Categorical Syllogism

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Mediate Inference

In mediate inference conclusion draw from two and more than two premises. Both premises jointly imply the conclusion.

**Syllogism:** A syllogism is a form of mediate deductive inference, in which the conclusion is drawn from two premises take jointly. There are three major types of syllogism:

- Conditional syllogism
- Categorical syllogism
- Disjunctive syllogism
A categorical syllogism is a deductive argument consisting of exactly three categorical propositions (two premises and a conclusion) in which there appear a total of exactly three categorical terms, each of which is used exactly twice.
Standard Form

- In a standard form categorical syllogism, major premise comes first, then the minor premise occurs and conclusion comes in the end. Standard form order of a syllogism is the following format:

  - *Conclusion*: based on the two premises.

- Consider, for example, the categorical syllogism:
  - No geese are felines.
  - Some birds are geese.
  - Therefore, Some birds are not felines.
Terms Used in Categorical Syllogism

- A syllogism contains exactly three terms or class names:
  - **Major Term/Major Premise:** The major term is the term that occurs as the predicate of the conclusion in a standard-form syllogism.
  - The major premise is the premise that contains the major term.
  - **Minor Term/Minor Premise:** The minor term is the term that occurs as the subject of the conclusion in a standard form syllogism.
  - The minor premise is the premise that contains the minor term.
  - **Middle term:** The term that occurs in both premises, but not in the conclusion, of a standard form syllogism.
Syllogistic Moods

Logicians also speak of syllogistic moods. Moods are defined as the arrangement of the premises according to quantity (universal or particular) and quality (affirmative or negative). In other words, we can say that mood is determined by the type of standard form categorical propositions of the syllogism contains. Example:

- A- All M is P.
- A- All S is M.
- A- All S is P.
- So, AAA is the mood of this syllogism.

Now we will see what rules govern each figure and how these rules affect the validity of the single moods.
The figure of a syllogism, determined by the positions of the middle term in its premises; there are four possible figures. When we use the term “syllogistic figure” we understand the disposition of the middle term (M) with respect to the major (P) and minor terms (S) in the premises of a syllogism.

The minor term (S) is always the subject and the major term (P) is always the predicate of the conclusion. Whatever variations that can take place in the relative position of the terms among themselves must occur in the premises.
In the major premise the middle term is compared with the major extreme. In the minor premise the middle term is compared with the minor extreme. This gives four different syllogistic figures:

**First Figure**

- M P  All animals (M) are a nuisance (P).
- S M  All dogs (S) are animals (M).
- S P  Therefore, All dogs (S) are a nuisance (P).

The middle term is the subject of the major premise and the predicate of the minor premise.
Second & Third

- **Second Figure**
  - P M : No statesmen are good politicians.
  - S M : Some journalists are good politicians.
  - S P : Therefore, Some journalists are not statesmen.
  
  The middle term is the predicate of both premises.

- **Third Figure**
  - M P All writers are intelligent.
  - M S Some writers are American citizens.
  - S P Therefore, Some American citizens are intelligent.
  
  The middle term is the subject of both premises.
Fourth Figure

- P M  All Americans are happy people.
- M S  All happy people are fun-loving.
- S P  Therefore, Some fun-loving people are Americans.

The middle term is the predicate of the major premise and the subject of the minor premise.
The First Figure has been considered to be the perfect syllogism because it is the way we tend to make statements normally and naturally. The other three figures, however, are correct forms of syllogistic reasoning, even if they seem to be somewhat stilted and unnatural.

**Rule of remind figures:** SPIRIT OPPRESSED THE PSALMIST.

Meaning: SP - First figure, PP - Second figure, SS – Third figure and PS - Fourth figure.
Aristotle and other traditional logicians provided certain rules which determine the validly/invalidity of syllogism. Here are some rules to check the validity of a syllogism.

**Rule 1: Avoid Four Terms**

**Fallacy:** *Fallacy of four terms* (A formal mistake in which a categorical syllogism contains more than three terms.)
Second Rule

- Rule 2: The middle term must be distributed at least once.
- Fallacy: Undistributed middle (A formal mistake in which a categorical syllogism contains a middle term that is not distribute in either premise.)
Third Rule

- Rule 3: If a term is distributed in the conclusion, then it must be distributed in a premise.

- Fallacy: *Illicit major* (A formal mistake in which the major term of a syllogism is undistributed in the major premise, but is distributed in the conclusion.)

- *Illicit minor* (A formal mistake in which the minor term of a syllogism is undistributed in the minor premise, but is distributed in the conclusion.)
Fourth Rule

- Rule 4: No conclusion drawn from two negative premises.
- Fallacy: *Exclusive premises* (A formal mistake in which both premises of a syllogism are negative)
Fifth Rule

- Rule 5: A negative premise requires a negative conclusion, and a negative conclusion requires a negative premise. (Alternate rendering: Any syllogism having exactly one negative statement is invalid.)

- Fallacy: Drawing an affirmative conclusion from a negative premise, or drawing a negative conclusion from an affirmative premise. (A formal mistake in which one premise of a syllogism is negative but the conclusion is affirmative.)
Sixth Rule

- Rule 6: If both premises are universal, the conclusion cannot be particular. And also there is no conclusion from two particular premises.

- Fallacy: *Existential fallacy* (As a formal fallacy, the mistake of inferring a particular conclusion from two universal premises.)
Validity of Syllogism through Venn Diagrammes

- The modern interpretation offers a more efficient method of evaluating the validity of categorical syllogisms. By combining the drawings of individual propositions, we can use Venn diagrams to assess the validity of categorical syllogisms by following a simple three-step procedure:
Steps

- Draw three overlapping circles and label them to represent the major, minor, and middle terms of the syllogism.
- Draw the diagrams of both of the syllogism’s premises. Two things always remember: (i) Always begin with a universal proposition, no matter whether it is the major or the minor premise. (ii) Remember that in each case you will be using only two of the circles in each case; ignore the third circle by making sure that your drawing (shading or ×) straddles it.
- Without drawing anything else, look for the drawing of the conclusion.
- If conclusion draws, then the syllogism valid.
- If No, then the syllogism invalid.
Examples

Here are the examples of several other syllogistic forms. In each case, both of the premises have already been drawn in the appropriate way, so if the drawing of the conclusion is already drawn, the syllogism must be valid, and if it is not, the syllogism must be invalid.
Exercises

- **Example of Valid Syllogism - AAA**
  - All M are P.
  - All S are M.
  - Therefore, All S are P.

- **Example of Invalid Syllogism - AAA**
  - All M are P.
  - All M are S.
  - Therefore, All S are P.
Conclusion

- In this topic we have discussed about Categorical Syllogism with its explanation and exercises.

References:

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