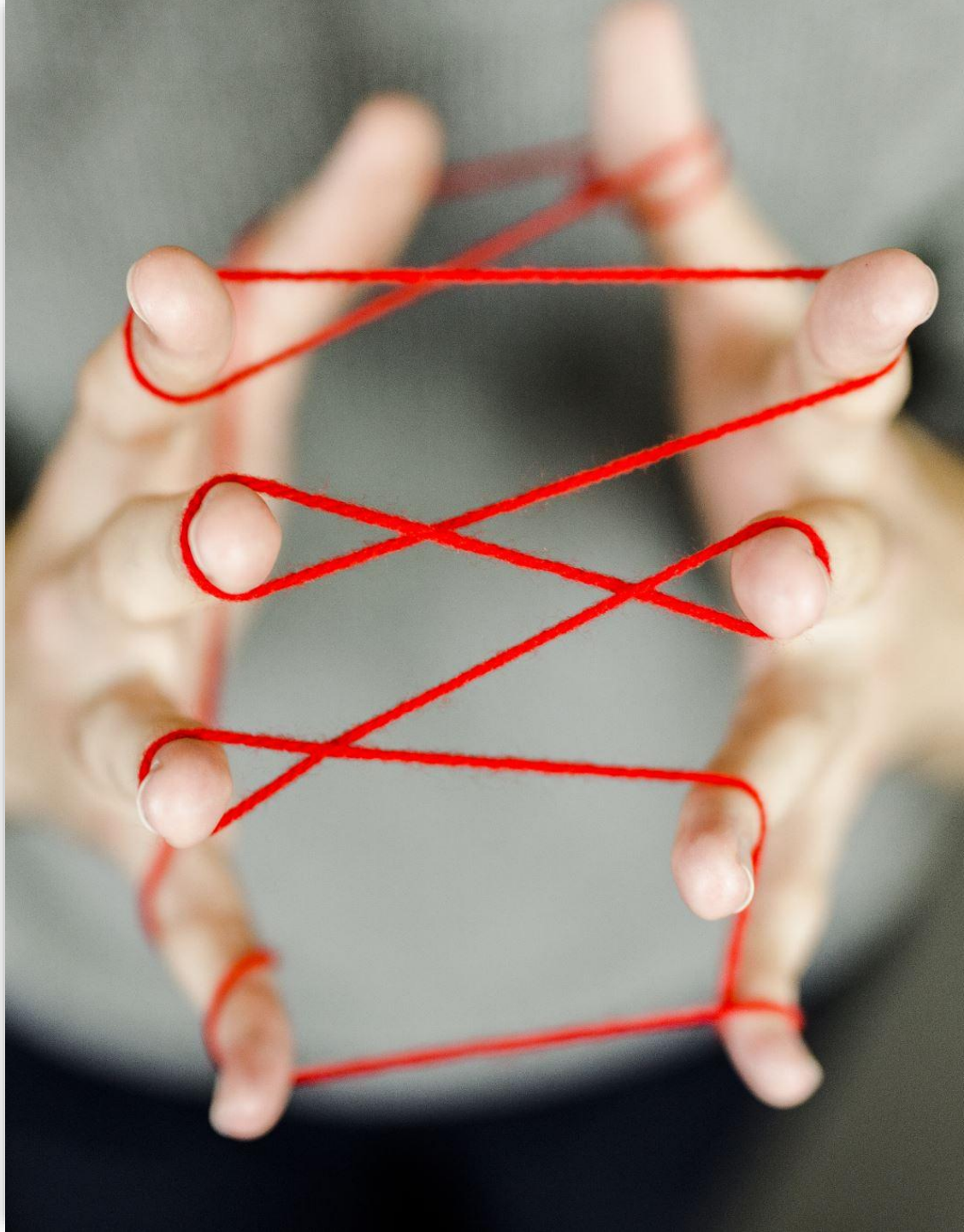
Distributed Terms

- We have seen that counterexamples are one method for determining the invalidity of syllogisms.
- This method is not very helpful when the syllogism happens to be valid.
- Because of this, we need another method for testing syllogisms for validity.
- A second, rules-based method, centers around understanding distributed terms.
- The terms in a syllogisms are said to be either distributed or undistributed.
- By distributed term, we mean that the term refers to all members of its category. We can tell if a term is distributed or not simply by its placement in a categorical statement.



Distributed Terms

- *All S are P (A)*—Here *S* is distributed, and *P* is undistributed. The *S* refers to all of its class, the *P* does not. The statement *All dogs are mammals* says something about all members of this subject class, all dogs, but it does not refer to all members of its predicate class. It does not say anything about all mammals. It only says that some of them are dogs.
- *No S are P (E)*—Both *S* and *P* are distributed. *S* refers to all of its class, and so does *P*. For example, the statement *No dogs are cats* makes a claim about all dogs (they are not cats) and about all cats (they are not dogs).
- *Some S are P (I)*—Both *S* and *P* are undistributed. No claim is being made about every *S* or every *P*. It only says that some of the *S* are *P*, and that some of the *P* are *S*.

Distributed Terms

- *Some S are not P (O)*—*S* is undistributed, and *P* is distributed. Consider the
  O statement *Some astronauts are not men*. This statement says nothing about all astronauts. It only says that some of them are not men. However, it does make a claim about all men. This claim is that all men are not those astronauts being referred to in the subject (namely, female astronauts).
- It may help you to remember that the subjects of universal statements are distributed (by definition of “universal”) and the predicate of negative statements are also distributed.

Practice

- Underline the distributed terms in the following statements.
  - Some athletes are not honors students.
  - No clear liquid is a solid object.
  - Some politicians are corrupt men.
  - All chefs are contented people.
  - No Bible reader is an ignorant person.
  - Some millionaires are not lazy men.
  - Some Baptists are immersionists.
- Underline the distributed terms in the following syllogism.
  - No wind instruments are guitars.
  - All wind instruments are expensive instruments.
  - Therefore, no expensive instrument is a guitar.

Practice

- Underline the distributed terms in the following syllogism.
  - Some colds are not fatal diseases.
  - All cancers are fatal diseases.
  - Therefore, some cancers are not colds.

Testing Syllogisms By Rules

- There are five rules for testing the validity of syllogisms. If any of these rules are violated, then a syllogism is invalid. If the syllogism passes all five, then its valid.
- Rule 1—In at least one premise, the middle term must be distributed.
- Rule 2—If a term is distributed in the conclusion, it must also be distributed in its premise.
- Rule 3—A valid syllogism cannot have two negative premises.
- Rule 4—A valid syllogism cannot have a negative premise and an affirmative conclusion.
- Rule 5—A valid syllogism cannot have two affirmative premises and a negative conclusion.

Testing Syllogisms By Rules

- Compare the last three rules. If you give them some thought, you should recognize an implication of rules 3 and 5: If a syllogism has a negative conclusion, then one premise must be affirmative and the other negative.
- You should also see from rule 4 that if a syllogism has an affirmative conclusion, then it must have two affirmative premises.
- So, these last three rules (3-5) can be combined even more briefly into this denser “rule”: The number of negative conclusions in a syllogism must equal the number of negative premises.
- If a syllogism has zero negative conclusions (i.e., an affirmative conclusion), then it must have exactly one negative premise.

Testing Syllogisms By Rules

- **Rule 1—In at least one premise, the middle term must be distributed.**
- This means that the middle term must be either the subject of an A statement, the subject or predicate of an E statement, or the predicate of an O statement.
- Below is a small paradigm showing which terms are distributed or undistributed in categorical statements.

	S	P
A	D	U
E	D	D
I	U	U
O	U	D

Testing Syllogisms By Rules

- When you are examining a syllogism, the first rule is applied by looking at what type of statement the middle term is in. For example, consider the following syllogism:
  - All men are mortals.
  - No mortals are angels.
  - Therefore, some angels are not men.
- The middle term is angels because it appears in both premises.
- The middle term occurs in two types of statements, A and E. NO the middle term is not distributed in the A statement, because it is the predicate. It is distributed in the E statement, because both terms are distributed in an E statement.
- The syllogism therefore passes the first test. When this rule is broken, it is known as the **Fallacy of the Undistributed Middle**.

Testing Syllogisms By Rules

- Here is an example in which the fallacy is made:
  - All men are created beings.
  - Some created beings are angels.
  - Therefore, some angels are men.
- The middle term, *created beings*, is not distributed in either premise. Thus, this syllogism is invalid; it has an undistributed middle.
- If the middle term is undistributed in both, meaning that in neither premise does it refer to all of its members, then no necessary connection is being made between the premises.
- In the example, the *created beings* of the major premise is a separate class from the *created beings* of the minor premise. The only way a connection is necessarily made between the two premises is for the middle term to be distributed in at least one of them.

Testing Syllogisms By Rules

- **Rule 2—If a term is distributed in the conclusion, it must also be distributed in its premise.**
- This rule is a result of the more general rule that, in a valid syllogism, the conclusion cannot go beyond the premises. If a term in the conclusion refers to all members of a particular class (i.e., the term is distributed), then the term in its premise must refer to all members of its class.
- This rule can be illustrated by looking again at the first example under rule 1. The conclusion is an O statement. By looking at our paradigm, we can see the predicate of an O statement is distributed. That term must therefore be distributed in the premise in which it occurs.
- When this rule is broken it can have two names. If the major term is distributed in the conclusion, but not in the premise, it is known as the **Fallacy of an Illicit Major**. Predicably enough, if the minor term is distributed in the conclusion, but not in the premise, it is known as the **Fallacy of an Illicit Minor**.

Testing Syllogisms By Rules

- Here is an example of an illicit major:
  - Some rocks are granite.
  - No granite is a sandstone.
  - Therefore, some sandstones are not rocks.
- Your see that the major term, rocks, is distributed in the conclusion, but it is not distributed in its premise. So this syllogism is invalid.
- **Rule 3—A valid syllogism cannot have two negative premises**.
- Any syllogism that has only E or O statements as premises is therefore invalid. The following combinations of premises are therefore invalid: OO, OE, EO, and EE. One of the premises must affirm something. If they are both negations, no valid conclusion can be drawn.
  - Some Turks are not Muslims.
  - No Hindus are Muslims.
  - Therefore, some Hindus are not Turks.
- The premises are O and E statements, which are both negative. If the rule is broken, we say that it is the **Fallacy of Two Negative Premises**.

Testing Syllogisms By Rules

- **Rule 4—A valid syllogism cannot have a negative premise and an affirmative conclusion.**
- The first thing to do is determine the nature of the conclusion. If it is affirmative (A or I), then it cannot have an E or O statement in the premises.
  - All Turks are Muslims.
  - No Hindus are Muslims.
  - Therefore, some Hindus are Turks.
- This syllogism breaks the fourth rule. The conclusion is affirmative (an I statement), and the minor premise is a negative premise (an E statement). In testing this rule, look first at the conclusion. If it is affirmative, quickly scan the premises and determine if either is negative. If one is, then the syllogism is necessarily invalid.
- Any syllogism that breaks this rule may be said to commit the **Fallacy of a Negative Premise and an Affirmative Conclusion**.

Testing Syllogisms By Rules

- **Rule 5—A valid syllogism cannot have two affirmative premises and a negative conclusion**.
- With this rule, the means of testing is similar to the means with the fourth rule. If the conclusion is negative, then one of the premises must also be negative.
  - All whales are mammals.
  - No canaries are mammals.
  - Therefore, some canaries are not whales.
- We see right away that the conclusion is negative. This means that one of the premises has to be negative as well, which the minor premise is. Here is an example that breaks this rule:
  - All whales are sea creatures.
  - Some sea creatures are warm-blooded animals.
  - Therefore, no warm-blooded animals are whales.
- When this rule is broken, the syllogism makes the **Fallacy of Two Affirmative Premises and a Negative Conclusion**.

Summary

- In Testing by rule, there are five rules to keep in mind. If a syllogism breaks just one rule, it is invalid.
- If it passes all five, it is necessarily valid.
- There are two rules that involve distributed terms: the middle must be distributed in at least one premise, and if the term is distributed in the conclusion, then it must be distributed in the premise in which it occurs.
- The last three rules involve the quality of the statements.
- A valid syllogism cannot have two negative premises, it cannot have a negative premise with an affirmative conclusion, and it cannot have two affirmative premises and a negative conclusion.

Works Cited

Introductory Logic: The Fundamentals of Thinking Well. Moscow, ID: Canon Press, 2014.